FINAL

REPORT

Highway 401 and Fraser Road Underpass (Site No. 31X-0230/B0) Replacement, Detail Design and Class Environmental Assessment Study GWP 4248-15-00

Design and Construction Report

Submitted to:

ONTARIO MINISTRY OF TRANSPORTATION
EAST REGION

Submitted by:

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221-08798-00

April 1, 2026

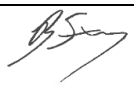
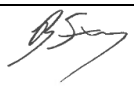


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Executive Summary

The Ministry of Transportation (MTO) retained WSP Canada Inc. (WSP) to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project).

This Design and Construction Report (DCR) presents the results of the Detail Design component of the Environmental Assessment study, which was completed in accordance with the approved environmental planning process for Group 'B' undertakings under the MTO's Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000).

The purpose of this Detail Design study is to develop the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction.

Opportunities to provide input were made available to the Township of South Glengarry, the United Counties of Stormont, Dundas and Glengarry (SDG), external agencies, emergency service providers, utilities, Indigenous communities, local elected representatives, interest groups, landowners and members of the public throughout the duration of the Detail Design and Class EA study. The consultation process included distribution of notification materials, newspaper notices, and stakeholder meetings.

Recommended Plan

The Recommend Plan for the replacement of the Fraser Road Underpass includes the following components:

- Replacement of the existing underpass along the existing horizontal alignment:
  - Construct containment platforms to control debris, rubble, and concrete effluent.
  - Rapid bridge removal and demolition.
  - Install abutment piles & pier caissons and construct bridge sub-structure (footings, pier, abutments and wingwalls).
  - Girder fabrication and erection.
  - Construct superstructure (bridge deck, parapet walls, approach slabs)
  - Bridge deck waterproofing, pave, and form & fill grooves.
- Reconstruction of Fraser Road to accommodate the vertical grade raise and new structure profile:
  - Clearing, grubbing, topsoil stripping and benching slopes for embankment widening.

- Install Expanded Polystyrene (EPS) lightweight fill at new abutments.
- Hot mix paving, shouldering, guide rail replacement, and pavement marking.
- Landscaping: tree planting, topsoil, seed, mulch, erosion control blankets (ECB).
- Drainage improvements:
  - Abandon existing catch basins on bridge approaches, install new curb and gutter with outlet at newly constructed rip-rap spillways.
  - Culvert replacement.

Implementation of the replacement of the Fraser Road Underpass will be conducted in two stages. One stage will construct the new centre pier in the median. The other stage will allow for the removal of the intermediate piers and the construction of new slope paving.

Environmental Issues and Commitments

Terrestrial Environment

Vegetation removal is anticipated where embankment widening will occur (rights-of-way adjacent to Fraser Road as far north as Raisin River Road and as far south as Airport Road). Impacts to four Species At Risk (SAR) are expected, including Little Brown Myotis (*Myotis lucifugus*), Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), and Eastern Red Bat (*Lasiurus borealis*). Anthropogenic structures in the study area, including the bridge, were found to provide suitable habitat for nesting of Barn Swallow and Cliff Swallow. Three types of candidate Significant Wildlife Habitat have been identified as potentially occurring within the study area: Colonially-nesting Bird Breeding Habitat (Trees/shrubs), Bat Maternity Colonies, and Amphibian Breeding Habitat (Woodland).

Common Reed is present within the Study Area on the western side of Airport Road where it meets Fraser Road (**Appendix B, Figure 3**). While not directly impacted by the construction works, this stand has been identified for removal as it is a small, isolated patch. Two (2) additional stands can be found in the northwest quadrant of the Fraser Road underpass and southeast quadrant. These stands will be impacted by construction of the emergency access from Highway 401 to Lapierre Road and Highway 401 ditching operations, respectively.

Erosion and Sediment Control

Disturbance of sediment during construction will increase the potential for erosion and movement of sediment into watercourses and wetlands present outside of the study area.

Contamination

An Assessment of Past Uses (APU) was completed and recommended that an excess soil sampling program be completed. The implementation of the soil quality assessment program is planned for early 2026. Following implementation of the sampling program, a Soil

Characterization Report (SCR) will be developed to document the findings. The estimated quantity of excess soil to be generated during construction activities is anticipated to be under 2000 m^3 based on design estimates.

Groundwater

Based on the Foundation Investigation and Design Report (WSP, 2024) and given that the adopted groundwater level was 49.9 masl, some dewatering for construction of the proposed new abutments is anticipated to be required. During dewatering and some time after, settlement may occur in saturated unconsolidated soils within a radius of influence due to dewatering. As a result, utilities and underground structures/infrastructure may be at risk when lowering water levels or depressurizing an aquifer. The maximum construction dewatering radius of influence is anticipated to be 6.5 m from the excavation boundary of the new pier and 3.6 m from the excavation boundary for the new pier and the new abutments. None of the identified water supply wells are located within the estimated radius of influence of the proposed water taking. Based on this assessment, no impacts to groundwater users are expected as a result of the proposed groundwater taking.

Landscape

Twenty-three (23) trees, including three (3) dead trees, are located within the limits of excavation and proposed fill. Excavation, grading and fill will significantly affect the critical root zone of trees. Twenty-one (21) trees have been recommended for removal, including three (3) dead trees. Additional tree removals may be required when Grading/Servicing and Detailed Site Plans become available. Two (2) trees will be preserved.

Traffic

The proposed construction staging and temporary traffic control for this assignment includes a long-term full closure of traffic on Fraser Road and a short-term full closure of Highway 401, as well as temporary lane closures, lane restrictions and rolling closures along Highway 401.

Whilst Fraser Road is closed, a signed detour route will be available along Airport Road, County Road 27, Gore Road, Kraft Road, and Diversion Road. It will take approximately 15-minutes to navigate the 14 km signed detour route. Due to low traffic volumes, the level of service will not be impacted along Airport Road, County Road 27, Gore Road, Kraft Road, and Diversion Road.

During the closure of Highay 401, traffic will be diverted approximately 16.5 km along the established Emergency Detour Route (EDR) on County Road 2

Utilities

ON1CALL locates conducted in Sept 2024 and July 2025 indicate two (2) underground BELL conduits running parallel to Highway 401 in proximity to the existing south abutment. Field investigations were undertaken in August 2025 to determine the location of the Bell plant. The

investigations found that there is only a single alignment for the Bell plant containing the BELL FOTS, and the copper line crosses to the north side of Highway 401 somewhere west of Fraser Road. MTO provided Bell Canada with forecasted settlement values along the alignment of the buried Fibre Optic line. Bell Canada reviewed the technical package and confirmed that the predicted settlements won't negatively impact the cable.

Existing aerial powerlines cross Fraser Road at approximately Sta. 10+264, and cross Airport Road at approximately Sta. 2+966. The proposed grade raise along Fraser Road will reduce the vertical clearance at existing aerial utility crossing.

Archaeological Resources

Despite the presence of archaeological potential within the Study Area, no archaeological resources were identified during the Stage 1-2 AA fieldwork. Consequently, the Stage 1-2 AA recommended that no further AA is required within the Study Area.

Environmental Effects, Proposed Mitigation, Commitments to Future Work

Following the 30-day comment period of the DCR and the 30-day review period by MECP, MTO may proceed to construction as outlined in the Class EA for Provincial Transportation Facilities, 2000. Mitigation measures and commitments to future work include:

- It is recommended that all tree removals and bridge demolition activities take place outside of the SAR bat active period (April 1 to November 30) and the breeding bird active period (April 1 to August 31).
- Activities related to the abandoning of the existing 1500 mm corrugated steel pipe (CSP) culvert at the south abutment should occur outside of the migratory bird nesting season (April 1 - August 31). If the project cannot accommodate this timing window, a nest survey (i.e., nest sweep) can be conducted by a qualified Biologist. Once the nest survey is complete and no nests are identified inside the culvert, the assessment will be valid for 48 hours, and culvert filling and/or other culvert activities should begin within that 48-hour window, otherwise another nest survey will be required.
- The Contractor will consider the use of:
  - Sediment traps for dewatering with Straw Bales (OPSD 219.241),
  - Discharging submersible pumps into a geotextile filter bag.
- Tree protective hoarding is to be installed for two (2) trees where the construction limits encroach into their respective tree protection zone (TPZs).
- A Traffic Management Plan will be implemented to minimize the impacts of closures.
- An Operational Constraint shall be included in the tender document to advise the Contractor of the presence of various utilities within the work area, and that various mitigation and protection measures may be necessary, as well as the requirement to verify the location of all utilities and applicable measures in coordination with the appropriate utility company prior to proceeding with work.
- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licenced consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).
- To minimize impacts on adjacent residents, the following best practices related to noise should be in place during construction:

- All equipment shall 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.

All environmental concerns and commitments identified during Detail Design are summarized in **Table 5-1.**

Public Record

A copy of this document has been submitted electronically to the Eastern Region district office of the Ontario Ministry of the Environment, Conservation and Parks (MECP) to fulfill the requirements of the Ministry of Transportation Class Environmental Assessment for Provincial Transportation Facilities (2000).

This Design and Construction Report is available for a 30-day comment period starting **April 1, 2026**, and ending **April 30, 2026**, on the project website (www.hwy401fraserrdunderpass.com) and during regular business hours, at the public review location listed below:

Public Review Location:
Stormont, Dundas and Glengarry County Library – Lancaster Branch
195 Military Road, Lancaster
Ontario, K0C 1N0
Times:
Monday: 9:00 am to 2:00 pm
Tuesday to Thursday: 10:00 am to 8:00 pm
Friday: 12:00 pm to 5:00 pm
Saturday 10:00 am to 2:00 pm
Sunday: Closed
Website:
www.hwy401fraserrdunderpass.com
E-mail:
project-team@hwy401fraserrdunderpass.com

The Project Team will respond to all comments generated during the 30-day public comment period. In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

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

The request should be sent in writing or by email to the following:

Minister of the Environment, Conservation and Parks

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

Director, Environmental Assessment Branch

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

Persons requiring accommodation to review these materials are encouraged to contact the Project Managers in the Notice to discuss accessibility requirements.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

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1 OVERVIEW OF THE UNDERTAKING

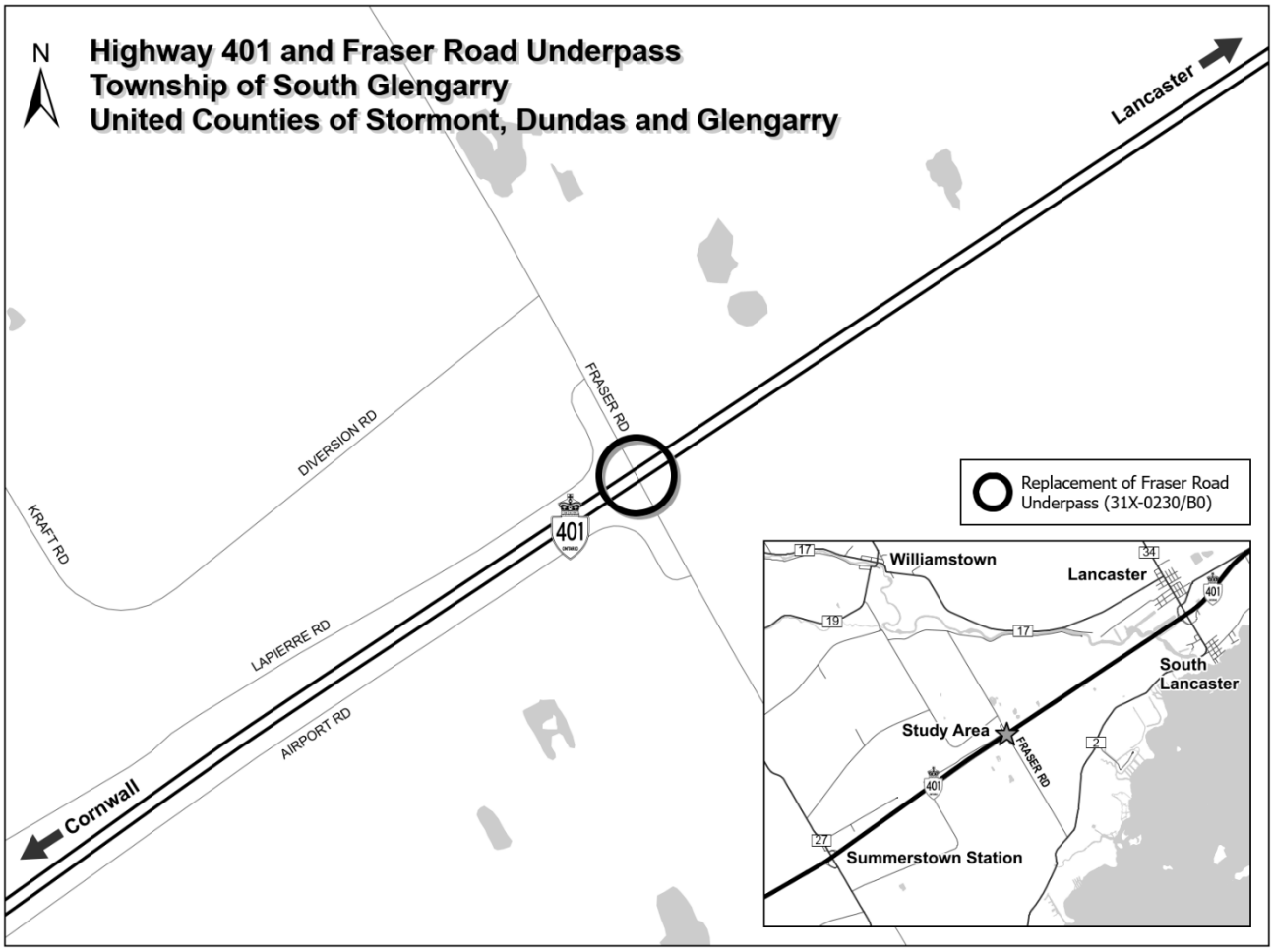
1.1 Introduction

The Ontario Ministry of Transportation (MTO) has retained WSP Canada Inc. (WSP) to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). A Preliminary Design Study and Transportation Environmental Study Report were completed in 2020 which evaluated alternatives and recommended replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. The replacement bridge is to be built to accommodate the future Highway 401 footprint (six (6) lanes) consisting of one (1) additional outside lane in each direction. The Project location is shown in **Figure 1-1**. The timing for the future Highway 401 footprint construction is unknown and depends on provincial priorities and funding.

The Project includes the following components:

- Replacement of the existing underpass along the existing horizontal alignment:
  - Construct containment platforms to control debris, rubble, and concrete effluent.
  - Rapid bridge removal and demolition.
  - Install abutment piles & pier caissons and construct bridge sub-structure (footings, pier, abutments and wingwalls).
  - Girder fabrication and erection.
  - Construct superstructure (bridge deck, parapet walls, approach slabs)
  - Bridge deck waterproofing, pave, and form & fill grooves.
- Reconstruction of Fraser Road to accommodate the vertical grade raise and new structure profile:
  - Clearing, grubbing, topsoil stripping and benching slopes for embankment widening.
  - Install Expanded Polystyrene (EPS) lightweight fill at new abutments.
  - Hot mix paving, shouldering, guide rail replacement, and pavement marking.
  - Landscaping: tree planting, topsoil, seed, mulch, erosion control blankets (ECB).
  - Drainage improvements:
    - Abandon existing catch basins on the bridge approaches, install new curb and gutter with outlet at newly constructed rip-rap spillways.
    - Culvert replacement.

Figure 1-1: Highway 401 and Fraser Road Underpass



The purpose of this Detail Design study is to develop the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction.

This Design and Construction Report (DCR) presents the results of the Detail Design component of the Environmental Assessment study, which was completed in accordance with the approved environmental planning process for Group ‘B’ undertakings under the MTO’s Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000).

The purpose of this DCR is to document the study process, existing conditions within the project limits, feedback received through consultation activities, the Detail Design of the Recommended Plan, potential environmental impacts, and proposed mitigation measures.

1.2 Project Background

In November 2020, the Ministry of Transportation (MTO) initiated a Preliminary Design Study to determine the appropriate strategy for the replacement of Fraser Road Underpass at Highway 401. Fraser Road is a two-lane road, designated as “Rural Collector Undivided” with a design speed of 70 km/h within the study area. The speed limit is currently unposted at the site, and the Township of South Glengarry has agreed to post the speed at 60 km/h following construction. Fraser Road provides a “flyover” of Highway 401 and access to Highway 401 is not provided.

The Fraser Road underpass was constructed in 1968. The structure underwent rehabilitation in 1975, consisting of waterproofing and paving of the deck, and installing a modified WABO strip seal expansion joint above the original neoprene seals. In 1984, the asphalt and waterproofing system was replaced, and new Type-C expansion joints were installed. In 2009, the exterior girders were repaired following a high load strike which included repair of nine (9) prestressing tendons, partial depth concrete repairs, and carbon fibre-reinforced polymer wrap.

The detail design study is being undertaken due to the following characteristics of the structure:

- Nearing the end of its service life (in service for 56 years)
- Substandard vertical clearance resulting in high load strikes
- Seismic upgrades required to meet current design standards
- Existing span configuration will not accommodate the future 6-lane footprint of Highway 401

1.3 Purpose of the Design and Construction Report

This DCR has been prepared in accordance with the requirements of the approved environmental planning process for Group ‘B’ undertakings under the MTO Class EA. The DCR is a public-facing document that is intended to document the following:

- Description of the project and its purpose;
- Transportation engineering and environmental issues/constraints;
- Changes in existing environmental conditions from those documented in Preliminary Design;
- Environmental concerns and commitments;
- Anticipated environmental impacts and commitments to mitigation measures (to be included in the contract documents);
- Description of the consultation program carried out during Detail Design;
- Identification of all project approvals, licenses and permits that must be obtained prior to construction;

- Implementation of the commitments to further work contained in the Transportation Environmental Study Report (TESR), including any environmental effects monitoring that is required; and
- Construction documentation, as required.

The completion of the DCR marks the final task in the Detail Design portion of the EA process. A Notice of Completion has been published to mark the start of the 30-day public comment period. The notice identifies the start and end dates for the DCR comment period, the publication details on the project website, as well as the address and hours of operation for the physical review location.

The Project Team is available to discuss information provided within this report or other project-related inquiries and can be contacted as follows:

- **Carmen Lapointe, P.Eng., PMP**

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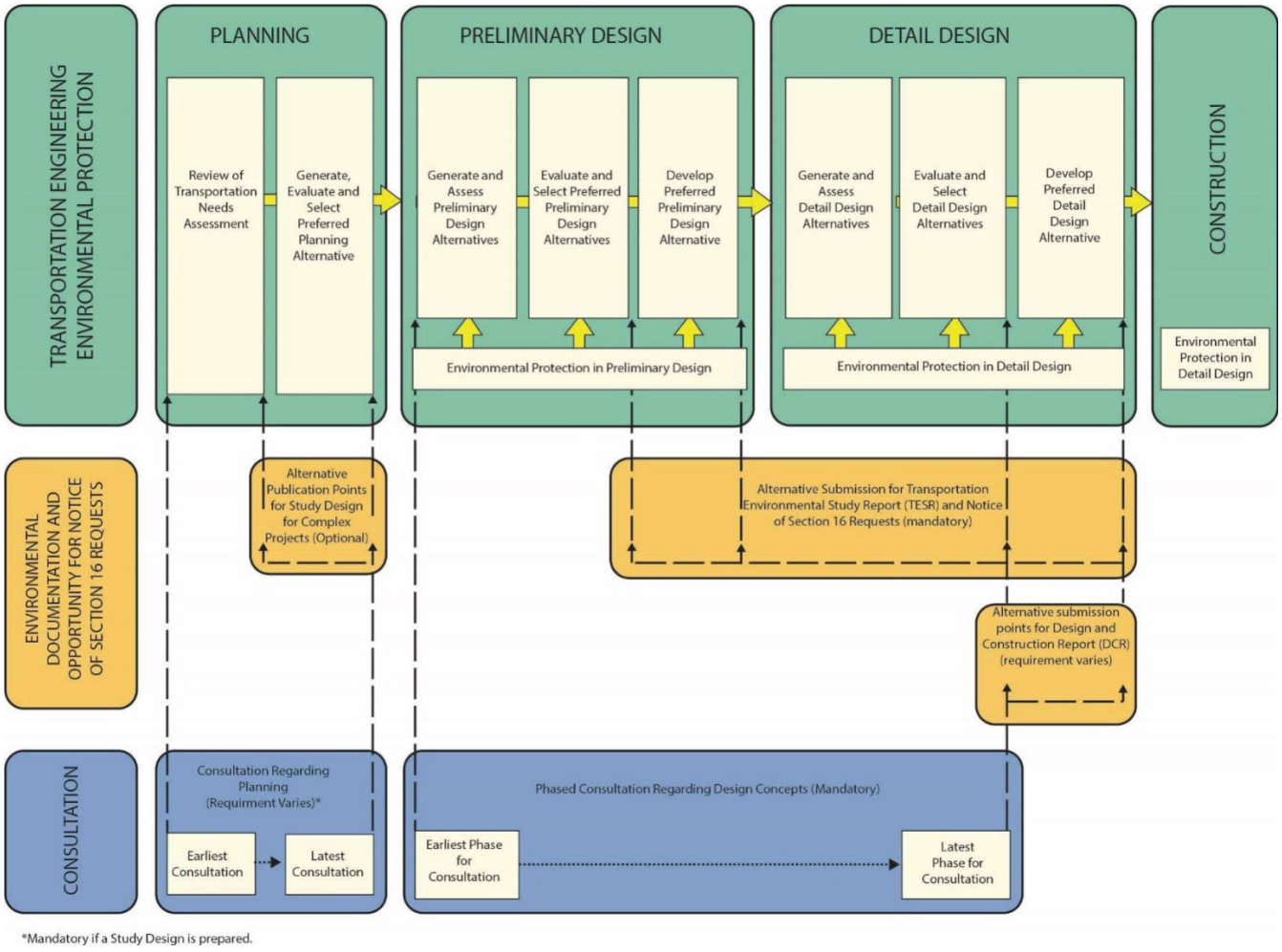
2 ENVIRONMENTAL ASSESSMENT PROCESS

2.1 Ontario Environmental Assessment Act

The Ontario Ministry of Transportation's Class Environmental Assessment for Provincial Transportation Facilities (Class EA) was approved under the Ontario *Environmental Assessment Act* in the fall of 1999 and amended in 2000. The planning report outlines the Class EA process that MTO has committed to follow to plan, design and implement the proposed Fraser Road Underpass Replacement at Highway 401. Provided that this process is followed, projects and activities included under the MTO Class EA do not require formal review and approval under the EAA.

The Detail Design study for the Fraser Road Underpass Replacement followed the MTO Class EA process for a Group 'B' project under the Ontario *Environmental Assessment Act* (2000). Group 'B' projects generally include highway realignments; improvements to existing highways; new interchanges or modifications to existing interchanges; new or modified; and new highway service facilities. Group 'B' projects are generally similar in natures, occur frequently, and have a predictable range of environmental effects for which standard mitigation can be used. The MTO Class EA process for Group 'B' projects is shown in **Figure 2-1**.

Figure 2-1: Overview of the Class EA Process for Group 'B' Projects



3 CONSULTATION PROCESS

Consistent with the requirements for Group 'B' undertakings under the MTO Class EA, consultation with federal and provincial agencies, the Township of South Glengarry, the United Counties of Stormont, Dundas and Glengarry, Indigenous communities, local elected representatives, interest groups, and members of the public was on-going throughout all stages of the project.

A comprehensive Consultation Plan was developed at the start of the study, which placed emphasis on consultation with stakeholders and members of the public that have the potential to be most directly affected by the project. The Consultation Plan was designed to involve stakeholders and the public early and throughout the study, identify public concerns and assist in the refinement of the Recommended Plan.

Stakeholders and the public were kept informed of the study and were asked for input through the use of conventional, effective consultation methods including:

- Ontario Government Notices published in local newspapers;
- Delivery via Canada Post bulk advertising mail to all residents, property owners and businesses in the vicinity of the study area;
- Direct letter mailings to local elected representatives, municipalities, Indigenous communities, and external agencies (provincial and federal agencies, emergency services, school boards, interest groups and local businesses);
- Correspondence with local elected officials, Indigenous communities, external agencies and members of the public;
- Project website updates; and
- Filing of the DCR for a 30-day public comment period online and at the local review location.

As part of the project's consultation activities, a presentation was made by the Project Team to the Township of South Glengarry Council and meetings were held with the Township of South Glengarry, the United Counties of Stormont, Dundas and Glengarry, local EMS, CN Rail and utility companies.

- On July 14, 2025, MTO and WSP gave a presentation to the Township of South Glengarry Council to provide an overview of the project and to request Council support for the long duration closure and detour of Fraser Road. The request was deferred to Administration for a report at a future meeting.
- On July 21, 2025, MTO and WSP held a stakeholder consultation meeting with staff from the Township of South Glengarry, the United Counties of Stormont, Dundas and Glengarry, the Township of South Glengarry Fire Department, Cornwall SDG Paramedic Services,

Ontario Provincial Police, Canadian National Railway, and Student Transportation of Eastern Ontario. The purpose of the meeting was to provide an overview of the project and the proposed contingency EMS access between Highway 401 and LaPierre Road.

- On August 25, 2025, MTO and WSP met with CN Rail to discuss design tie-in near the CN rail line, traffic control and safety, and permitting requirements. Following the meeting, CN provided documentation which was included in the tender documents to direct the contractor.
- On November 6, 2025, MTO and WSP met with Bell Canada to present and discuss the results of a settlement analysis related to the Bell fibre optic line at the Fraser Road Bridge replacement location, outlining predicted settlements, technical constraints, and the need for Bell's engineering review to determine next steps. WSP provided Bell Canada with forecasted settlement values along the alignment of the buried Fibre Optic line. Bell Canada reviewed the technical package provided by WSP and confirmed that the predicted settlements won't negatively impact the cable and mitigation, reinforcement or relocation are not required.

3.1 Study Contact List

A contact list of local elected officials, Indigenous communities, provincial and federal agencies, local municipal government, emergency services, utilities, school boards, and interest groups and local businesses was developed at study commencement, building on contact lists from Preliminary Design. Over the course of the study, any individuals or organizations expressing interest in the project were added to the contact list. The contact list includes the following individuals and organizations:

Table 3-1: Study Contact List

Local Elected Representatives	MPP – Stormont–Dundas–South Glengarry Township of South Glengarry – Mayor Township of South Glengarry – Councillors United Counties of Stormont, Dundas and Glengarry – Warden
Provincial and Federal Agencies	CN Rail Ministry of Agriculture, Food and Agri-business Ministry of Citizenship and Multiculturalism Ministry of Natural Resources Ministry of the Solicitor General Ministry of the Environment, Conservation and Parks Ministry of Indigenous Affairs and First Nations Economic Reconciliation St. Lawrence Parks Commission Raisin Region Conservation Authority

Local Municipal Government	Township of South Glengarry: General Manager, Planning, Building and Enforcement General Manager, Infrastructure United Counties of Stormont, Dundas and Glengarry: Chief Administrative Officer Communications Coordinator Director, Transportation Director, Planning & Economic Development Director, Corporate Services
Emergency Services	Township of South Glengarry Fire Department Township Roads Emergency United Counties of Stormont, Dundas and Glengarry: Coordinator, Emergency Management Cornwall SDG Paramedic Services Paramedic Services Chief Deputy Chief, Operations Administrative Assistant Ontario Provincial Police (OPP) Stormont, Dundas and Glengarry (SDG) Lancaster Detachment
Utilities	Bell Canada Union Gas Cogeco Connexion Hydro One Networks Inc. Cornwall Electric (CE)
School Boards	Upper Canada District Schoolboard Catholic District School Board of Eastern Ontario Conseil des écoles publiques de l'Est de l'Ontario Conseil scolair de district catholique de L'Est ontarien Consortium de transport scolaire de l'Est Student Transportation of Eastern Ontario (STEO)
Interest Groups and Local Businesses	Ontario Trucking Association Ontario Federation of Snowmobile Clubs Ontario Federation of Agriculture Glengarry Federation of Agriculture

3.2 Notice of Study Commencement

On October 2, 2024, a Notice of Study Commencement letter was distributed to local elected officials by MTO. Indigenous communities were notified directly by MTO on October 2, 2024. All other contacts on the study contact list received notifications from WSP dated October 2, 2024. The purpose of the letter was to inform stakeholders of the project, as well as to provide

an opportunity to submit information, comments or questions regarding the project. A key map and a comment sheet that could be returned to the Project Team were enclosed with all letters.

Copies of the study commencement notices, letters, and enclosures are included in **Appendix A**.

3.3 Summary of Comments Received

A total of four (4) comments were received from stakeholders over the course of the study. A summary of all comments received and how they were addressed are included in **Appendix A**. Personal Information has been redacted in accordance with the *Freedom of Information and Protection of Privacy Act.*

Comments received generally included the following:

- Confirmation from Hydro One that there are no existing transmission assets in the project area.
- Request from the OPP to update the contacts to be included on the Contact List.
- Phone conversation between the owner of Petro-Pass Truck Stop and C. Lapointe to discuss the potential impacts on road closures of Highway 401 and Fraser Road.
- Request from a member of the public to be included on the Contact List.

3.4 Project Website

A project website (https://hwy401fraserrdunderpass.com) was created to provide project information, updates and documents to interested stakeholders. The website includes information on the project background, study area, study process, public involvement, the project schedule, and provides a comment submission tool.

3.5 Indigenous Consultation

The following Indigenous Communities were sent the Notice of Study Commencement directly by MTO on October 2, 2024:

- Mohawk Council of Akwesasne
- Métis Nation of Ontario

No comments were received from Indigenous Communities during this study.

3.6 Notice of Completion

On March 26, 2026, a Notice of Study Completion letter was distributed to local elected officials by MTO. Indigenous communities were notified directly by MTO on March 25, 2026. All other contacts on the study contact list received notifications from WSP dated March 30, 2026. The purpose of the letter was to inform stakeholders that the DCR was available for a 30-day public comment period, the publication details on the project website, and the address

and hours of operation of the review location (Stormont, Dundas and Glengarry County Library – Lancaster Branch, 195 Military Road Lancaster, Ontario K0C 1N0). A key map was enclosed with all letters.

Copies of the study completion notices, letters, and enclosures are included in **Appendix A**.

4 DETAILED DESCRIPTION OF THE RECOMMENDED PLAN

4.1 Major Features of Proposed Works

The Project includes the following components:

- Replacement of the existing underpass along the existing horizontal alignment:
  - Construct containment platforms to control debris, rubble, and concrete effluent.
  - Rapid bridge removal and demolition.
  - Install abutment piles & pier caissons and construct bridge sub-structure (footings, pier, abutments and wingwalls).
  - Girder fabrication and erection.
  - Construct superstructure (bridge deck, parapet walls, approach slabs)
  - Bridge deck waterproofing, pave, and form & fill grooves.
- Reconstruction of Fraser Road to accommodate the vertical grade raise and new structure profile:
  - Clearing, grubbing, topsoil stripping and benching slopes for embankment widening.
  - Install Expanded Polystyrene (EPS) lightweight fill at new abutments.
  - Hot mix paving, shouldering, guide rail replacement, and pavement marking.
  - Landscaping: tree planting, topsoil, seed, mulch, erosion control blankets (ECB).
  - Drainage improvements:
    - Abandon existing catch basins on bridge approaches, install new curb and gutter with outlet at newly constructed rip-rap spillways.
    - Culvert replacement.

5 ENVIRONMENTAL ISSUES AND COMMITMENTS

This section provides a description of direct and indirect environmental impacts associated with the proposed works. This section also describes the mitigation measures developed to minimize the impacts for each identified environmental issue. Mitigation measures include planning decisions, design features, construction requirements and constraints.

The key to ensuring effective environmental quality control and risk management during the project is the development and proactive implementation of an approach that:

- Identifies environmental sensitivities;
- Presents environmental protection measures in a way that can be translated into contractual requirements and for which compliance can be verified; and
- Includes a monitoring program, as required, that verifies that environmental protection measures are being implemented and are effective.

It is important to ensure that the Contract Administrator and Contractor are made aware of, and are prepared to deal with, all environmental issues that may arise during construction. Environmental controls will be included in the contract documents to address specific environmental and operational concerns.

The key environmental concerns and commitments identified during Detail Design are summarized in **Table 5-1**.

5.1 Natural Environment

5.1.1 Terrestrial

Natural environment conditions within the study area were assessed through a review of information collected during Detail Design and field investigations. Detailed information on the natural environment existing conditions and sensitivities is documented in the Terrestrial Ecosystem Existing Conditions and Impact Assessment Report included in **Appendix B**.

Terrestrial and vegetation surveys were conducted to characterize the natural features, vegetation communities, and wildlife in the study area, as well as to verify the presence / absence of potential Species at Risk (SAR) species that could be directly or indirectly impacted by the proposed works.

Terrestrial field investigations were conducted on August 7 and August 12, 2024, by WSP within the study area, encompassing 120 m surrounding the underpass. Specifically, field investigations included a botanical inventory and Ecological Land Classification (ELC), as well as incidental wildlife and SAR habitat surveys.

Background terrestrial information and SAR records for this report were obtained from the following sources:

- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Natural Heritage Information Centre Database (NHIC; MNR, 2024)
- Ontario Breeding Bird Atlas (OBBA, 2024)
- eBird Basic Dataset (EBD; Sullivan, et al., 2009)
- Ontario Reptile and Amphibian Atlas (ORAA, 2023)

- Ontario Butterfly and Moth Atlas (OBA, 2024; OMA, 2024)
- iNaturalist (iNaturalist)
- Bat Conservation International Bat Profiles (BCI)
- Database of Vascular Plants of Canada (Canadensys, 2024)
- Terrestrial Ecosystem Impact Assessment Report Fraser Road Underpass (Dillon Consulting Limited, 2020)

Based on the desktop review, a screening was performed to identify any SAR or Species of Conservation Concern (SCC) that have moderate to high probability of occurring in the study area. This SAR screening was then updated according to results from field investigations conducted in 2024.

A tree inventory was completed on October 17, 2024, for all trees within the study area's limit of work.

An Arborist Report and associated fieldwork were completed in 2024. Details of this work are available in the Arborist Report (WSP 2024) that is included in **Appendix C**.

The following sections summarize existing environmental conditions and sensitivities, potential impacts to the natural environment associated with the proposed works, and the mitigation measures that have been included in the Contract Documents.

5.1.2 Vegetation

EXISTING CONDITIONS

Three Ecosite classes were identified in the study area:

- Mineral Cultural Meadow (Meadow; Ecosite: CUM1) occurs within the 15-20 m buffer zone within the Right of Way (ROW) alongside Highway 401 and Fraser Road, as well as within highway medians. These areas are characterized by mowed grass with occasional trees and shrubs.
- Mineral Cultural Woodland (Woodland; CUW1) was identified as an inclusion within the Meadow bound by Airport Road, Highway 401, and Fraser Road.
- Meadow also occurs in the study area southwest of Airport Road. This portion of the study area appears to have previously been agricultural and is now comprised of Mineral Cultural Meadow dominated by forbs and grasses.

The study area contains one unevaluated wetland east of Fraser Road on both sides of Highway 401. The canopy is dominated by maples while the sub-canopy and understorey are dominated by Green Ash (*Fraxinus pennsylvanica*). The ground layer is sparse, dominated by Sensitive Fern, but with a significant surface area susceptible to flooding.

Agricultural areas are found northwest of Lapierre Road (Soya; *Glycine max*) and in the southeast corner of the study area where Airport Road joins Fraser Road (field corn; *Zea mays*).

Ecological Land Classification mapping can be found in **Figure 2** of **Appendix B**.

During ELC surveys, 39 plant taxa were identified. None of the plants identified during ELC surveys are SAR or SCC. Common Milkweed (*Asclepias syriaca*) plants, which provide habitat for Monarch, were found in one of the Meadow communities.

Black Ash (*Fraxinus nigra*) was not recorded in the study area within MTO property limits. Swamp areas in the study area provide suitable habitat, but without access to those areas, presence/absence could not be confirmed.

Within the study area, four (4) invasive plant species were identified:

- Common Buckthorn (*Rhamnus cathartica*);
- Common Reed (*Phragmites australis* ssp. *australis*);
- Purple Loosestrife (*Lythrum salicaria*); and
- Wild Parsnip (*Pastinaca sativa*).

Common Reed, Purple Loosestrife, and Wild Parsnip were observed throughout the meadow south of Airport Road, a portion of the study area that is not part of the site and is not expected to be impacted or altered by construction activities. Common Buckthorn was recorded at the edges of the inclusion woodland as well as along edges between deciduous swamp and meadows.

Wild Parsnip is considered a noxious plant as it can be harmful to humans. Wild Parsnip was observed in the meadow south of Airport Road, a portion of the study area that is not part of the project site and is not expected to incur a health hazard provided that construction activities are contained within the project site.

Common Reed is present within the Study Area on the western side of Airport Road where it meets Fraser Road (**Appendix B, Figure 3**)**.** While not directly impacted by the construction works, this stand has been identified for removal as it is a small, isolated patch. Two (2) additional stands can be found in the northwest quadrant of the Fraser Road underpass and southeast quadrant. These stands will be impacted by construction of the emergency access from Highway 401 to Lapierre Road and Highway 401 ditching operations, respectively.

POTENTIAL IMPACTS

Vegetation removal is anticipated where embankment widening will occur (rights-of-way adjacent to Fraser Road as far north as Raisin River Road and as far south as Airport Road). Vegetation communities that are expected to be affected by this removal include meadow and woodland. No rare or sensitive plant species are expected to be impacted by vegetation

removal. If vegetation clearing extends beyond the ROW areas, deciduous forest and its associated SAR and SCC habitat may be impacted as well. Indirect impacts could include the release of contaminants (i.e., construction-generated sediment) beyond working limits.

The removal of vegetation in areas near observations of invasive species and noxious species has the potential to allow invasive and noxious species to spread and colonize vegetation communities.

MITIGATION

General and specific mitigation measures are outlined in **Section 2.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work.** These mitigation measures describe how vegetation shall be protected and/or removed, as well as how re-stabilization and re-vegetation shall be implemented to minimize erosion and sedimentation once erosion and sediment control (ESC) measures are removed.

5.1.3 Wildlife and Species at Risk

EXISTING CONDITIONS

Bat Species and Bat Habitat

Field investigations confirmed the presence of four (4) bat SAR:

- Little Brown Myotis (*Myotis lucifugus*);
- Hoary Bat (*Lasiurus cinereus*);
- Silver-haired Bat (*Lasionycteris noctivagans*); and
- Eastern Red Bat (*Lasiurus borealis*).

Bats roosting within the structure of the underpass was confirmed by the observation of a Big Brown Bat (*Eptesicus fuscus*) nestled within the south abutment as well as guano found throughout areas beneath the north abutment.

There is a high probability that Little Brown Myotis uses the structure as a roost given the species' presence at the site, confirmed by visual and acoustical monitoring, as well as its propensity to roost within anthropogenic structures. There is a moderate probability that Silver-haired Bat uses the structure as a roost given its presence in the study area and its occasional use of anthropogenic structures as roosts. ROW areas adjacent to the structure and nearby woodlands likely provide foraging habitat for Little Brown Myotis, Hoary Bat, Silver-haired Bat, and Eastern Red Bat given that these are open areas at the edge of woodlands.

Bird Species and Bird Habitat

One SCC bird was identified during field investigations:

- Barn Swallow (*Hirundo rustica*)

A total of eight species of bird were recorded during point-counts, none of which are SAR. One of the species encountered, Gray Catbird (*Dumetella carolinensis*), is rare in Ontario during the non-breeding season.

During inspection of the Fraser Road Underpass, no nests were discovered. Inspection revealed that the underpass is suitable for nesting by Barn Swallow, Cliff Swallow (*Petrochelidon pyrrhonota*; no conservation status), and Eastern Phoebe (*Sayornis phoebe*; no conservation status). The culvert to be abandoned was identified as suitable nesting habitat for Barn Swallow, however no nests were found. Works to fill this abandoned culvert must be undertaken outside the migratory bird nesting season (April 1 – August 31). If the works can not be completed outside the migratory bird nesting season, a qualified Biologist must conduct a nest survey less than 48 hours prior to the commencement of the works.

The swamp areas within the study area are assumed to be suitable nesting habitat for birds, including the SAR birds Canada Warbler, Eastern Wood-pewee, and Wood Thrush. As the swamp areas are on inaccessible private property, no nest searches were conducted in these areas. No suitable nesting habitat was found for Bank Swallow (*Riparia riparia*), Grasshopper Sparrow (*Ammodramus savannarum*), or Eastern Meadowlark (*Sturnella magna*), however, if meadows are left unmaintained, they may become suitable nesting habitat for Eastern Meadowlark. Agricultural areas within the study area serve as potential foraging habitat for Barn Swallow, Bank Swallow, Grasshopper Sparrow, and Meadowlark (*Sturnella spp*.).

Monarch and Monarch Habitat

A Monarch (*Danaus plexippus*) was observed on August 7, 2024, in the Meadow area southwest of Fraser Road and Highway 401. Common Milkweed plants were found infrequently in the same location of the study area. In Canada, Milkweed found in open areas provides habitat for Monarch as its larval stage depends on Milkweed for forage.

Significant Wildlife Habitat

During field investigations, three potential SWHs were identified in the study area. The potential types of SWH are described below:

Colonially-Nesting Bird Breeding Habitat (Trees/Shrubs): Maple Mineral Deciduous Swamp is one type of Ecosite that can host colonially-nesting waterbirds. Such colonies require live or dead standing trees with water below or nearby. Presence of at least five nests would be required to confirm the SWH. Without access to the swamp and without timed field investigations, the presence of this SWH could not be confirmed.

Bat Maternity Colonies: Swamp in the study area may support maternal roosting colonies of bats. Evidence of maternal colonies would be required to confirm the presence of this SWH. Although roost features within the swamp are unassessed, the presence of Big Brown Bat and Silver-haired Bat in the study area suggest that maternity colonies are possible.

Amphibian Breeding Habitat (Woodland): Swamp in the study area may provide this type of SWH. Given the depressed areas of floor with extensive cover of decaying leaf-litter, this area

likely floods annually and provides habitat for amphibian egg-laying. Confirmation of the presence of breeding pools would be required to confirm the presence of this SWH.

Although waterfowl stopover and staging habitat was identified during the background review as a potential SWH within the study area, site conditions are unlikely to provide hydrology suitable for the accumulation of sheet water or meltwater. Additionally, no areas of open water occur within the study area.

The results of the SAR screening are included in **Figure 3** and **Appendix A** within **Appendix B**.

POTENTIAL IMPACTS

Field investigations confirmed the presence of six wildlife SAR and SCC, and that the study area provides habitat that is suitable or is assumed to be suitable for an additional nine wildlife SAR and SCC that were not detected during field investigations. Direct impacts to wildlife may occur if wildlife enter the construction zone or if vegetation is removed. Indirect impacts include contaminated surface runoff resulting from sediment and/or spills released into sensitive habitats.

Bat Species and Bat Habitat

Potential direct impacts of the proposed works to bats, including bat SAR, include:

- Replacement of the underpass: without usage of timing windows, bats may be directly harmed if they are within the underpass structure during construction. Additionally, bats will temporarily be excluded from roosting within the underpass during its replacement. Woodland and swamp may offer alternative roost sites for all bat species during underpass replacement.
- Vegetation removal in meadow and woodland areas: bats are likely to use open areas found in meadow communities to forage. Removal of vegetation in the meadow may exclude bats from foraging there. Also, woodland provides roost sites, therefore, removal of trees and snags in the woodland excludes bats from using those features as roost sites.
- Use of heavy machinery in the study area: the vibrations and sound produced by heavy machinery have been demonstrated to negatively affect the ability of bats to use echolocation to capture prey.

Contamination by surface runoff into wetlands (i.e., the swamp) is a potential indirect impact to bats in the study area. Runoff may negatively impact the vegetation community and prey insects that bats are assumed to be using within the study area.

Bird Species and Habitat

Anthropogenic structures in the study area, including the underpass and the abandoned culvert, were found to provide suitable habitat for nesting of Barn Swallow and Cliff Swallow.

No nests were found during field investigations, and no evidence of breeding was recorded for Barn Swallow.

Monarch and Monarch Habitat

Milkweed was found in the southwest portion of the study area, within the ROW between Fraser Road and Airport Road (meadow). An adult Monarch was recorded in this vicinity during field investigations.

Vegetation removal is needed for widening of the embankment, and this work is expected to impact the Milkweed found in the study area. Given that Milkweed is infrequent in the study area, and that nearby environments are open and likely support Milkweed, proposed works are likely to have minimal impact on Monarch in the study area.

Significant Wildlife Habitat

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNR, 2015) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. SWH includes the following categories as defined in the Significant Wildlife Habitat Technical Guide and Ecoregion Criteria:

- Seasonal concentration areas;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat for species of conservation concern; and
- Wildlife movement corridors.

A SWH screening has been completed based on the background review of the species and ELC communities that occur in the study area. The SWHs that have the potential to be pertinent to the study area and the site conditions are included in **Table 3** of **Appendix B**.

Three types of candidate Significant Wildlife Habitat have been identified as potentially occurring within the study area: Colonially-nesting Bird Breeding Habitat (Trees/shrubs), Bat Maternity Colonies, and Amphibian Breeding Habitat (Woodland).

MITIGATION

General and specific mitigation measures are outlined in **Section 3.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures describe how wildlife species (both general and SAR) are to be protected during construction. These include notification and avoidance processes to be followed if wildlife is encountered during construction and the use of timing windows to protect SAR and their habitat in accordance with applicable legislation (ex. ESA).

5.1.4 Erosion and Sediment Control

POTENTIAL IMPACTS

Disturbance of sediment during construction will increase the potential for erosion and movement of sediment into watercourses and wetlands present outside of the study area.

MITIGATION

General and specific mitigation measures are outlined **in Section 4.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work.** These mitigation measures describe the type of required ESC measures and the timing of when they shall be implemented to reduce erosion and sedimentation impacts on the construction zones and surrounding natural areas.

5.1.5 Management of Waste / Debris and Excess Materials

EXISTING CONDITIONS

An Assessment of Past Uses (APU) was conducted by WSP to support the management of excess soil that will be generated during the replacement of the Fraser Road Underpass. The objectives of the APU were to identify the likelihood of the presence or absence of potentially contaminating activities (PCAs) within the Project Area and lands within 250 m of the Project Area and to identify the corresponding areas of potential environmental concern (APECs) and contaminants of potential concern (COPCs).

Based on the available information obtained and reviewed as part of the APU, a total of five (5) APECs were identified in association with the Project Area. Based on the APECs identified during this assessment, associated COPCs in soil include:

- Electrical conductivity;
- Sodium adsorption ratio;
- Metals;
- Hydride-forming metals;
- Polycyclic aromatic hydrocarbons (PAHs);
- Petroleum hydrocarbons (PHCs);
- Benzene, Toluene, Ethylbenzene, and Xylene (BTEX); and
- Organochlorine pesticides.

The APU recommended the preparation and implementation of a Sampling and Analysis Plan (SAP) followed by a soil quality assessment program. WSP prepared the SAP in 2025 to support the management of excess soil that will be generated during the project. The estimated quantity of excess soil to be generated during construction activities is anticipated to be under 2000 m^3 based on current design estimates.

The implementation of the soil quality assessment program is planned for early 2026, prior to construction. Following implementation of the sampling program, a Soil Characterization Report (SCR) will be developed to document the findings. The SCR will be used to support decisions on soil reuse and disposal.

Asbestos

Two unoccupied utility ducts are present in the west safety curb of the existing structure. A small sample of the cementitious ducts was tested in December 2018 by Paracel Laboratories Ltd. and confirmed to contain Chrysotile Asbestos.

Effluent from Concrete Cutting/ Grinding

The removal of the existing bridge structure tender item requires the demolition and removal of the existing concrete components (deck, barrier walls, approach slabs, abutments, piers, slope paving, etc.). Demolition of the existing structure is to be completed through rapid demolition techniques which will likely be a combination of saw cutting, hydraulic cutting and mechanical demolition.

POTENTIAL IMPACTS

During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment. Dust emissions may result from construction activities. Excess soils may be impacted by salts. Spills or effluent released during construction may impact natural areas.

APECS and PCAs associated with COPCs were identified to have the potential to impact the excess soils that will be generated within the Project Area.

Asbestos

Asbestos exposure has been linked to several serious health conditions that are both cancerous (mesothelioma and lung cancer) and noncancerous (asbestosis).

To minimize the risk of asbestos-related diseases, it's crucial to avoid exposure, especially in environments where asbestos is present. Proper safety protocols and protective equipment are essential for those working with or around asbestos.

Effluent from Concrete Cutting/ Grinding

Concrete effluent poses several environmental concerns including but not limited to:

- Water pollution
    - Concrete effluent is highly alkaline, with a pH near 12, and can harm aquatic life if the slurry enters the watercourse.

    - The effluent slurry contains toxic metals that can contaminate waterbodies, posing risks to both aquatic ecosystems and human health.
- Soil Contamination
    - Concrete effluent can alter soil chemistry, inhibiting vegetation growth and potentially leading to long-term soil degradation.
    - Polluted rainwater can percolate through the soil and potentially contaminate groundwater sources.
- Air Quality
    - Sawcutting of concrete can generate dust that may contain harmful particles, contributing to air pollution and exacerbate respiratory issues.

If not managed correctly, concrete effluent slurry can run off into storm drains and surface waters, causing widespread environmental damage.

MITIGATION

General and specific mitigation measures are outlined in **Section 5.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures detail how excess materials will be managed, utilized and/or removed from the site for proper disposal or reuse on another site. Additional mitigation measures outline best practices for construction operation, maintenance and re-fueling to reduce the potential for spills, fluid leaks and to minimize dust and other air quality impacts.

5.1.6 Groundwater

EXISTING CONDITIONS

In 2019, Golder Associates Ltd. (Golder; now WSP Canada Inc.) carried out a preliminary foundation investigation for the proposed replacement of the Highway 401/Fraser Road underpass. The field investigation included the advancement of five (5) boreholes and a monitoring well was installed. In 2023, a detailed design subsurface investigation was carried out by WSP Canada Inc. (WSP), and the field investigation included the advancement of eight (8) boreholes and a monitoring well was installed in three (3) boreholes. Groundwater levels were measured in the monitoring wells on two occasions between December 14 and 19, 2017, and on January 28, 2025.

During this Detail Design, a hydrogeological investigation was completed in support of this study to assess the existing hydrogeological conditions beneath the study area and evaluate the dewatering requirements for construction. The groundwater level measurements collected during the field investigations indicated that the depth to the water table ranged from 3.3 to 6.1 m below ground surface.

The MECP Source Protection Information Atlas (SPIA) indicates that the site is not within a wellhead protection area (WHPA) with the site within Raisin Region Conservation Authority.

The site is also not within a surface water intake protection zone (IPZ), and not within an area identified as significant groundwater recharge area (SGRA), but it is identified as a highly vulnerable aquifer (HVA) score 6. HVA analysis assumes that the vulnerability of an aquifer usually increases as the protection provided by the overlying geological materials decreases. Each vulnerable area is assigned a vulnerability score from 1 to 10, with a higher score indicating a higher vulnerability.

The MECP Water Well Information System (WWIS) database was reviewed to identify water wells in the vicinity of the proposed groundwater takings. The MECP water well database indicated a total of eleven (11) wells completed within approximately 500 m of the site. Of the eleven wells identified, six are water supply wells, and five are monitoring wells.

Groundwater analytical results collected in the vicinity of the underpass were compared to Table 1 – Limits for Sanitary and Combined Sewers and Table 2 – Limits for Storm Sewer Discharge, and to the Provincial Water Quality Objectives (PQWO) guidelines. The collected groundwater samples from the available well had no exceedances to Table 1 – Limits for Sanitary and Combined Sewers and Table 2 – Limits for Storm Sewer Discharge. When compared against the PWQO criteria, the groundwater samples presented exceedances for dissolved cobalt and dissolved iron.

Based on the Foundation Investigation and Design Report (WSP, 2024) and given that the adopted groundwater level was 49.9 masl, some dewatering for construction of the proposed new abutments is anticipated to be required. Based on the estimated construction dewatering rate, groundwater takings will be less than 50,000 L/day. Therefore, under the *Ontario Water Resource Act*, water taking at the Site will not require a registration under the MECP EASR system.

POTENTIAL IMPACTS

Unevaluated wetlands are located adjacent to the Site to the east, and at approximately 200 m west of the site. Considering the calculated radius of influence of 6.4 m and 3.6 m, impacts to the unevaluated wetlands are not expected to be significant. However, it is recommended to assess any impacts to the unevaluated wetlands prior to any dewatering activities.

During dewatering and some time after, settlement may occur in saturated unconsolidated soils within a radius of influence due to dewatering. As a result, neighbouring buildings, utilities and underground structures/infrastructure may be at risk when lowering water levels or depressurizing an aquifer.

The maximum construction dewatering radius of influence is anticipated to be 6.5 m from the excavation boundary of the new pier and 3.6 m from the excavation boundary for the new pier and the new abutments. Other than the existing underpass structures and potential underground infrastructures, there are no buildings within the estimated radius of influence.

None of the identified water supply wells are located within the estimated radius of influence of the proposed water taking. Based on this assessment, no impacts to groundwater users are expected as a result of the proposed groundwater taking.

Based on the Source Water Protection Threats (SPIP, 2021), there are chemical threats with moderate and low risk for HVA score 6 during construction and ongoing road maintenance, including fuel handling and storage as well as road salt application.

Decommissioning of piezometers is typically carried out to mitigate the risk of having a pathway for surface water or groundwater to migrate between/across different subsurface strata. For example, an open standpipe that penetrates through a clayey stratum an into an underlying aquifer may become a potential pathway that could create a risk of introducing contaminated surface water into the aquifer.

Decommissioning may sometimes also be carried out simply to avoid leaving potential obstructions in the ground that could be encountered during future construction.

MITIGATION

General and specific mitigation measures are outlined in **Section 6.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures detail how construction dewatering and discharge should be completed and monitored to reduce impacts on the groundwater, the surrounding lands and nearby surface water receivers.

5.1.7 Landscape

EXISTING CONDITIONS

The study area consists mostly of individual trees with some tree groupings along an asphalt road. There are wooded areas surrounding the study area in the northern and southern portion of the site and landscaped green areas on the east and west sides of the road.

Trees within the study area are mostly planted species, with a few naturally occurring species at the limits of dense vegetation. Inventoried trees span from young to mature ranging in size from under 12 to 40 cm DBH.

Species composition is detailed below:

- Abundant: Green Ash (*Fraxinus pennsylvanica*) and Trembling Aspen (*Populus tremuloides*)
- Occasional: Little Leaf Linden (*Tilia americana*), American Elm (*Ulmus americana*)
- Tree health ranges between good and dead with a majority observed to be in good condition. Signs of decline and defects were observed on a small number of trees including:
- Multiple stems
- Suckers

- Dieback
- Dead wood
- Fruiting bodies/fungi
- Evidence of Emerald Ash Borer emergence/exit holes
- Vine growth

POTENTIAL IMPACTS

Twenty-three (23) trees, including three (3) dead trees, are located within the limits of excavation and proposed fill. Excavation, grading and fill will significantly affect the critical root zone of trees. Twenty-one (21) trees have been recommended for removal, including three (3) dead trees. Additional tree removals may be required when Grading/Servicing and Detailed Site Plans become available. Two (2) trees will be preserved.

MITIGATION

General and specific mitigation measures are outlined in **Section 7.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures outline the specifics methods for tree/vegetation protection, pruning and/or removal and the requirements for tree replacements in accordance with best management practices.

5.2 Social / Economic Environment

5.2.1 Traffic

EXISTING CONDITIONS

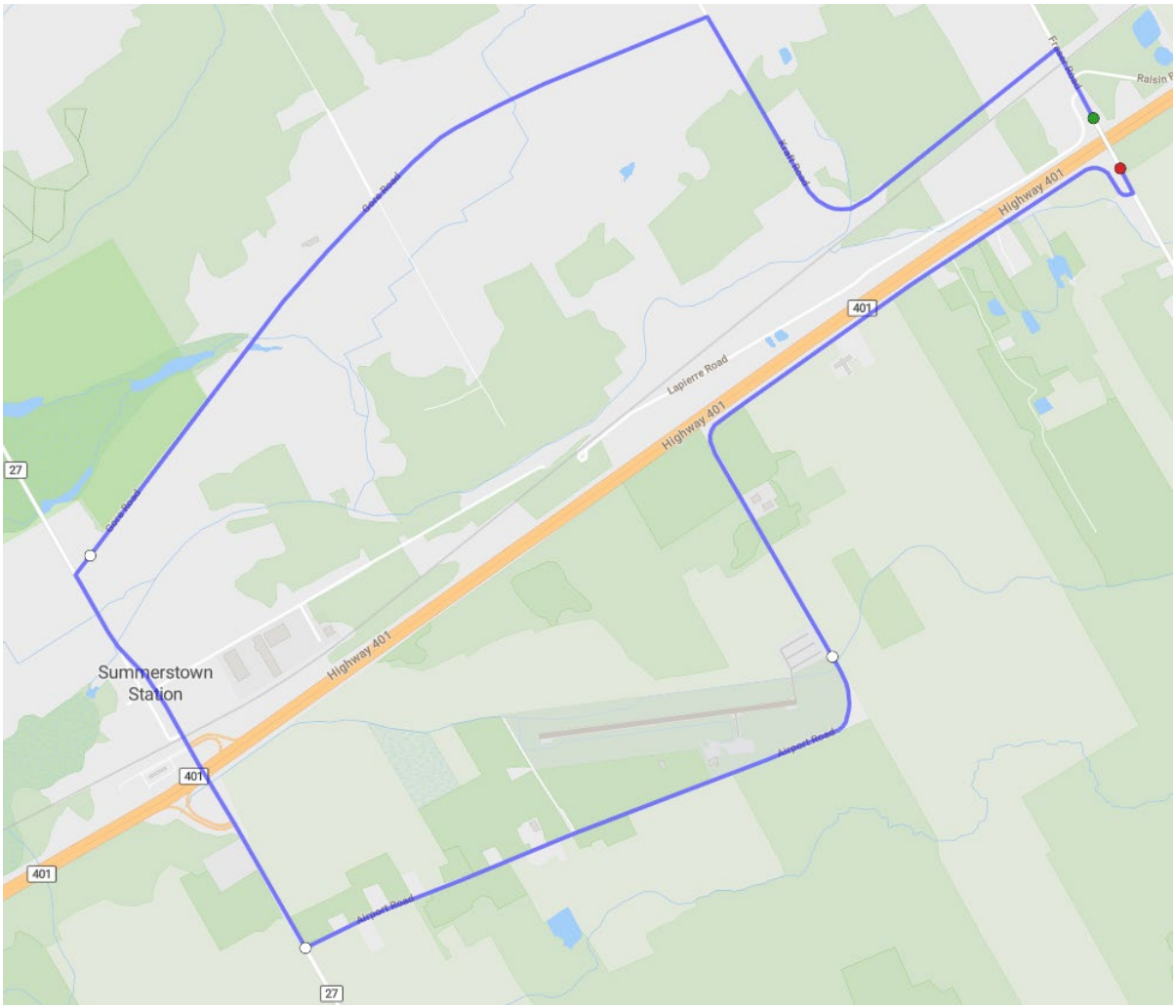
The proposed construction staging and temporary traffic control for this assignment includes a long-term full closure of traffic on Fraser Road and a short-term full closure of Highway 401, as well as temporary lane closures, lane restrictions and rolling closures along Highway 401.

Fraser Road Full Closure

To accommodate the replacement of the bridge structure, Fraser Road will be fully closed for up to two (2) seasonal shutdowns from Lapierre Road to Airport Road for the duration of the project. Whilst Fraser Road is closed, the signed detour route will be available along Airport Road, County Road 27, Gore Road, Kraft Road, and Diversion Road as shown in (**Figure 5-1**).

There is a two-track at-grade railway crossing on Fraser Road, owned by CN Rail, located immediately north of the project limits. The proposed construction limits extend to the railway crossing (but not including the crossing). The crossing is equipped with signal protection with gates and is actively used by both CN and VIA Rail. No impacts to the railway crossing are anticipated. CN's requirements for flagging at the railway crossings are detailed further below.

Figure 5-1: Fraser Road Detour Route



Highway 401 Full Closure

The proposed construction staging and temporary traffic control for this project will include short-term full closures of Highway 401, as well as short- and long-duration lane closures and shoulder closures, along Highway 401.

The bridge will be replaced using a staged construction methodology that will require traffic on Highway 401 to be reduced to one (1) lane in each direction. One stage will close the interior lanes (Lane 1) in both directions to provide worker safety while constructing the new centre pier in the median. The other stage will close the exterior lanes (Lane 2) in both directions to allow for the removal of the intermediate piers and the construction of new slope paving. A minimum lane width of 3.75 m, with a 1.0 m wide median and 1.0 m wide shoulder, will be maintained in each direction.

Short-term, full closures of Highway 401 during off-peak hours will be required to facilitate the rapid demolition of the existing structure and the installation of new bridge girders. Highway 401 will be temporarily closed between Summerstown (CR 27) and Lancaster (CR 2/34) interchanges. During these closures, traffic will be diverted approximately 16.5 km along the established Emergency Detour Route (EDR) on County Road 2 (**Figure 5-2** & **Figure 5-3**).

Figure 5-2: Highway 401 Eastbound Detour Route

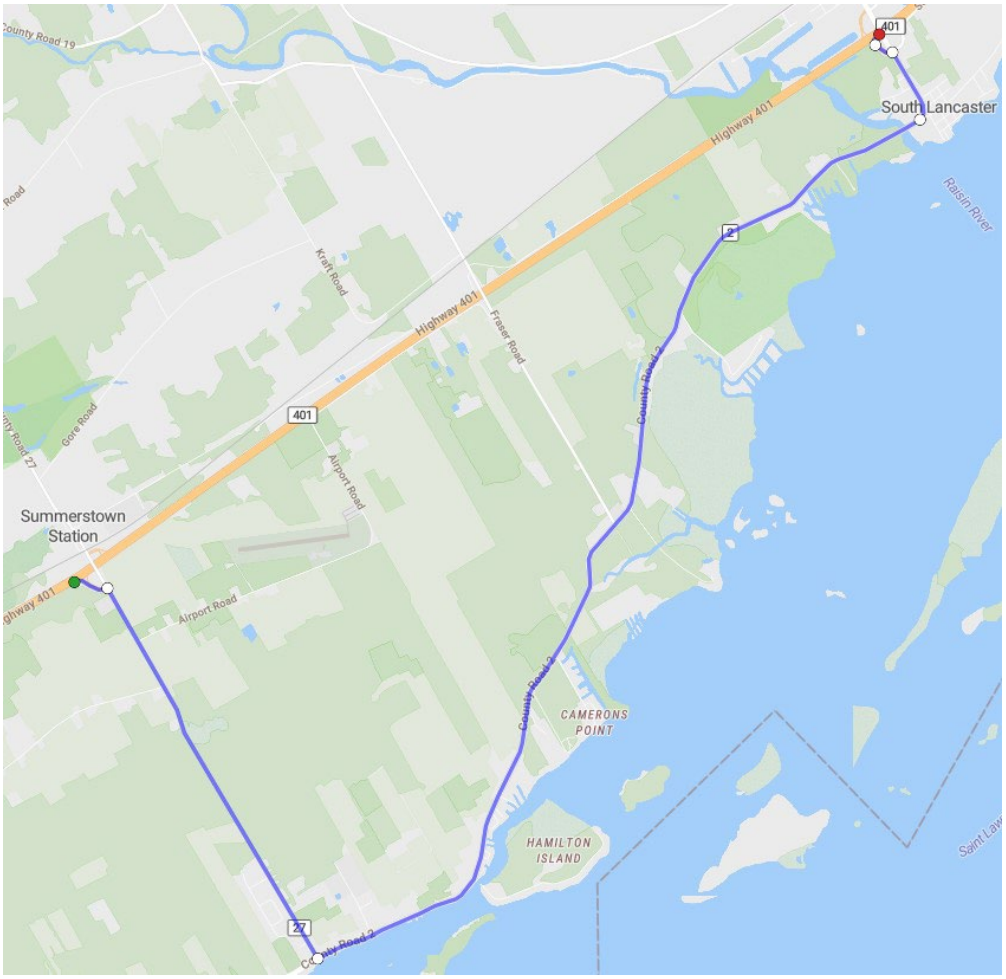
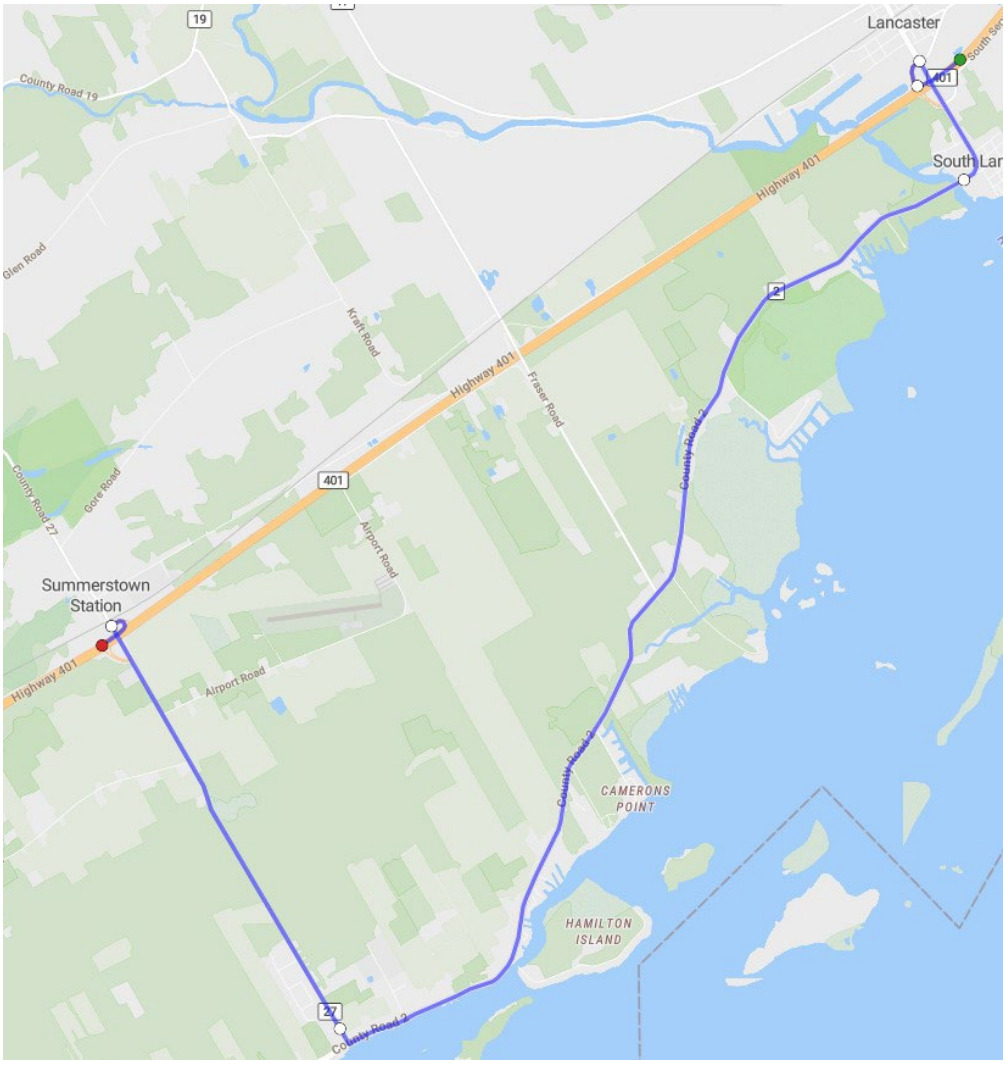


Figure 5-3: Highway 401 Westbound Detour Route



POTENTIAL IMPACTS

Fraser Road Full Closure

It will take approximately 15-minutes to navigate the 14 km signed detour route. Due to low traffic volumes, the level of service will not be impacted along Airport Road, County Road 27, Gore Road, Kraft Road, and Diversion Road. Advanced notice of the Fraser Road closure will be provided to the affected stakeholders, emergency service providers, and residents. The proposed staging and detour was presented to the local Municipal Governments and they are in agreement with the proposed works.

In the unlikely event that a train blocks the CN Rail crossing to the north while the bridge is closed, access to Lapierre Road and Raisin River Road will be restricted. Lapierre Road serves approximately eight (8) residences, while Raisin River Road contains agricultural properties and provides access to an inactive campground owned by the St. Lawrence Parks

Commission. Although the likelihood of a train blocking access is low, such a scenario would significantly delay emergency service response times.

CN Rail was consulted and expressed concerns about construction equipment using the at-grade crossing to access the site. The primary concern is that dump trucks and construction equipment using the crossing could interfere with the tracks, depositing mud, dirt or debris for which CN would seek compensation from the Contractor. Although the Contractor will primarily access the site from Highway 401 and from the south side of Fraser Road, access from the north end will be required to construct the new embankment.

Highway 401 Full Closure

The Highway 401 detour route analysis in Appendix E of the Preliminary Design Report (dated January 22, 2020) indicates that the eastbound and westbound lane closures could occur concurrently on a single weekend (Friday/Saturday night closure) with no major traffic impacts, except for potential northbound left-turn traffic queues. These queues could exceed the storage lane and block the northbound through traffic along SDG County Road 2/34 at the Highway 401 south ramp terminal.

A geometric review of the detour route was conducted to confirm that two trucks travelling in opposite directions can navigate all points of the detour route and to assess whether Highway 401 eastbound and westbound lanes can be closed concurrently.

Although the temporary construction barrier transitions are designed for the normal posted speed and maintain sight lines, stopping sight distances, and lane/shoulder widths during staging, this section of the Highway 401 is not illuminated.

A temporary regulatory speed reduction is required for worker safety is during short-term stationary freeway construction when workers are within 3 m of an adjacent live lane of traffic without the presence of a barrier. A regulatory speed reduction is also recommended to enhance safety during rolling closures and temporary full closures.

MITIGATION

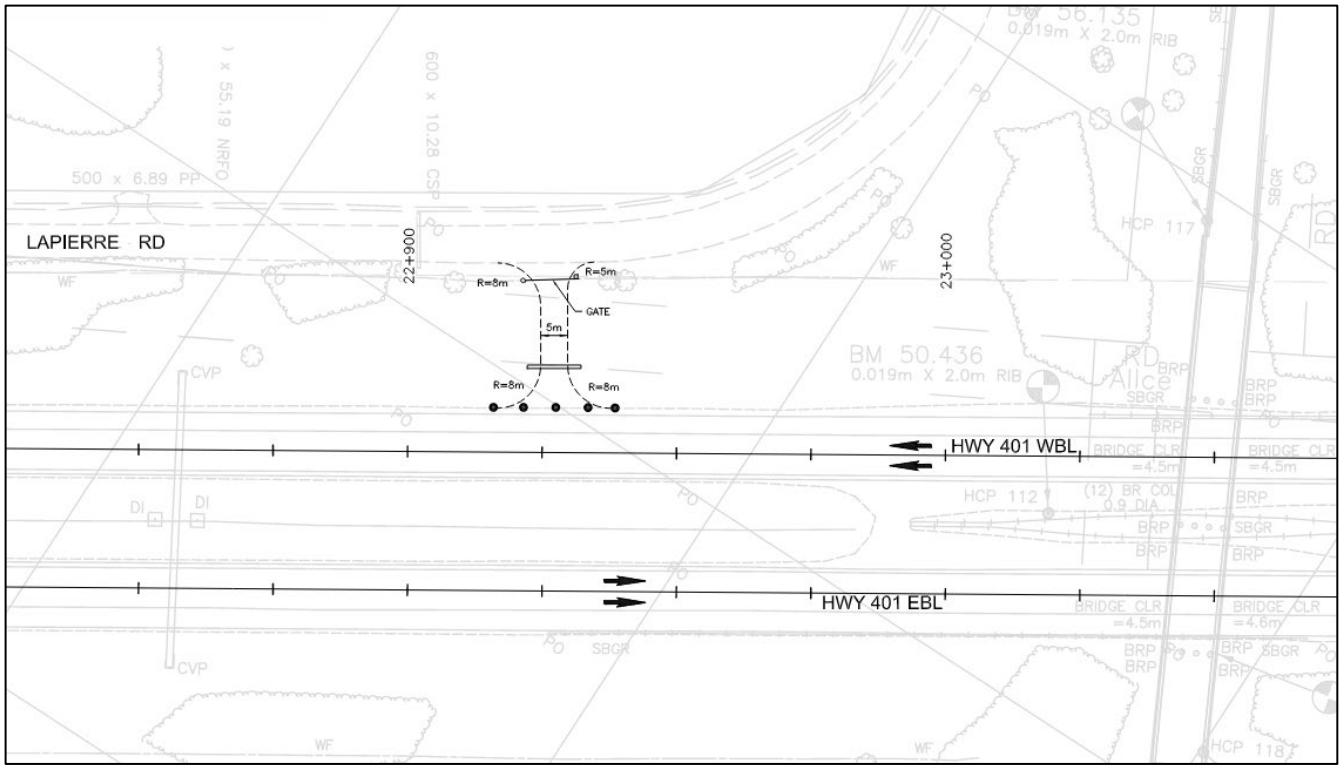
Fraser Road Full Closure

Advanced notice of the Fraser Road closure will be provided to the affected stakeholders, emergency service providers, municipality, student transportation providers, and local residents. Road Closing/Restriction Notice Signs (TC-64s) will be installed a minimum of 2 weeks prior, and a Canada Post mailout will be completed a minimum of 10 Calendar Days prior.

Additional consultation with the local emergency service providers was carried out during the Detail Design phase to assist with the development of a suitable emergency response plan during construction in case an emergency occurs while access is blocked.

A meeting was held with SDG EMS and Fire to discuss mitigation options in the unlikely event that a train blocks access to Fraser Road from the north. Although the MTO normally typically prohibits uncontrolled access to and from 400-series freeways, there is no alternative route to Lapierre Road other than Highway 401 in the event of a rail blockage on Fraser Road. To address this, a conceptual sketch was prepared showing a temporary EMS access road from the westbound shoulder of Highway 401 to Lapierre Road, approximately 125 m west of Fraser Road (**Figure 5-4**).

Figure 5-4: EMS Contingency Access to Lapierre Road



This granular access will accommodate the turning movements of a fire truck design vehicle during both stages of the Highway 401 construction staging. A locked gate will be installed to prevent access to and from the highway, and a culvert will be provided to maintain positive drainage. TC-54 barrels will be placed along the highway shoulder to prevent the Contractor from parking equipment or vehicles in this area. Access will be from the westbound lanes only; no median crossings will be permitted. The temporary access will be removed once Fraser Road reopens, prior to construction completion. This contingency access will be used exclusively by EMS in the unlikely event of a stopped train blocking the tracks crossing Fraser Road.

Further consultation with CN Rail confirmed that placement of all traffic control devices and traffic control persons (flaggers) must comply with CN's minimum offset clearance standards (30 feet from the edge of the nearest rail of the closest track). Traffic control plans must

prevent queuing or alternating single-lane traffic over the railway tracks, ensuring that northbound and southbound traffic stay in their respective lanes, as required by Transport Canada. Depending on how the contractor accesses the bridge site, a permit from CN may be required (ex. crossing the CN rail for construction access or otherwise affecting the CN right-of-way) which will be the responsibility of the contractor. Permit processing usually takes 8-10 weeks, while flagging arrangements require 4-6 weeks.

Highway 401 Full Closure

Traffic will be notified a minimum of two (2) weeks in advance of Highway 401 lane closures with TC-64 Advanced Notification Signing (ANS) and TC-64 Advanced Warning Signs (AWS). In addition, four (4) Portable Variable Message Signs (PVMS) will also be deployed on Highway 401. For full closures, road closure and detouring signage will also be installed.

Minor encroachment was observed for the southbound left-turn and westbound right-turn movements at the intersection of SDG County Road 27 and SDG County Road 2. This encroachment will be mitigated by paving the existing granular shoulder around the northeast radius of the intersection.

To mitigate the northbound left-turn traffic queues that could exceed the storage lane and block the northbound through traffic along SDG County Road 2/34 at the Highway 401 south ramp terminal, either a combination of signal timing adjustments (as those developed during the preliminary design phase) and police presence will be used, or alternatively, separating the detour directions over two nights to minimize traffic impacts on local roads.

The use of paid-duty police at key locations along the detour route will be required.

Communication Plan for Traffic Management

A comprehensive Communication Plan for Traffic Management shall be developed, maintained, and executed by the Contractor throughout the duration of the project. This communication plan details the advance notification requirements for various project milestones including project start-up, Fraser Road full closure, Highway 401 full closure(s), and long duration singe lane closure(s) on Highway 401 (construction staging). Advanced notice will be provided to all affected stakeholders including MTO, municipalities, emergency service providers, student transportation providers, and residents.

The communication plan details the requirements for media releases to local newspapers, radio and televisions stations for broadcasting/publication a minimum of two (2) weeks in advance of closure events. Requirements for Canada Post mail-outs to residents at project start-up and in advance of full closure events is also detailed within the communication plan. In addition to media releases and mail-outs there are also requirements for the Contractor to provide advance notice to a list of applicable stakeholders in-writing prior to major project milestones.

Safety of Workers and the Travelling Public

To mitigate the risk to the travelling public and workers throughout the construction zone, a regulatory speed limit reduction from 110 km/h to 80 km/h on Highway 401 is proposed for the following temporary conditions:

- Short duration shoulder closures
- Rolling closures and temporary full closures; and
- Long duration construction staging.

The Designated Construction Zone (DCZ) is proposed to have a length of 5.7 km to accommodate a transitional speed reduction and provide a 1.6 km long reduced speed zone at Fraser Road. Advanced Warning Signs (AWS), Advanced Notification Signs (ANS) & Portable Variable Message Signs (PVMS) will be deployed in both English and French.

Upon installation of night work illumination, the Contractor shall ensure that all construction lighting is adjusted and maintained as to not interfere with the vision or operational safety of vehicle drivers on or near adjacent roadways or interfere with residences adjacent to the construction site.

The Contractor shall ensure that the existing guide rail system, an approved temporary barrier system, or the new guiderail system as per contract requirements shall be in place by the end of each day for the duration of the Contract at all locations of existing guiderail on Highway 401.

5.2.2 Utilities

5.2.2.1 Buried Utilities

EXISTING CONDITIONS

National BELL Fibre Optic Transmission System (FOTS)

- The existing National Bell Fibre Optic Transmission System (FOTS) is buried within the Highway 401 eastbound ROW.
- Multiple locations within the Preliminary Design Report states that the BELL FOTS line was daylighted in November 2018 and is contained within a steel duct below Fraser Road, located approximately 11.7 m south of the south expansion joint, and is approximately 1 m below the toe of embankment slope.
- ON1CALL locates conducted in Sept 2024 and July 2025 indicate two (2) underground BELL conduits running parallel to Highway 401 in proximity to the existing south abutment. Field investigations were undertaken in August 2025 to determine the location of the Bell plant. The investigations found that there is only a single alignment for the Bell plant containing the BELL FOTS, and the copper line crosses to the north side of Highway 401 somewhere west of Fraser Road.

POTENTIAL IMPACTS

- The existing National Bell Fibre Optic Transmission System (FOTS) is buried within the Highway 401 ROW near the proposed south abutment and has been identified as a potential conflict during construction.
- As the alignment and elevation of the FOTS are unknown, this conduit may present an obstruction conflict with the proposed south abutment piles.
- The vibration and settlement tolerances of the Bell FOTS plant are also unknown, and construction activities could potentially damage the plant.
- If these risks are not mitigated, they could potentially result in a loss in service to a large number of users, repair costs, customer dissatisfaction, lost sales and reputation damage.
- MTO provided Bell Canada with forecasted settlement values along the alignment of the buried Fibre Optic line. Bell Canada reviewed the technical package and confirmed that the predicted settlements won't negatively impact the cable.

MITIGATION

General and specific mitigation measures are outlined in **Section 9.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work.** These mitigation measures advise the contractor on the presence of utilities within the work area and the requirements to verify all utilities locations prior to proceeding with work. There is also a recommendation for settlement monitoring to assess the need for maintenance to the surface treatment and pavement in the years following construction.

5.2.2.2 Aerial Utilities

EXISTING CONDITIONS

Cornwall Electric (CE)

Existing aerial powerlines cross Fraser Road at approximately Sta. 10+264, and cross Airport Road at approximately Sta. 2+966. The proposed grade raise along Fraser Road will reduce the vertical clearance at existing aerial utility crossing.

POTENTIAL IMPACTS

- The overhead clearance at Cornwall Electric's plant at Sta. 10+264 (roughly 219 m south of the existing abutment), will be reduced by 150 – 210 mm, increasing the potential of being struck by traffic or construction equipment.
- Striking an aerial hydro line can lead to severe consequences, including electrocution, which can cause serious injuries or fatalities. It also poses fire hazards, as sparks from damaged lines can ignite fires. Additionally, such incidents can result in power outages, disrupting electricity supply to homes, businesses, and essential services. Equipment involved in the collision can be significantly damaged, and workers operating near power

lines are at risk of serious injuries. Therefore, it's crucial to follow safety protocols and maintain a safe distance from power lines to prevent these risks.

MITIGATION

General and specific mitigation measures are outlined in **Section 9.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures advise the contractor on the presence of utilities within the work area and the requirements to verify all utilities locations prior to proceeding with work.

5.3 Cultural Environment

5.3.1 Archaeological Resources

PRELIMINARY DESIGN

In 2018, ASI was retained by Dillon Consulting Limited to complete a Stage 1 Archaeological Assessment (AA) as part of the Highway 401 and Fraser Road Underpass in the township of South Glengarry. Aside from a small section within Lapierre Road, this Stage 1 AA covered the current Study Area, north and south of Highway 401 along Fraser Road. The assessment determined that undisturbed sections within the forested area and agricultural fields required further assessment. As such, a Stage 2 test pit or pedestrian survey was recommended within these areas retaining archaeological potential.

DETAIL DESIGN

As part of the Stage 1 AA, a property inspection was conducted on November 1, 2024, to determine the presence of any areas of disturbance that would affect archaeological potential, and to determine what survey strategies would be appropriate for a Stage 2 AA. The Stage 1 AA Study area comprised the lands not previously assessed by ASI, consisting of the west side of Lapierre Road and west berm. The entire Stage 1 AA Study Area (100%) was recorded as deeply and extensively disturbed from the construction of Lapierre Road and berm.

The Stage 2 AA was conducted concurrently with the Stage 1 AA on November 1, 2024. The Stage 2 AA followed the recommendations of ASI's Stage 1 AA of the Study Area completed in 2018 (ASI 2018), and included a review of historical maps, aerial photography, land registry documents, local histories, and previous AA reports. The entire Stage 2 AA Study Area (100%) was subject to test pit surveying at 5 m intervals. Despite the presence of archaeological potential within the Study Area, no archaeological resources were identified during the Stage 2 AA fieldwork. Consequently, the Stage 1-2 AA recommended that no further AA is required within the Study Area.

MITIGATION

General and specific mitigation measures are outlined in **Section 10.0** of **Table 5-1** in **Section 5.4 – Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work**. These mitigation measures outline the processes to be followed in the event undocumented archaeological resources or human remains are discovered during construction.

5.4 Summary of Environmental Effects, Proposed Mitigation, Commitments to Future Work

Table 5-1 summarizes the anticipated environmental impacts and the mitigation measures that will be incorporated into the design and Contract Documents. Provided that these mitigation measures are implemented, the impacts to the natural, social/economic, and cultural environments are expected to be minimal.

Mitigation measures for this project are related to:

- Vegetation;
- Wildlife and Species at Risk;
- Designated Natural Areas;
- Management of Waste / Debris and Excess Materials;
- Management of Designated Substances / Contaminated Areas;
- Erosion and Sediment Control;
- Landscaping;
- Traffic Operations;
- Construction Noise;
- Utilities;
- Foundations; and
- Archaeological Resources.

Table 5-1: Summary of Environmental Concerns and Commitments

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
1.0 General	1.1 Impacts from Construction Vehicles	MTO MECP MNR	1.1.1	Vehicle maintenance and refueling shall be controlled to prevent the entry of petroleum products or other deleterious substances, such as debris, waste, rubble, or concrete material, into the natural environment, as per Ontario Provincial Standard Specifications (OPSS) 182 – General Specification for Environmental Protection for Construction In and Around Waterbodies and On Waterbody Banks and NSP 001A850 – Equipment Refueling, Maintenance, and Washing.
1.0 General	1.1 Impacts from Construction Vehicles	MTO MECP MNR	1.1.2	Waste management shall be completed per OPSS 180 – General Specification for the Management of Excess Materials: ▪ All construction-related materials, equipment, and construction-generated materials (e.g., runoff from exposed soils, stockpiled soils, or other materials from clearing and grubbing) shall be properly stored/contained, maintained, filtered, and otherwise handled and managed at a distance of at least 30 m away from sensitive areas (i.e., woodland and wetland).
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MTO MECP MNR	2.1.1	Re-stabilize and re-vegetate all exposed surfaces as soon as possible using seeding with Standard Roadside seed mix as specified in OPSS 803 – Construction Specification for Vegetative Cover. The 90-day performance measures will be met in accordance with the MTO Seeding and Cover Quality Assurance Visual Inspection Field Guide (June 2013).
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MTO	2.1.2	Vegetation damage and removal should be minimized to the smallest footprint of work needed.
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MECP	2.1.3	The work zone extent adjacent to naturally occurring vegetation communities should be identified and protected using visual fencing (e.g. snow fencing) to prevent encroachment.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MNR	2.1.4	If any trees are proposed for removal, the Contractor shall use tree felling and grubbing procedures as outlined in OPSS 201, Construction Specification for Clearing, Close Cute Clearing and Grubbing.
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MTO	2.1.5	Temporarily disturbed vegetated areas shall 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
2.0 Vegetation	2.1 An estimated 21 trees, including three (3) dead trees, are anticipated to be removed for this project. The proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment.	MECP	2.1.6	Areas temporarily cleared of vegetation to facilitate road and underpass works should be stabilized (e.g., vegetated/seeded) prior to removal of erosion and sedimentation control (ESC) measures: ▪ Minimize the disturbance of existing well-vegetated ditches and grassed slopes. ▪ Protect undisturbed slopes and sensitive ditching with silt fence and temporary flow check dams. These measures should remain in place until exposed soils are stabilized. ▪ 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. The site shall be stabilized prior to removal of ESC measures.
2.0 Vegetation	2.2 Removal of Common Reed (Phragmites australis) stands.	MTO MECP MNR	2.2.1	Soils containing Invasive Species (Phragmites) should be removed, contained and managed accordingly. The Contractor is required to bring clean, sanitized equipment to the site, such that Phragmites is not introduced into areas that are currently free of the invasive, noxious weed.
2.0 Vegetation	2.2 Removal of Common Reed (Phragmites australis) stands.	MTO MECP MNR	2.2.2	**Cutting** Recommended to occur in the summer during the primary growth stage of Phragmites before seed heads develop. If cutting can only occur once, the best time to cut is when the plant reaches peak height, just as the seed head emerges (late August). Cutting at this time should not be delayed to avoid the migratory bird nesting window (April 1 to August 31) as the risk of Phragmites spread increases dramatically once the seed head emerges. Vegetation clearing during this period requires a nest search by a qualified biologist.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
				If seed heads are present, it is recommended to carefully use pruners to cut seed heads and then dispose of them into bags prior to undertaking the patch removal As with any vegetation removal during the migratory bird season (April 1 to August 31), prior to cutting, a nest search by a qualified biologist shall be completed. **Herbicide** Spaying is not to take place within 30 m of a watercourse, wetland or open water areas. These areas are to be cut only. For best results, spray in late summer or early fall when plants are actively growing and in full bloom. Young emergent plants will not be affected by the spray and will continue to grow. Do not apply herbicide if heavy rains are forecasted. Follow herbicide regulative protocols as quoted in the BMP. Soil contaminated with invasive and noxious weed plant material should only be disposed of at a site where the material can be contained, monitored and, if necessary, treated, or at an appropriate municipal staging or disposal location. Inspect and clean all equipment following the Clean Equipment Protocol for Industry (Halloran et al. 2013) (https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf) to remove soil, seeds, and plant material before leaving or entering a site. Protocol recommendations include: Inspect equipment before leaving a site or entering a new one. Check all vehicles, machinery, and tools for soil, seeds, and plant material. Remove debris, loose soil and plant fragments from tires, tracks, buckets, and undercarriages. Clean equipment thoroughly with use compressed air, pressure washing, or hand tools. Collect and dispose of debris in designated containment areas away from sensitive habitats. Apply approved disinfectants, if required, after physical cleaning in high-risk areas (e.g., wetlands). Record cleaning activities and equipment movement.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.1	If wildlife is encountered in the construction area, work should be temporarily suspended 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.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.2	Wildlife incidentally encountered during construction shall not knowingly be harmed and shall be allowed to move away from the construction area on its own.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.3	If wildlife encountered during construction does not move on its own from the construction zone, the Contract Administrator shall be informed; the Contractor shall not move the wildlife.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.4	If vegetation clearing or grubbing occurs during the period when most birds in the study area breed (between April 1 and August 31), it shall be preceded by bird nest surveys conducted by an avian specialist not more than two days (48 hours) before the work.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.5	If an active bird nest is found, an avian specialist shall determine whether the nest belongs to a protected species and if this is the case, shall establish a suitable buffer around the nest within which work is halted until the nestling birds are fully fledged and the nest is unoccupied.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.6	The Contractor shall not destroy active nests (nests with eggs or young birds), or wound or kill birds, or species protected under the MBCA and/or Regulations under the MBCA.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.7	Avoid the use of mesh or netting-type stabilization material on site for erosion control measures to prevent the entanglement of wildlife.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.8	A general awareness of the potential for wildlife in the construction zone and avoidance of harm to wildlife is sufficient.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.9	The Contractor shall not harass or kill any wildlife encountered during construction.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.10	The Contractor shall not block or prohibit wildlife access to culverts. Passage for wildlife through culverts must be maintained throughout construction.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.11	No additional compensation shall be made for work delays as a result of encounters with wildlife.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.12	To avoid incidental take of birds, bird nests, and bats, the usage of timing windows for vegetation removal and construction is recommended.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.13	To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. If a nest of a migratory bird is found within the construction area outside of this nesting period, it still receives protection.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.14	If vegetation must be removed during the overall bird nesting season: ▪ Nest and nesting activity searches will be conducted in areas defined as simple habitat (i.e., the CUM1-1 community) by a qualified biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2021). ▪ If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following Environment and Climate Change Canada (ECCC) guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC 2018), which will be confirmed by a qualified Biologist, but will protect a minimum of 10m around the nest or nesting activity. ▪ The results of all nest searches will be documented at the end of each survey day in a technical memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites. If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same Best Management Practices (BMPs) such as nest and nesting activity searches described above will be undertaken.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.15	Vegetation/underpass removal completed outside of the breeding bird season (i.e., April 1 to August 31).
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.16	Tree removal should be completed outside of the breeding bird season (i.e., April 1 to August 31). If this is not possible, a nest survey should be completed.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.17	Vegetation/underpass removal can occur during restricted periods if a qualified biologist conducts a nest search of the area prior to work commencing and determines that active nests are not observed in proximity to the work area. This nest survey is valid for a period of 48 hours. If breeding birds and/or active 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 by a qualified biologist that the young have left the nest. This may result in construction delays.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.18	Alternatively for the underpass removal, netting or tarping may be placed around the underpass to prevent birds from nesting on the structure if removal is to occur during the restricted breeding bird season.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.19	Workers should be vigilant and check work areas and machinery for the presence of wildlife prior to each day of construction.
3.0 Wildlife and Species at Risk	3.1 Wildlife may be temporarily impacted during construction by vegetation removals or by entering the work zone. Three candidate Significant Wildlife Habitats have been identified as potentially occurring within the study area.	MTO MNR MECP	3.1.20	Heavy machinery should be used according to timing windows to minimize the impact of sound and vibrations on bat behavior.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.1	Implement Contractor awareness and encounter protocols for SAR in contract documents.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.2	The Contractor shall minimize removal of trees in the woodland inclusion of the meadow to avoid removal of bat roost habitat.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.3	It is recommended that all tree removals and bridge demolition activities take place outside of the SAR bat active period (April 1 to November 30) and the breeding bird active period (April 1 to August 31).

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.4	If a SAR is encountered within or adjacent to the construction site, the Contractor will stop work and contact the Contract Administrator.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.5	If construction activities are such that continuing construction in that area would result in a contravention of the ESA, all activities will stop, and the Contract Administrator shall be informed.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.6	As a mechanism to mitigate potential impacts on SAR species, a fact sheet and detection protocol for SAR species shall be provided to the contractor before the project begins.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.7	Any SAR sightings should be reported to MECP.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.8	Vegetation removal should be completed outside of the active bat season (i.e., April 1 to November 30).
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.9	Workers should be vigilant and check work areas and machinery for the presence of wildlife prior to each day of construction.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.10	Removal of the underpass structure completed outside of the active bat season (i.e., April 1 to November 30). If this is not possible, the cracks and crevices that potentially provide bat roosting habitat within this structure should be filled in or blocked off (i.e., tarping) prior to the active bat season (i.e., April 1 to November 30) to prevent bat use in accordance with the ESA, 2007 and associated regulations.
3.0 Wildlife and Species at Risk	3.2 The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow. The agricultural fields and meadow communities provide potential habitat for Barn Swallow, Bank Swallow, Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush.	MTO MECP MNR	3.2.11	Activities related to the abandoning of the existing 1500 mm corrugated steel pipe (CSP) culvert at the south abutment should occur outside of the migratory bird nesting season (April 1 - August 31). If the project cannot accommodate this timing window, a nest survey (i.e., nest sweep) can be conducted by a qualified Biologist. Once the nest survey is complete and no nests are identified inside the culvert, the assessment will be valid for 48 hours, and culvert filling and/or other culvert activities should begin within that 48-hour window, otherwise another nest survey will be required.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.1	The time interval between commencement and completion of any work that disturbs earth surfaces shall be a maximum of 45 calendar days. Commencement of such work shall be considered to have occurred when the original stabilizing ground cover has been removed, including grubbing, or has been covered with fill material. Completion of such work shall be considered to have occurred when the cover material (seed and mulch, seed and erosion control blanket, sod, rip-rap, etc.) has been applied.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.2	Where the timing of the operation results in a conflict with the application requirements of the specified cover, the Contractor shall determine appropriate interim measures that afford temporary protection until such a time as final cover can be applied. These timing constraints apply regardless of timing of Contract award.

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4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.3	Where interceptor ditches or subsurface drains are specified in the Contract, they shall be constructed before commencement of any related cut or fill.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.4	Run-off from construction materials and any stockpiles shall be contained and discharged so as to prevent entry of sediment to watercourses.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.5	Where dewatering is required, and where culverts are cleaned by hydraulic means, effluent shall be discharged to prevent entry of sediment to watercourses.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.6	To minimize impacts on migratory birds protected by the Migratory Birds Convention Act (MBCA), it is recommended, when feasible, to avoid installing and/or decommissioning erosion and sediment control (ESC) measures between April 1 and August 31.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.7	Avoid the use of mesh or netting-type stabilization material on site for erosion control measures to prevent the entanglement of wildlife.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.8	Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.9	A 200 m stand-by supply of prefabricated silt fence barrier, in addition to silt fence barrier which may be specified elsewhere in the Contract, shall be maintained at the Contract site prior to commencement of grading operations and throughout the duration of the Contract.

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4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.10	The erosion and sedimentation control items detailed in the Contract address the requirements of regulatory authorities needed to obtain authorizations, permits and/or approvals in order to proceed to construction, and erosion and sedimentation controls not related to contractor construction methods and operations such as final slopes and final ditches.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.11	The Contractor shall, as part of the Contract price, control erosion and sediment caused by their construction methods and operations including but not limited to incomplete earth slopes, ditches and designated disposal areas, stockpiles, access and service roads, storage and work areas, and non-designated disposal areas so as to meet all legislative requirements, to prevent entry of sediments into watercourses and environmentally sensitive areas and to prevent damage to property inside or outside of the right-of-way.
4.0 Erosion and Sediment Control	4.1 Construction, clean-up and restoration activities may result in sediment-laden runoff entering watercourses, private property or other sensitive areas.	MTO MECP MNR	4.1.12	The Contractor will consider the use of: ▪ Sediment traps for dewatering with Straw Bales (OPSD 219.241), ▪ Discharging submersible pumps into a geotextile filter bag.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.1	Excess materials will be managed in accordance with OPSS 180.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.2	Excess soil will first be reused on site or stored within the Construction Limits in appropriate stockpile areas. Remaining excess soils will require removal to an off-site location for reuse or disposal.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.3	The Contractor will control the emission of dust and other pollutants and prevent them from leaving the work site. Impacts minimized by Contractor compliance with General Conditions to minimize dust and other air quality impacts.

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5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.4	All equipment onsite shall be clean and in good working order (no leaks of fuel, grease or oils).
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.5	Vehicle maintenance and refueling shall be confined to designated areas a minimum of 30 m away from any natural features, and all activities shall be controlled to prevent entry of petroleum products or other deleterious substances into the natural environment.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.6	A Spill Control and Response Plan will be developed and implemented by the Contractor to prevent deleterious substances from entering the natural environment.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.7	An emergency spill kit will be kept on-site in case of spills during activities or fluid leaks or spills from equipment.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.8	When spills occur, the Ministry of the Environment Spills Action Centre should be contacted, and all reasonable corrective action should be taken to contain and clean the spill immediately.

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5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.9	The Contractor shall note that excess earth from highway construction projects may contain elevated concentrations of chloride and sodium and may have elevated values for Electrical Conductivity and Sodium Adsorption Ratio. For the purpose of this Contract, excess earth with salt impacts is not considered to be “contaminated” within the meaning of Table 1 in OPSS 180
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.10	Where the Contractor manages excess earth as disposable fill, the Contractor shall take into account the possibility of salt impacts and ensure that the material is managed responsibly and in an environmentally appropriate manner. Where the Contractor intends to manage the excess earth that may be salt impacted on private property, the Contractor shall make the Property Owner aware that it may be salt impacted by using the attached Property Owner’s Release in place of MTO form PH-CC-183.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.11	The Contractor is responsible for conducting such sampling and testing as may be necessary to comply with any requirements imposed by the Property Owner as a condition of accepting the excess earth.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.12	Should the Contractor choose to establish excess material management areas for the purpose of disposing of tops, stumps, roots and other excess materials resulting from his grading operations, the following conditions shall apply in addition to the requirements of OPSS 180: ▪ The Contract Administrator shall be notified of the areas selected prior to any disposal activity. ▪ The area selected shall be cleared of standing vegetation. ▪ The natural wood shall be top-covered with a minimum of 0.5m of earth or swamp materials. ▪ The area shall be contour graded. ▪ The area shall be seeded and mulched. The permission of landowners, including MNR for Crown lands shall be obtained prior to the use or clearing of any site.

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5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.13	All activities, including equipment maintenance, refueling and concrete truck washing shall be controlled to prevent entry of petroleum products (e.g. gasoline, oils, lubricants), primers, grout, bonding adhesives or other hazardous or deleterious substances including any debris, waste, rubble or concrete materials in all water courses and water bodies within the project limits unless otherwise specified in the contract. Substances are to be stored and mixed on protected surfaces away from the water courses and water bodies within the project limits in order to prevent contamination of soils and waters. Any such material which advertently enters the water courses or water bodies within the project limits shall be removed by the Contractor, at his own expense, in a manner satisfactory to the Contract Administrator.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.14	For mobile equipment and vehicles, maintenance, refueling and truck washing shall be conducted no closer than 30 m from the water courses and water bodies within the project limits in order to prevent water contamination due to accidental spills.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.15	All large equipment working in or near the water courses and water bodies within the project limits shall be well maintained to avoid contaminant leakage, shall be free of excess surface oil or grease and shall be equipped with spill kits deemed acceptable by the Contract Administrator.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.16	General Conditions to be included in Contract to specify 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.
5.0 Management of Waste / Debris and Excess Materials	5.1 During construction, excess materials will be generated. If not managed properly, stockpiled and excess materials and construction waste have the potential to contaminate the surrounding environment.	MTO MECP MNRF	5.1.17	Soils containing Invasive Species (Phragmites) should be removed, contained and managed accordingly. The Contractor is required to bring clean, sanitized equipment to the site, such that Phragmites is not introduced into areas that are currently free of the invasive, noxious weed.

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5.0 Management of Waste / Debris and Excess Materials	5.2 Asbestos	MOL MECP	5.2.1	In the event a Type 3 or Type 2 Glove Bag operation is to be used for asbestos removal, a Notice of Project will be submitted to the Ministry of Labour
5.0 Management of Waste / Debris and Excess Materials	5.2 Asbestos	MOL MECP	5.2.2	An Environmental Compliance Approval for a Waste Management System valid for solid non-hazardous industrial waste, including asbestos for the off-site transportation and disposal of asbestos waste and a Certificate of Approval will be obtained from MECP, as well as the waste disposal site to which the asbestos waste is to be taken for disposal will be confirmed with MECP.
5.0 Management of Waste / Debris and Excess Materials	5.2 Asbestos	MOL MECP	5.2.3	Item Code: 0899-0010 Management and Disposal of Materials Containing Asbestos has been included in the contract tender.
5.0 Management of Waste / Debris and Excess Materials	5.2 Asbestos	MOL MECP	5.2.4	The item specific special provision (SP 899S01) associated with this item requires that an asbestos abatement plan be developed by a Certified Industrial Hygienist (CIH) and shall include: ▪ Method of asbestos removal (Type 1, 2 or 3). ▪ Method of on-site management and handling of all asbestos containing materials including detailed designs of the measures and procedures required for the type of removal including preparation of the work area, dust control methods, PPE and clothing, clean-up of the work area and asbestos waste disposal as well, details regarding the containment and other contingency planning and emergency management measures to be taken to ensure that asbestos is fully contained and controlled and released into the environment. Written proof of training, specifically related to asbestos abatement operations, for all supervisory staff and workers.
5.0 Management of Waste / Debris and Excess Materials	5.3 Effluent from Concrete Cutting/ Grinding	MECP	5.3.1	Effluent from concrete cutting and grinding operations, that does not dry without run-off from the concrete surfaces that are cut/ground, shall be captured and contained for management in compliance with the Special Provision in the contract documents.
5.0 Management of Waste / Debris and Excess Materials	5.3 Effluent from Concrete Cutting/ Grinding	MECP	5.3.2	Effluent resulting from concrete cutting and grinding operations shall be transported to one of the following receiving sites: ▪ A waste disposal site with a Certificate of Approval for a Waste Disposal Site valid for liquid industrial waste Class 146(L); ▪ A waste processing facility with Certificate of Approval for a Waste Disposal Site (Processing) valid for liquid industrial waste Class 146(L).

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5.0 Management of Waste / Debris and Excess Materials	5.3 Effluent from Concrete Cutting/ Grinding	MECP	5.3.3	Each shipment of effluent from the construction site to any receiving site shall be transported by a carrier having a Certificate of Approval and Manifest.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.1	A discharge plan shall be developed by the Contractor and requires the following to be provided for the water pumped from the proposed excavation areas: ▪ An assessment of the quality and quantity of the water that is expected to be discharged; ▪ The location of the discharge; if applicable; ▪ A recommendation of one or more of the methods of transfer or discharge; ▪ If the recommended method of discharge is to surface land or to a storm sewer, a statement that the discharge will not cause an adverse effect to the environment; ▪ If the recommended method of discharge is to a surface land or to a storm sewer, identification of any treatment or control measures required to minimize erosion, flooding, scouring and sedimentation and a statement that addresses the quality of the discharge to ensure that it will not cause an adverse effect on the environment; ▪ An analysis to determine whether a monitoring plan would be needed to monitor potential impacts of the discharge and, if needed, a description of the plan and the circumstances in which it would be needed; ▪ A summary of qualifications and experience of the person who prepared the discharge report; ▪ A contingency plan that includes measures to address: potential impacts related to the quality and quantity of discharge, any failures of recommended treatment or control measures and other site-specific impacts such as flooding. A description of a shutdown protocol should be included if a qualified person assesses that such a protocol is required; and All calculations and assumptions used in the preparation of the discharge report must be included in the report.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.2	The groundwater that is pumped during the proposed water taking must be handled appropriately. The contractor will be responsible for discharging the water taken in a manner that does not result in erosion, flooding or siltation. Given that the groundwater samples collected from the available monitoring well satisfied the sanitary/combined and storm sewer use discharge criteria, the pumped groundwater could be discharged to a local sewer. An appropriate discharge agreement with the municipality must be obtained prior to discharging to any sewer system. Even though no exceedances were detected for the sewer by-law criteria, sediment control tanks and a physical filtration system are recommended during construction to decrease fines and a subsequent control in total suspended solids (TSS) levels.

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6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.3	It is expected that under the discharge agreement with the municipality, the contractor will be required to implement a groundwater quality sampling program and properly dispose of the pumped water.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.4	Groundwater collected during construction can be discharged to the natural environment, however, the discharge will need to be monitored and pre-treated to ensure that it meets the PWQO criteria.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.5	WSP recommends that groundwater is tested by the Contractor for parameters listed in the City of Cornwall sanitary/combined and storm sewer use by-law and in the PWQO guideline prior to construction.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.6	Unevaluated wetlands are located adjacent to the Site to the east. Considering the radius of influence of 6.4 m and 3.6 m, impacts to the unevaluated wetlands are not expected to be significant. The estimated radius of influence will have to be refined and impacts to surface water features and natural heritage systems re-evaluated if the design plan changes.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.7	Prior to dewatering, activities, it is recommended to assess any impacts to unevaluated wetlands.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.8	The rate and daily volume of water pumped from the proposed excavation areas will be measured using a flow meter and controlled using valves as appropriate. The location of discharge, the discharge effluent and a point downstream of the point of discharge (if applicable) should be visually inspected at least once daily to ensure that there are no visible signs of erosion or petroleum hydrocarbon films or sheens present. An inspection log should be kept with daily observations. Field analyses for pH, temperature, conductivity, and turbidity should be conducted periodically (minimum daily). In addition, water quality samples should be collected and analyzed (at an analytical laboratory) to determine water quality changes over the course of the construction dewatering.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.9	Efforts should also be implemented to divert surface water, including rainwater, from entering open excavations as these storm water pumping volumes from the excavation are to be included in the daily excavation dewatering rates.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.10	Discharge activities will be suspended if: ▪ Impacts to nearby surface water features are detected; ▪ Impacts to nearby structures are detected; ▪ Visible oil or sheen is observed in the discharge water; ▪ Significant erosion or significant increase in turbidity is observed at the discharge point and cannot be mitigated in a short period of time; or, Should a complaint arise in regard to water quality or quantity that can be directly attributed to the water taking or discharge.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.11	Until normal conditions are restored, discharge activities will be postponed. Discharge will only commence (or recommence) once normal conditions are restored, and/or erosion has been mitigated (if applicable).
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.12	The contractor will be responsible for discharging the water taken in a manner that does not result in erosion, flooding or siltation.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.13	If fuel is to be stored in the area of the HVA, the threat must be reviewed, and applicable requirements adhered to. If salt is to be applied to the roads in this area the threat must be reviewed, and applicable environmental protection requirements adhered to.

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6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.14	The Contractor will consider the use of: ▪ Sediment traps for dewatering with Straw Bales (OPSD 219.241), ▪ Discharging trash pumps into a geotextile filter bag.
6.0 Groundwater	6.1 Potential impacts to groundwater quantity and quality may occur during construction and ongoing road maintenance, including construction dewatering, fuel handling and storage, and road salt application	MTO MECP	6.1.15	A geotechnical engineer should be consulted to determine potential settlement impacts to underground structures and infrastructure from dewatering activities.
6.0 Groundwater	6.2 Decommissioning of Piezometers	MECP	6.2.1	To mitigate the risk of groundwater contamination and potential obstructions, the existing piezometers shall be decommissioned by the Contractor during construction in accordance with O.Reg 903.
6.0 Groundwater	6.2 Decommissioning of Piezometers	MECP	6.2.2	To support this mitigation strategy the contract documents will include the non-standard tender item “NSTI 9999-5044 - Decommission of Piezometers” in conjunction with a non-standard special provision (NSSP) detailing the scope of work, location of existing piezometers, submission requirements and O.Reg 903 requirements.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.1	Any roots exposed during grading are to be pruned using good arboricultural practices and per the guidelines in the Arborist Report (Appendix C).
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.2	To minimize damage to roots, it is recommended that excavators scrape soil within the same direction of the roots and not across. Any roots exposed are too be pruned neatly and cleanly.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.3	In areas where excavation, grading and construction have compacted soil within a reduced tree protection zone (TPZ), scarify soil to a depth of 100 mm at the completion of construction. Restore disturbed areas and apply the following methods below: ▪ Water trees periodically during construction; and After construction it is recommended that a 150 mm depth layer of mulch be placed in a 2 m radius around the trunks of these trees.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.4	A total of 21 trees will be replaced based on best management practices that recommend a 1:1 replacement ratio for any tree removed within the limit of work. The three existing dead trees noted do not qualify for compensation. These 21 replacement trees are recommended to be planted where possible within areas that were disturbed during construction and staging. If adequate space is not available for replacement planting in these areas, then planting can occur within areas adjacent to disturbed limits where vegetation cover is sparse.

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7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.5	Tree protective hoarding is to be installed for two (2) trees where the construction limits encroach into their respective TPZs. To protect these trees, the following fence types will be installed: ▪ 1.2 m high plastic snow fence ▪ Tree protective hoarding is to be: ▪ Installed prior to construction and remain until construction is completed; ▪ Installed and protected from construction activity, grade changes, surface treatment or excavations of any kind is permitted within the TPZ; ▪ Installed per OPSD 220.010 - Barrier for Tree Protection; ▪ Installed per the minimum TPZ distances detailed in the Tree Preservation Plans in the Arborist Report (Appendix C); and Installed as shown on TP-1 and TP-2 of the Tree Preservation Plans.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.6	Vegetation has been recommended to be retained and preserved beyond the construction limits.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.7	The tree protection fencing will be maintained until all construction is completed, soils are stabilized, and all the equipment has been removed from the site.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.8	Prior to the commencement of tree removals, all limits of the locations of the tree preservation fencing must be clearly staked in the field, installed per approved plans, and approved by the Contract Administrator. All trees within the TPZ must be left standing. The tree removals must be coordinated in accordance and compliance with the MBCA.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.9	All removals must be felled into the work area to ensure that damage does not occur to the trees within the TPZ.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.10	Upon completion of the tree removals, all felled trees are to be removed from the site, and all should be brush chipped. All brush, roots and wood debris must be shredded into pieces that are smaller than 25 mm in size to ensure that any insect pests that could be present within the wood are destroyed.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.11	The CFIA has issued a prohibition of movement where the Emerald ash borer (Agrilus planipennis) (EAB) has been confirmed. EAB has been found within the southern Ontario and is within the EAB Regulated Area which covers most of Ontario and a portion of western Quebec. This directive pertains to the movement of regulated materials (including but not limited to ash wood or bark and ash wood chips or bark chips) from a regulated area. EAB regulated articles moving out of a regulated area must be accompanied by a Movement Certificate issued by the CFIA. Refer to the EAB Regulated Areas of Canada found on the CFIA website.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.12	Ash materials may be removed from the site and disposed of within the 'Regulated Area' (see CFIA website for the 'Regulated Area' limits). Should it be necessary to dispose of Ash products outside of the 'Regulated Area' a 'Movement Certificate' will be required from the CFIA prior to transport.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.13	Tree protection fencing must be constructed and installed as per the details on the approved Tree Preservation Plan. Upon installation of the fencing, the Contractor will contact the Contract Administrator to review and approve the fencing and its location prior to commencement of any grading work.

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7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.14	Areas within the TPZ are not to be used for any type of storage (e.g. storage of debris, construction material, surplus soils, and construction equipment). No trenching or tunnelling for underground services shall be located within the TPZ or dripline of trees designated for preservation within or adjacent to the construction zone.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.15	No grade changes shall occur within the TPZ unless approved as part of this report. If any grade changes may occur, either as a cut or fill situation, the consulting arborist must be notified prior to such work occurring to ensure that all precautions to preserve the tree are made.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.16	Trees shall not have any rigging cables or hardware of any sort attached or wrapped around them, nor shall any contaminants be dumped within the protective areas. Further, no contaminants shall be dumped or flushed where they may come into contact with the feeder roots of the trees.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.17	If it is necessary to remove additional limbs or portions of trees after construction has commenced to accommodate the construction, the consulting arborist is to be informed and under their direction the removal is to be executed carefully and in full accordance with arboricultural techniques, by a certified arborist.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.18	A site meeting will be held with Contractor and Contract Administrator to review the clearing limits and confirm the installation location for the temporary tree protection fence.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.19	Tree removal along the tree retention limit must be carefully felled away from the tree retention limit and into the construction / development area. Stumps adjacent to trees identified for retention are to be flush cut and not chipped or grubbed to avoid impacts to retained trees.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.20	All approved root pruning is to take place by or under the supervision of an arborist and in accordance good arboricultural practices.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.21	Pruned root ends shall be neatly and squarely trimmed, and the area shall be backfilled with clean native fill as soon as possible to prevent desiccation and promote root growth.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.22	The exposed roots shall not be allowed to dry out and an appropriate watering schedule shall be undertaken (e.g. water bi-weekly to field capacity between June 1st and September 15th) so that the roots maintain optimum soil moisture during construction and backfilling operations.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.23	Backfilling shall occur immediately and shall be with clean uncontaminated topsoil from an approved source. It is recommended that texture of backfill be coarser than existing soils, and that backfill comes into clean contact with existing soils, i.e. remove air pockets, sod, etc.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.24	Tree protection fencing shall be erected prior to the start of construction and demolition and maintained for the duration of the work. Priority should be given to protecting vegetation that will not be impacted by grading and construction as this vegetation along property lines provides a visual barrier, shade, noise and wind buffer between properties.

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7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.25	All limbs damaged or broken during construction shall be pruned cleanly, utilizing by-pass secateurs in accordance with approved arboricultural practices. Should there be a potential risk of transfer of disease from infected to non-infected trees, tools must be disinfected after pruning each tree by dipping in methyl hydrate. This practice is particularly important during periods of tree stress and when pruning many members of the same genera, within which a disease could be spread quickly (i.e., Verticillium Wilt on Maples or Fireblight on genera of the Rosaceae family).
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.26	All pruning cuts should be made to a growing point such as a bud, twig or branch, cut just outside the branch collar (the swollen area at the base of the branch that sometimes has a bark ridge), and perpendicular to the branch being pruned rather than as close to the trunk as possible, minimizing the site of the wound. No stubs should be left. Poor cut location, poor cut angle and torn cuts are not acceptable.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.27	Extensive pruning is best completed before plants break dormancy. Pruning should be limited to the removal of no more than 25% of the total bud and leaf bearing branches. Pruning should include the careful removal of: ▪ deadwood, ▪ branches that are weak, damaged, diseased and those which will interfere with construction activity, ▪ secondary leaders of conifers, ▪ trunk and root suckers, ▪ trunk waterspouts, and tight V-shaped or weak crotches (included unions).
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.28	Any branches that overhang the work area and require pruning are to be pruned using good arboricultural practices utilizing by-pass secateurs in accordance with American National Standard (ANSI) A300 (Part 1) – 2008 Pruning.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.29	The Contractor must report immediately any damage to trees such as broken limbs, damage to roots, or wounds to the main trunk or stem systems so that the damage can be assessed immediately.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.30	Periodic inspections will be undertaken by the site supervisor to ensure that the mitigation measures are being maintained during construction.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.31	The temporary protection fence is to be maintained throughout the entire construction period. No equipment storage, flushing of fuel, washing of construction equipment, and storage of spoil or construction debris is to occur behind the temporary protection fence.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.32	To avoid root zone impacts on trees to be retained, excavated material will not be stored against the tree protection barrier.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.33	Given the evidence of Species at Risk bats roosting within the study area on the Terrestrial Ecosystem Existing Conditions and Impact Assessment Report, tree removals and canopy pruning are to be coordinated outside of the active period for bats (e.g. from the beginning of April up to the end of November). Overall clearing of trees would be permitted between December 1 to March 31.

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7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.34	Tree removals and canopy pruning are to be coordinated outside of the Migratory Bird Nesting Season (April 1 to August 31). Overall clearing of trees would be permitted between October 1 to March 31.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.35	If tree works must be completed within the Migratory Bird Nesting Season, surveying for nests and nest activity will be conducted to ensure compliance with the MBCA. Nest surveys will be performed by a qualified Biologist no sooner than 48 hours before tree pruning is to take place.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.36	The temporary protection fence will be removed last after all the construction has been completed, soils are stabilized, and all the equipment has been removed.
7.0 Landscape	7.1 Impacts to Trees	MTO MNR	7.1.37	Where grading will encroach into a large proportion of a TPZ resulting in cut or fill, or change of grade or slope, the following measures are to be applied: ▪ Trees are to be preserved during this work. The following methods are to be applied: ▪ Temporary removal of tree protection fencing; ▪ Wrap trunk up to 1.4m height with tree wrap, or; ▪ Place 4' length 2"x4"s around the trunk spaced at 2" apart and wrap with rope or tape to prevent movement; ▪ No grading work within 1m of the trunk of the trees that are <30cm DBH and 2m of trees that are ≥30cm DBH. Create a soil mound / transition at this limit and proposed grading works. ▪ Add 100mm depth mulch between the trunk and grading limit. ▪ At the completion of grading works re-install tree protection fencing ▪ Any grading required within a TPZ is to be conducted by hand using a hard rake or equivalent. Addition or removal of soil to be done by hand where possible. If equipment must be used, after completion of grading works soil is to be scarified to a depth of 5cm to reduce compaction from equipment. Reinstate tree protection fencing at the completion of grading works.
8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.1	SSP199S44 – Traffic Control at Intersections, has been included in the tender package. This special provision requires the use of police services to direct traffic at signalized intersections when those intersections are adversely affected by construction operations.

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8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.2	Lane reductions and ramp closures will be kept to the minimum required to complete the work.
8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.3	A Traffic Management Plan will be implemented to minimize the impacts of closures.
8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.4	Advance signage will be provided prior to lane and ramp closures.

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8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.5	Signed detours will be in place during ramp closures.
8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.6	An operational constraint has been included in the contract for maintenance of detour routes. This will require the Contractor to provide advance notice to the Contract Administrator (CA) of full closures to allow the CA time to perform a review of the detour route and document conditions. The CA shall then reassess the detour route and document the conditions after each use of the route and in the event post construction repairs to the municipal roads are required, the Contractor shall make all necessary repairs as directed by the CA.
8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.7	The existing private and commercial entrances within the contract limits shall be maintained in a safe and usable condition at all times. The Contractor shall provide notification of any temporary entrance impacts (start and duration) to the property owner(s)/occupants 48 hours in advance of the work. All entrances shall be restored prior to shutting down at the end of the day. Access to all sideroads shall be maintained in a safe and usable condition at all times.

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8.0 Traffic	8.1 Lane Reductions and Ramp Closures	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.1.8	Disruption will be minimized by following Ontario Traffic Manual Book 7 Temporary Conditions.
8.0 Traffic	8.2 Temporary Closure of Highway 401	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.2.1	Traffic will be notified a minimum of two (2) weeks in advance of Highway 401 lane closures with TC-64 Advanced Notification Signing (ANS) and TC-64 Advanced Warning Signs (AWS). Four (4) PVMS boards will also be deployed on Highway 401. For full closures, road closure and detouring signage will also be installed.
8.0 Traffic	8.2 Temporary Closure of Highway 401	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.2.2	Minor encroachment was observed for the southbound left-turn and westbound right-turn movements at the intersection of SDG County Road 27 and SDG County Road 2. This encroachment will be mitigated by paving the existing granular shoulder around the northeast radius of the intersection.

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8.0 Traffic	8.2 Temporary Closure of Highway 401	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.2.3	To mitigate the northbound left-turn traffic queues that could exceed the storage lane and block the northbound through traffic along SDG County Road 2/34 at the Highway 401 south ramp terminal, either a combination of signal timing adjustments (as those developed during the preliminary design phase) and police presence will be used, or alternatively, separating the detour directions over two nights to minimize traffic impacts on local roads.
8.0 Traffic	8.2 Temporary Closure of Highway 401	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.2.4	The use of paid-duty police at key locations along the detour route will be required.
8.0 Traffic	8.3 Temporary Closure of Fraser Road	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.3.1	Advanced notice of the Fraser Road closure will be provided to the affected stakeholders, emergency service providers, municipality, student transportation providers, and local residents.

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8.0 Traffic	8.3 Temporary Closure of Fraser Road	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.3.2	A temporary EMS access road to Lapierre Road from the westbound shoulder of Highway 401 approximately 125 m west of Fraser Road is proposed to allow EMS access in the unlikely event of a train blocking Fraser Road and will be removed upon the reopening of Fraser Road prior to construction completion. This granular access will accommodate the access/egress turning movements of a fire truck design vehicle during both stages of the Highway 401 construction staging. A locked gate would be provided to prevent access to/from the highway. A culvert would be installed to maintain positive drainage. Barrels would be placed along the highway shoulder to prevent the contractor from parking equipment/vehicles in this area. Access will be from the westbound lanes only.
8.0 Traffic	8.3 Temporary Closure of Fraser Road	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.3.3	Further consultation with CN Rail confirmed that placement of all traffic control devices and traffic control persons (flaggers) must comply with CN's minimum offset clearance standards (30 feet from the edge of the nearest rail of the closest track). Traffic control plans must prevent queuing or alternating single-lane traffic over the railway tracks, ensuring that northbound and southbound traffic stay in their respective lanes as required by Transport Canada. Depending on how the contractor accesses the bridge site, a permit from CN may be required (ex. crossing the CN rail for construction access or otherwise affecting the CN right-of-way) which will be the responsibility of the contractor. Permit processing usually takes 8-10 weeks, while flagging arrangements require 4-6 weeks.
8.0 Traffic	8.3 Temporary Closure of Fraser Road	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.3.4	These measures ensure safety and regulatory compliance during construction near CN tracks, the following will be included in the tender package: ▪ CN work permit application. ▪ Standard Special Provision 100S22 - Indemnification and Insurance Requirements Concerning the Canadian National Railway Company, May 2023. Operational Constraint restricting Contractors from implementing single-lane alternating traffic control over the rail tracks and the need to coordinate with CN for permits and potential flagging.

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8.0 Traffic	8.3 Temporary Closure of Fraser Road	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.3.5	Potential delays will be minimized by: ▪ Regular communication with Emergency Service Providers during construction. Implementation of the emergency response plan to address scenario of increased emergency response times to Lapierre Road residents in the event a train blocks Fraser Road
8.0 Traffic	8.4 Lane closures may affect vehicle and worker safety during construction.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.4.1	To mitigate the risk to the travelling public and workers throughout the construction zone that does not have existing illumination a regulatory speed limit reduction from 110 km/h to 80 km/h on Highway 401 is proposed for the following temporary conditions: ▪ Short duration shoulder closures ▪ Rolling closures and temporary full closures; and ▪ Long duration construction staging.
8.0 Traffic	8.4 Lane closures may affect vehicle and worker safety during construction.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.4.2	The Designated Construction Zone (DCZ) is proposed to have a length of 5.7 km to accommodate a transitional speed reduction and provide a 1.6 km long reduced speed zone at Fraser Road. Advanced Warning Signs (AWS), Advanced Notification Signs (ANS) & Portable Variable Message Signs (PVMS) will be deployed in both English and French.

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8.0 Traffic	8.4 Lane closures may affect vehicle and worker safety during construction.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.4.3	Upon installation of night work illumination, the Contractor shall ensure that all construction lighting is adjusted and maintained as to not interfere with the vision or operational safety of vehicle drivers on or near adjacent roadways or interfere with residences adjacent to the construction site.
8.0 Traffic	8.4 Lane closures may affect vehicle and worker safety during construction.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.4.4	The Contractor shall ensure that the existing guide rail system, an approved temporary barrier system, or the new guiderail system as per contract requirements shall be in place by the end of each day for the duration of the Contract at all locations of existing guiderail on Highway 401.
8.0 Traffic	8.5 A Communication Plan for Traffic Management has been developed to communicate road and lane closures to local stakeholders.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.5.1	A comprehensive Communication Plan for Traffic Management shall be developed, maintained, and executed by the Contractor throughout the duration of the Project. This communication plan details the advance notification requirements for various project milestones including, project start-up, Fraser Road full closure, Highway 401 full closure(s), and long duration singe lane closure(s) on Highway 401 (construction staging). Advanced notice will be provided to all affected stakeholders including MTO, municipalities, emergency service providers, student transportation providers, and residents.

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8.0 Traffic	8.5 A Communication Plan for Traffic Management has been developed to communicate road and lane closures to local stakeholders.	MTO United Counties of Stormont, Dundas and Glengarry Township of South Glengarry Student transportation providers Travelling public Local residents	8.5.2	The communication plan details the requirements for media releases to local newspapers, radio and televisions stations for broadcasting/publication a minimum of two (2) weeks in advance of closure events. Requirements for Canada Post mail-outs to residents at project start-up and in advance of full closure events is also detailed within the communication plan. In addition to media releases and mail-outs there are also requirements for the Contractor to provide advance notice to a list of applicable stakeholders in-writing prior to major project milestones.
9.0 Utilities	9.1 The proposed grade raise along Fraser Road will reduce the vertical clearance at existing aerial utility crossings. The overhead clearance at Cornwall Electric's plant at Sta. 10+264 (roughly 219 m south of the existing abutment), will be reduced by 150 – 210 mm, increasing the potential of being struck by traffic or construction equipment.	MTO Cornwall Electric (CE)	9.1.1	In accordance with the process outlined within the MTO Utility Relocation Guidelines, WSP issued utility letters to Cornwall Electric to identify the potential conflict. Following a field review, it was determined that the existing poles don't have sufficient room to accommodate raising the existing cables as they are currently located at the top of the existing poles, therefore three (3) existing utility poles will require replacement with taller poles which will allow the cables to be raised. CE provided a preliminary cost estimate to replace these utility poles and raise the elevation of the aerial cables to satisfy vertical clearance requirements. The quote was reviewed, accepted and the MTO issued a Moving of Utilities (MOU) on June 5, 2025 to complete the relocation work prior to construction. Cornwall Electric completed the work and raised the elevation of the existing aerial crossings on July 7, 2025.
9.0 Utilities	9.2 The existing National Bell Fibre Optic Transmission System (FOTS) is buried within the Highway 401 ROW near the proposed south abutment and has been identified a potential conflict during construction. As the alignment and elevation of the FOTS are unknown, this conduit may present an obstruction conflict with the proposed south abutment piles. The vibration and settlement tolerances of the Bell FOTS plant are also unknown, and construction activities could potentially damage the plant. Excessive vibration and settlement can cause physical damage to the	MTO Bell Canada	9.2.1	Bell Canada was contacted and was unable to provide the exact location of the FOTS plant and recommended daylighting test pits be conducted. The Ministry was advised that the alignment and elevation of the Bell FOTs plant is unknown. A combination of Test pitting (daylighting) and Ground Penetrating Radar (GPR) was conducted in August 2025. The results of these investigations were inconclusive. An Operational Constraint shall be included in the tender document to advise the Contractor of the presence of various utilities within the work area, and that various mitigation and protection measures may be necessary, as well as the requirement to verify the location of all utilities and applicable measures in coordination with the appropriate utility company prior to proceeding with work.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
	sensitive fibre optic cables (cracks breaks or complete severances) or can introduce micro/macro bending which causes the fibre optic cables to stretch or compress, ultimately resulting in signal loss or degradation. The aforementioned concerns may result in a loss in service to a large number of users, repair costs, customer dissatisfaction, lost sales and reputation damage.			
9.0 Utilities	9.2 The existing National Bell Fibre Optic Transmission System (FOTS) is buried within the Highway 401 ROW near the proposed south abutment and has been identified a potential conflict during construction. As the alignment and elevation of the FOTS are unknown, this conduit may present an obstruction conflict with the proposed south abutment piles. The vibration and settlement tolerances of the Bell FOTS plant are also unknown, and construction activities could potentially damage the plant. Excessive vibration and settlement can cause physical damage to the sensitive fibre optic cables (cracks breaks or complete severances) or can introduce micro/macro bending which causes the fibre optic cables to stretch or compress, ultimately resulting in signal loss or degradation. The aforementioned concerns may result in a loss in service to a large	MTO Bell Canada	9.2.2	Section 6.9.5 of the Foundations Investigation and Design Report (FIDR) notes that settlement monitoring is recommended to assess the timing of any required maintenance to the surface treatment or pavement structure on Fraser Road within/near the approach areas to the bridge structure in the years following construction. It is recommended that the post-construction settlement monitoring program consist of settlement points (PK nails) in the concrete curb and gutter installed after completion of construction. A total of six (6) settlement monitoring points (3 on each approach embankment should be installed at 5 m, 10 m and 20 m behind the new abutments.

I.D.#	Issue / Concern / Potential Effects	Concerned Agencies	I.D.#	Proposed Mitigation / Protection / Monitoring
	number of users, repair costs, customer dissatisfaction, lost sales and reputation damage.			
10.0 Archaeological Resources	10.1 The proposed works will occur within areas identified as being disturbed. No further archaeological assessment is required as part of the study.	MTO MCM Indigenous Communities	10.1.1	Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licenced consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b).
10.0 Archaeological Resources	10.1 The proposed works will occur within areas identified as being disturbed. No further archaeological assessment is required as part of the study.	MTO MCM Indigenous Communities	10.1.2	The Funeral, Burial and Cremation Services Act (FBCSA), 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner (Government of Ontario 2002). It is recommended that the Registrar, FBCSA at the Ministry of Public and Business Service Delivery, are also immediately notified.
11.0 Construction Noise and Air Quality Impacts	11.1 Potential noise impacts may occur during construction.	MECP Local residents	11.1.1	To minimize impacts on adjacent residents, the following best practices related to noise should be in place during construction: ▪ All equipment shall 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.
11.0 Construction Noise and Air Quality Impacts	11.1 Potential noise impacts may occur during construction.	MECP Local residents	11.1.2	The Ontario Legislation Act (2006) exempts MTO from the requirements of municipal noise By-Laws. As such, MTO is not required to obtain exemptions from municipal noise By-Laws.
11.0 Construction Noise and Air Quality Impacts	11.2 Potential dust and air quality impacts may occur caused by construction and construction traffic.	MECP Local residents	11.2.1	Impacts minimized by Contractor compliance with General Conditions to minimize dust and other air quality impacts.

6 MONITORING

The Contract Administrator will ensure that the environmental protection measures outlined in this DCR are carried out. If the impacts of construction are different than anticipated, or if the method of construction is such that there are greater than anticipated impacts, the Contractor's methods of operation will be changed or modified to reduce those impacts. During construction, the on-site Contract Administrator ensures that implementation of mitigating measures and key design features are consistent with the contract and external commitments. In addition, the effectiveness of the environmental mitigation measures is assessed to ensure that:

- Individual mitigating measures are providing the expected control and/or protection;
- Composite control and/or protection provided by the mitigating measures is adequate;
- Mitigating measures are maintained and any necessary repairs are completed quickly; and,
- Additional mitigating measures are provided, as required, for any unanticipated environmental problems that may develop during construction.

On-site construction administration staff will ensure that environmental measures outlined in the Contract Documents are carried out. Post-construction monitoring will be carried out as required. In the event that problems develop, the Ontario Ministry of Transportation (MTO) and appropriate provincial ministries and/or agencies will be contacted to provide additional input and recommendations.

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Signature Page

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SP/BF/CL/al/ld

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The original of the technology-based document sent herewith has been authenticated and will be retained by WSP for a minimum of ten years. Since the file transmitted is now out of WSP's control and its integrity can no longer be ensured, no guarantee may be given with regards to any modifications made to this document.

https://wsponlinecan.sharepoint.com/sites/ca-ca00197044282/shared documents/05. technical/.06 environmental/02. consultation/9.0 dcr/221-08798-00-r-final-highway 401 fraser road underpass dcr-01april2026_aoda.docx

APPENDIX A

Consultation Materials

Ontario

ONTARIO GOVERNMENT NOTICE

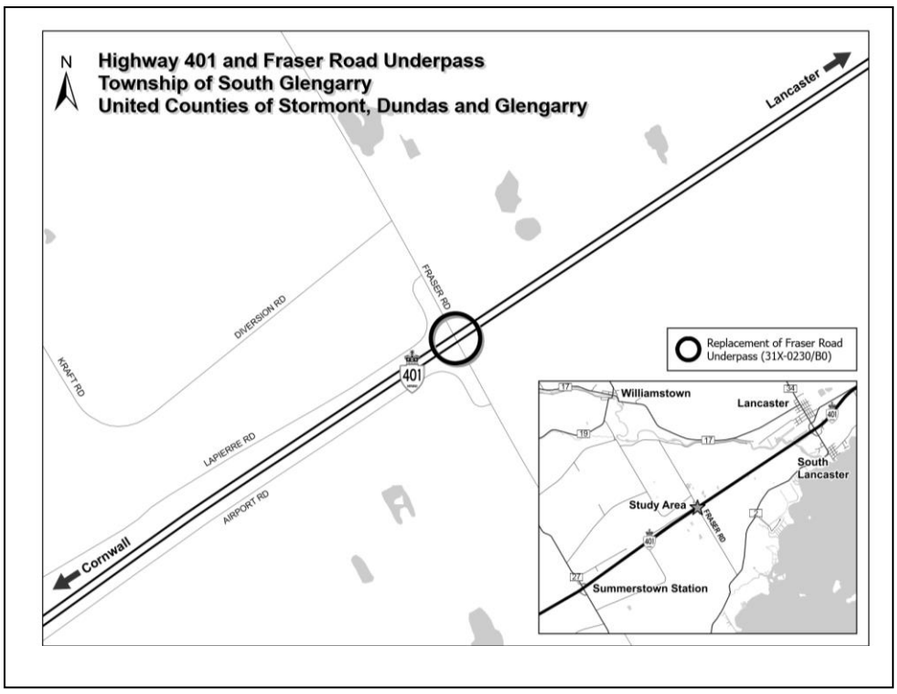
NOTICE OF STUDY COMMENCEMENT
HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00)
DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

THE STUDY

The **Ontario Ministry of Transportation (MTO)** has retained **WSP Canada Inc. (WSP)** to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). A Preliminary Design Study and Transportation Environmental Study Report were completed in 2020 which evaluated alternatives and recommended replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. The replacement bridge is to be built to accommodate the future Highway 401 footprint (six (6) lanes) consisting of one (1) additional outside lane in each direction. The Project location is shown in the key map below.

The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rails as required for the new structure and vertical alignment improvements.



THE PROCESS

This project is being carried out in accordance with the approved environmental planning process for Group 'B' projects under the MTO *Class Environmental Assessment* (Class EA) *for Provincial Transportation Facilities* (2000). As part of the Class EA process, interested parties are notified of the proposed works and have an opportunity to provide comments or request additional information. A Design and Construction Report will be prepared and made available for a 30-day comment period at the conclusion of the Detail Design phase.

CONSULTATION AND COMMENTS

You are encouraged to participate in the Study and to provide comments to the Project Team. For up-to-date information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com. If you wish to have your name added to the project mailing list or have any comments or questions about the study, please contact one of the following Project Team members:

Lee Collins, P.Eng.
MTO Project Manager
Ministry of Transportation – Project Delivery East
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Carmen Lapointe, P.Eng., PMP
Consultant Project Manager
WSP Canada Inc.
Phone: (613) 690-1092
E-mail: Carmen.Lapointe@wsp.com

If you have any accessibility requirements to participate in this project, please contact one of the Project Team members listed above. Comments and information are being collected to assist the MTO in meeting the requirements of the Ontario *Environmental Assessment Act*. Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

Ontario

AVIS DU GOUVERNEMENT DE L'ONTARIO

AVIS DE DÉBUT D'ÉTUDE

RÉFECTION DES PASSAGES SOUTERRAINS DE L'AUTOROUTE 401 ET DU CHEMIN FRASER (GWP 4248-15-00)

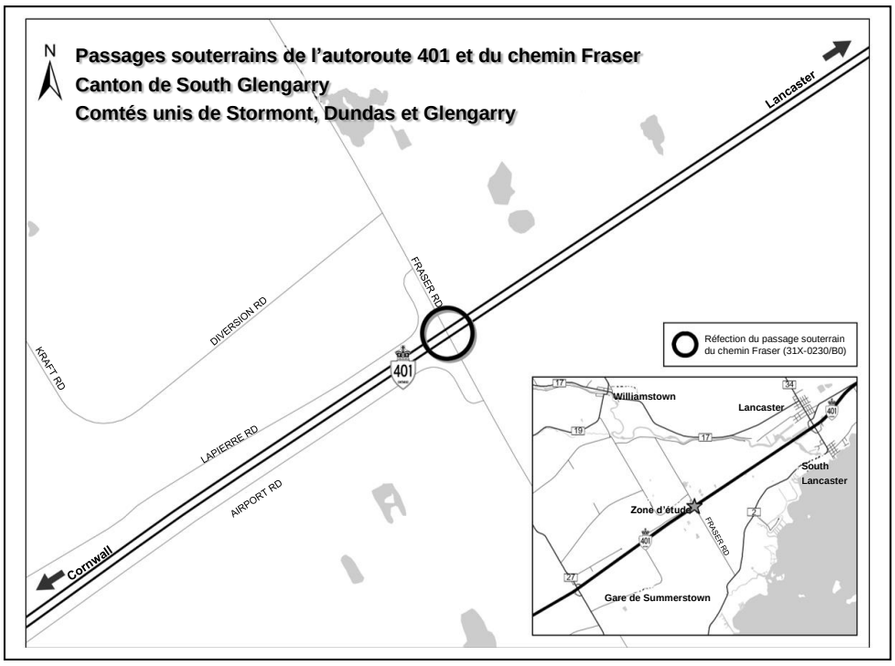
ÉTUDE DE CONCEPTION DÉTAILLÉE ET ÉVALUATION ENVIRONNEMENTALE DE PORTÉE GÉNÉRALE

L'ÉTUDE

Le **ministère des Transports de l'Ontario (MTO)** a retenu les services de **WSP Canada Inc. (WSP)** pour réaliser l'étude de conception détaillée et l'évaluation environnementale de portée générale pour remplacer le passage souterrain du chemin Fraser, à 4,5 km à l'ouest de Lancaster sur l'autoroute 401 dans le canton de South Glengarry, dans les comtés unis de Stormont, Dundas et Glengarry (le projet). Une étude de conception préliminaire et un rapport d'étude environnementale sur les transports ont été achevés en 2020. Ces documents ont évalué les solutions de rechange et recommandé la réfection de la structure des passages souterrains comme solution à privilégier sur le plan technique. La structure doit être remplacée en raison de son état actuel et de son dégagement vertical insuffisant au-dessus de l'autoroute 401. Le pont de remplacement doit être construit en fonction de la future empreinte de l'autoroute 401 (six [6] voies), comprenant une (1) voie extérieure supplémentaire dans chaque direction. L'emplacement du projet figure sur la carte-index ci-dessous.

Le projet comprend ce qui suit:

- Réfection des passages souterrains existants le long du tracé horizontal existant
- Nivellement du profil du remblai d'approche en fonction de la nouvelle profondeur de la structure et de l'augmentation du dégagement vertical sur l'autoroute 401
- Élargissement du remblai
- Reconstruction de la chaussée
- Améliorations du drainage
- Remplacement des bordures et caniveaux
- Installation des glissières de sécurité nécessaires à la nouvelle structure et à l'amélioration de l'alignement vertical



LE PROCESSUS

Ce projet respectera le processus de planification environnementale approuvé pour les projets du groupe « B » en vertu de l'*Évaluation environnementale de portée générale pour les routes provinciales* (2000) du MTO. Dans le cadre du processus d'évaluation environnementale de portée générale, les parties intéressées sont informées des travaux proposés et ont la possibilité de présenter des observations ou de demander des informations supplémentaires. Un rapport sur la conception et la construction sera préparé et mis à la disposition des intéressés pour une période de 30 jours, à la fin de la phase de conception détaillée.

CONSULTATION ET COMMENTAIRES

Nous vous encourageons à participer à l'étude et à présenter vos observations à l'équipe de projet. Pour obtenir des informations à jour sur le projet, veuillez consulter le site Web du projet à l'adresse suivante : www.Hwy401FraserRdUnderpass.com. Si vous souhaitez que votre nom soit ajouté à la liste de diffusion du projet ou si vous avez des commentaires ou des questions concernant l'étude, veuillez communiquer avec l'un des membres suivants de l'équipe de projet :

Lee Collins, P.Eng.
Gestionnaire du projet du MTO
Ministère des Transports – Mise en œuvre des projets – Est
Téléphone : 613 583-6752
Courriel : Lee.Collins@ontario.ca

Carmen Lapointe, P.Eng., PMP
Gestionnaire du projet et consultant
WSP Canada Inc.
Téléphone : 613 690-1092
Courriel : Carmen.Lapointe@wsp.com

Si vous avez des besoins sur le plan de l'accessibilité pour participer à ce projet, veuillez communiquer avec l'un des membres de l'équipe de projet mentionnés ci-dessus. Les commentaires et les renseignements requis sont recueillis pour aider le MTO à satisfaire aux exigences de la *Loi sur les évaluations environnementales de* l'Ontario. Les renseignements seront recueillis conformément à la *Loi sur l'accès à l'information et la protection de la vie privée*. À l'exception des renseignements personnels, tous les commentaires seront versés au dossier public.

Des renseignements sont disponibles en français en composant le 613 690-1092 (Carmen Lapointe).

Ministry of Transportation

Project Delivery
1355 John Counter Boulevard
Postal Bag 4000
Kingston, Ontario K7L 5A3
Tel.: 613-545-4701
1-800-267-0295
Fax: 613-540-5106

Ministère des Transports

Zone d'exécution du projet
1355, boulevard John Counter
CP/Service de sacs 4000
Kingston (Ontario) K7L 5A3
Tél.: 613-545-4701
1-800-267-0295
Téléc. 613 540-5106

Ontario

October 2, 2024

Nolan Quinn
MPP – Stormont-Dundas-South Glengarry
120 Second Street West
Cornwall, ON K6J 1G5

Re: Notice of Study Commencement
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00)
Detail Design and Class Environmental Assessment Study

Dear MPP Nolan Quinn:

The **Ontario Ministry of Transportation (MTO)** has retained **WSP Canada Inc. (WSP)** to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). A Preliminary Design Study and Transportation Environmental Study Report were completed in 2020 which evaluated alternatives and recommended replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. The replacement bridge is to be built to accommodate the future Highway 401 footprint (six (6) lanes) consisting of one (1) additional outside lane in each direction. The Project location is shown in the enclosed Notice.

The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rails as required for the new structure and vertical alignment improvements.

The Project is being carried out in accordance with the approved environmental planning process for Group ‘B’ projects under the MTO Class Environmental Assessment (Class EA) for

Provincial Transportation Facilities (2000). A Design and Construction Report will be prepared and made available for a 30-day comment period at the conclusion of the Detail Design phase.

The purpose of this letter is to notify you of the Project and provide you with an opportunity to identify any interests you may have. We invite you to contact the Project Team throughout the Project with any questions or comments you wish to share by contacting the undersigned. For up-to-date information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Please be advised that the attached Ontario Government Notice (OGN) advertising the Study Commencement will be published in the *Cornwall Seaway News* and the *Cornwall Express, Community Press* on October 2, 2024. A notice will also be delivered to potentially affected residents and businesses within the Project area to inform them directly of the Study Commencement.

Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act* (FOIPPA). With the exception of personal information, all comments will become part of the public record. If you have accessibility requirements in order to participate in this project, please contact the undersigned.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

Yours truly,

Lee Collins, P.Eng.
MTO Project Manager
Ministry of Transportation – Project Delivery East
Email: lee.collins@ontario.ca
Phone: (613) 583-6752

Encl. Notice of Study Commencement

cc: Carmen Lapointe, Consultant Project Manager, WSP Canada Inc.
Krystal Lacan, MTO Environmental Planner, MTO Eastern Region
Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

Ministry of Transportation

Operations Branch
1355 John Counter Boulevard
Postal Box 4000
Kingston, Ontario K7L 5A3
Tel.: 1-613-545-4600

Ministère des Transports

Direction des opérations
1355, boulevard John Counter
Case postale 4000
Kingston, Ontario K7L 5A3
Tél.: 1-613-545-4600

Ontario

STUDY COMMENCEMENT LETTER – INDIGENOUS COMMUNITY

October 2, 2024

«Title» «FirstName» «LastName»
«JobTitle»
«Address1»
«Address2»
«City», «Province» «PostalCode»

Re: Notice of Study Commencement
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00)
Detail Design and Class Environmental Assessment Study

Dear «Title» «FirstName» «LastName»:

The **Ontario Ministry of Transportation (MTO)** has retained **WSP Canada Inc. (WSP)** to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). A map of the project study area is included for your reference.

The purpose of this letter is to notify you of the project and provide you with an opportunity to identify any interests you may have. The project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rails as required for the new structure and vertical alignment improvements.
- The replacement bridge is to be built to accommodate a possible future Highway 401 footprint (six (6) lanes) consisting of one (1) additional outside lane in each direction.

This project is being carried out in accordance with the approved environmental planning process for Group ‘B’ projects under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). A Design and Construction Report will be prepared and made available for a 30-day comment period at the conclusion of the Detail Design phase.

The preliminary design phase for this project was completed in 2020 which evaluated alternatives and recommended the replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. A transportation environmental study report was prepared as part of the preliminary design phase and it documents the existing conditions of the study area, the evaluation of the alternatives, and identified the preferred plan and commitments to future work.

If you have any information with respect to any environmental, social, and cultural values your community may have within the study area; have comments or questions that you would like to share; or you would like to meet with the MTO Project Team, please contact me. For up-to-date information about the Project, please also visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Information collected during this project will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. All information and comments, with the exception of personal information and other protected information, will become part of the public record. Please contact me if you have accessibility requirements in order to participate in this project.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

If you have any questions or comments, or if you require further information regarding this project, please feel free to contact me, Franca Sacchetti, Director of East Operations at franca.saccetti@ontario.ca, or Peter Copping, Indigenous Liaison Specialist at peter.a.copping@ontario.ca. The MTO will continue to engage with you as this project progresses.

Sincerely,

Franca Sacchetti

Director, East Operations

Encl. Notice of Study Commencement

cc: Lee Collins, MTO Project Engineer, MTO Eastern Region
Krystal Lacan, MTO Environmental Planner, MTO Eastern Region
Peter Copping, MTO Indigenous Liaison Specialist
Carmen Lapointe, Consultant Project Manager, WSP Canada Inc.
Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

October 2, 2024

Notice Issued to all Agencies / Stakeholders / Utility Organizations / Property Owners

Re: Notice of Study Commencement
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) Detail Design and Class Environmental Assessment Study

To Whom it May Concern:

The **Ontario Ministry of Transportation (MTO)** has retained **WSP Canada Inc. (WSP)** to conduct the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass, located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). A Preliminary Design Study and Transportation Environmental Study Report were completed in 2020 which evaluated alternatives and recommended the replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. The replacement bridge is to be built to accommodate the future Highway 401 footprint (six (6) lanes) consisting of one (1) additional outside lane in each direction. The Project location is shown in the enclosed Notice.

The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rails as required for the new structure and vertical alignment improvements.

The Project is being carried out in accordance with the approved environmental planning process for Group ‘B’ projects under the MTO *Class Environmental*

Suite 300
2611 Queensview Drive
Ottawa, ON, Canada K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
wsp.com

Assessment (Class EA) *for Provincial Transportation Facilities* (2000). As part of the Class EA process, interested parties are notified of the proposed works and have an opportunity to provide comments or request additional information. A Design and Construction Report will be prepared and made available for a 30-day comment period at the conclusion of the Detail Design phase.

The purpose of this letter is to notify you of the Project and provide you with an opportunity to identify any interests you may have. We invite you to contact the Project Team throughout the Project with any questions or comments you wish to share by contacting Carmen Lapointe, WSP Consultant Project Manager, at (613) 690-1092 or Carmen.Lapointe@wsp.com. For up-to-date information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act* (FOIPPA). With the exception of personal information, all comments will become part of the public record. If you have accessibility requirements in order to participate in this project, please contact the undersigned.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

Sincerely,



Carmen Lapointe, P.Eng., PMP
WSP Project Manager

Encl. Notice of Study Commencement

cc: Lee Collins, MTO Project Engineer, MTO Eastern Region
Krystal Lacan, MTO Environmental Planner, MTO Eastern Region
Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

Highway 401 and Fraser Rd Underpass

Name	Organization	Department	Title	Email	Phone	Address	Second Address	City	Prov	Postal Code	P.O. Box	Preffered Contact Method	Notes
Federal Agencies													
To Whom It May Concern	CN Rail	Public Works		Proximity@cn.ca; Permits.qld@cn.ca		1 Administration Road		Concord	ON	L4K 1B9		Email	
Salar Zulfiquar	CN Rail	Public Works - East	Senior Public Works Officer	salar.zulfiquar@cn.ca	905-669-3242				ON				
Nafey Gill	CP Rail	Project and Public Works	Manager	nafey.gill@cpkcr.com		1290 Central Parkway West	Suite 600	Mississauga	ON	L5C 4R3		Email	
Provincial Agencies													
Payton Hofstetter	Ministry of Agriculture, Food and Rural Affairs	Food Safety and Environmental Policy Branch	Rural Planner	payton.hofstetter@ontario.ca	226-962-8933	1 Stone Road West		Guelph	ON	N1G 4Y2			
To Whom It May Concern	Ministry of Agriculture, Food and Rural Affairs	Shared EA Notices	Shared EA Notices	SharedEANotices@ontario.ca		1 Stone Road West		Guelph	ON	N1G 4Y2		Email	
Karla Barboza	Ministry of Citizenship and Multiculturalism	Heirtage Planning Unit	Lead, Heritage Planning	karla.barboza@ontario.ca	416-660-1027	400 University Avenue	5th Floor	Toronto	ON	M7A 2R9		Email	
Erika Leclerc	Ministry of Citizenship and Multiculturalism	Heirtage Planning Unit	Heritage Planner	erika.leclerc@ontario.ca	416-305-0757	400 University Avenue	5th Floor	Toronto	ON	M7A 2R9		Email	
Adam Worth	Ministry of Natural Resources and Forestry	Kemptville Work Centre	District Manager (Acting)	adam.worth@ontario.ca	647-294-5292	10 Campus Drive, Unit 1		Kemptville	ON	K0G 1J0		Email	
Gillian Hartman & Cara Holtby	Ministry of Natural Resources and Forestry	Southern Region	Regional Planning Coordinator	SR.Planning@ontario.ca		300 Water Street	South Tower, 4th Floor, Box 7000	Peterborough	ON	K9J 8MS		Email	
Christina Kwan	Ministry of the Solicitor General	Capital Planning	Manager	christina.kwan@ontario.ca	647-201-6169	25 Grosvenor Street	13th Floor	Toronto	ON	M7A 1Y6		Email	
Laura Berazadi	Ministry of the Solicitor General	Capital Planning		laura.berazadi@ontario.ca	437-772-6257	25 Grosvenor Street		Toronto	ON	M7A 1Y6		Email	
Jennifer Backler	Ministry of the Solicitor General	Infrastructure Modernization		jennifer.backler@ontario.ca	437-533-1178	25 Grosvenor Street		Toronto	ON	M7A 1Y6		Email	
MECP EA Notification	Ministry of Environment, Conservation and Parks			eanotification.eregion@ontario.ca					ON				MECP East Region
Jon Orpana	Ministry of Environment, Conservation and Parks	Environmental Assessment Services	Environmental Resource Planner & EA Coordinator	jon.orpana@ontario.ca	613-561-8250	135 St Clair Avenue West	7th Floor	Toronto	ON	M4V 1P5			MECP East Region
Michael MacPherson	Ministry of Indigenous Affairs	Indigenous Relations Unit	Manager	michael.macpherson@ontario.ca	416-456-3603	160 Bloor Street East	4th Floor	Toronto	ON	M7A 2E6		Email	
Elected Officials													
Eric Duncan	Stormont—Dundas—South Glengarry		MP	eric.duncan@parl.gc.ca	613-937-3331	691 Brookdale Ave.	Unit C	Cornwall	ON	K6J 5C6			
Nolan Quinn	Stormont—Dundas—South Glengarry		MPP	nolan.quinn@pc.ola.org	613-933-6513	120 Second Street West	Suite 100	Cornwall	ON	K6J 1G5			
Municipalities													
Lachlan McDonald	Township of South Glengarry		Mayor	mayor@southglengarry.com	613-551-0091	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Martin Lang	Township of South Glengarry		Deputy Mayor	mlang@southglengarry.com	613-551-7205	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Stephanie Jaworski	Township of South Glengarry		Councillor	sjaworski@southglengarry.com	613-361-2232	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Sam McDonell	Township of South Glengarry		Councillor	smcdonell@southglengarry.com	613-330-8921	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Trevor Bougie	Township of South Glengarry		Councillor	tbougie@southglengarry.com	613-662-1370	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Joanne Haley	Township of South Glengarry	Planning, Building and Enforcement	General Manager	jhaley@southglengarry.com	613-347-1166 x2201	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Kyle McIntosh	Township of South Glengarry	Infrastructure Services	Technical Supervisor	kmcintosh@southglengarry.com	613-347-1166 x2501	6 Oak Street		Lancaster	ON	K0C 1N0	P.O. Box 220		
Jamie MacDonald	United Counties of Stormont, Dundas and Glengarry		Warden	jamiemacdonald@northglengarry.ca	613-551-8691	26 Pitt Street		Cornwall	ON	K6J 3P2			
Maureen Adams	United Counties of Stormont, Dundas and Glengarry		Chief Administrative Officer	madams@sdgcounties.ca	613-932-1515 x1202	26 Pitt Street		Cornwall	ON	K6J 3P2			
Todd Lihou	United Counties of Stormont, Dundas and Glengarry		Communications Coordiantor	tlihou@sdgcounties.ca	613-932-1515 x1205	26 Pitt Street		Cornwall	ON	K6J 3P2			
Benjamin de Haan	United Counties of Stormont, Dundas and Glengarry	Transportation	Director	bdehaan@sdgcounties.ca	613-932-1515 x1208	26 Pitt Street		Cornwall	ON	K6J 3P2			
Colleen Willison	United Counties of Stormont, Dundas and Glengarry	Transportation	Administrative Assistant	cwillison@sdgcounties.ca	613-932-1515 x1209	26 Pitt Street		Cornwall	ON	K6J 3P2			
Peter Young	United Counties of Stormont, Dundas and Glengarry	Planning & Economic Development	Director	pyoung@sdgcounties.ca	613-932-1515 x1266	26 Pitt Street		Cornwall	ON	K6J 3P2			
Cory Hagen	United Counties of Stormont, Dundas and Glengarry	Planning & Economic Development	Administrative Assistant	chagen@sdgcounties.ca	613-932-1515 x1216	26 Pitt Street		Cornwall	ON	K6J 3P2			
Katherine Beehler	United Counties of Stormont, Dundas and Glengarry	Emergency Management	Coordinator	kbeehler@sdgcounties.ca	613-932-1515 x1257	26 Pitt Street		Cornwall	ON	K6J 3P2			
To Whom It May Concern	United Counties of Stormont, Dundas and Glengarry	County Roads Emergency			613-930-3578	26 Pitt Street		Cornwall	ON	K6J 3P2			
Kimberley Casselman	United Counties of Stormont, Dundas and Glengarry		Director of Corporate Services / Clerk	kcasselman@sdgcounties.ca	613-932-1515 x1203	26 Pitt Street		Cornwall	ON	K6J 3P2			
Conservation Authorities													
Alison McDonald	Raisin Region Conservation Authority		General Manager	alison.mcdonald@rrca.on.ca	613-938-3611 x222	18045 County Road 2		Cornwall	ON	K6H 5T2	P.O. Box 429		
Josianne Sabourin	Raisin Region Conservation Authority		Administrative Assistant	josianne.sabourin@rrca.on.ca	613-938-3611 x233	18045 County Road 2		Cornwall	ON	K6H 5T2	P.O. Box 429		
Matthew Levac	Raisin Region Conservation Authority		Planning and Regulations Officer	matthew.levac@rrca.on.ca	613-938-3611 x225	18045 County Road 2		Cornwall	ON	K6H 5T2	P.O. Box 429		
Colin Herrewynen	Raisin Region Conservation Authority		Watershed Planner	colin.herrewynen@rrca.on.ca	613-938-3611 x232	18045 County Road 2		Cornwall	ON	K6H 5T2	P.O. Box 429		
Jason Symington	Raisin Region Conservation Authority		Drinking Water Source Protection Project Manager	jason.symington@rrca.on.ca	613-938-3611 x239	18045 County Road 2		Cornwall	ON	K6H 5T2	P.O. Box 429		
Hollie Kew	St. Lawrence Parks Commission	Chief Executive Officer	General Manager	Hollee.Kew@parks.on.ca	613-543-4328 x2469	13740 County Road 2	RR 1	Morrisburg	ON	K0C 1X0			
School Boards													
Ron Ferguson	Upper Canada District School Board		Director of Education	ron.ferguson@ucdsb.on.ca	613-342-0371 x1204	225 Central Avenue West		Brockville	ON	K6V 5X1			
Laurie Corrigan	Catholic District School Board of Eastern Ontario		Director of Education	director@cdsbeo.on.ca	613-258-7757	2755 Highway 43		Kemptville	ON	K0G 1J0			
Christian-Charle Bouchard	Conseil des écoles publiques de l'Est de l'Ontario		Director of Education	christian-charle.bouchard@cepeo.on.ca	613-747-3838	2445 St. Laurent Boulevard		Ottawa	ON	K1G 6C3			
Lyne Racine	Conseil scolair de district catholique de L'Est ontarien		Director of Education	directioneducation@csdceo.org	613-675-4691	875 County Road 17		L'Original	ON	K0B 1K0			Alternate: courriel@csdceo.org
Paul Roulea	Consortium de transport scolaire de l'Est		Director RTA	p.rouleau@cdse.ca	855-689-2873 x224	CP 740		Casselman	ON	K0A 1M0			
Marc Gosset	Student Transportation of Eastern Ontario (STEO)	Student Transportation of Eastern Ontario (STEO)	Operations Manager	marc.gosset@steo.ca	612-925-0022 x1107	104 Commerce Drive		Prescott	ON	K0E 1T1	P.O. Box 1179		Added by Brandon
To Whom It May Concern	Student Transportation of Eastern Ontario (STEO)	Student Transportation of Eastern Ontario (STEO)	Roadway Closure Notification email	transportation@steo.ca	613-925-0022	104 Commerce Drive		Prescott	ON	K0E 1T0	P.O. Box 1179	Email	
Emergency Services													
Dave Robertson	Township of South Glengarry	Fire Department	Fire Chief	drobertson@southglengarry.com	613-347-1166 x2441	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Jason Vaughan	Township of South Glengarry	Fire Department	Deputy Fire Chief	jvaughan@southolengarry.com	613-347-1166 x2442	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Kelli Campeau	Township of South Glengarry		Clerk	kcampeau@southglengarry.com	613-347-1166 x2102	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
To Whom It May Concern	Township of South Glengarry	Township Roads Emergency			613-930-3445	6 Oak Street		South Glengarry	ON	K0C 1N0	P.O. Box 220		
Bill Lister	Cornwall SDG Paramedic Services		Chief	blister@cornwall.ca	613-930-2787 x2125	601 Campbell Street		Cornwall	ON	K6H 5T9	P.O. Box 877		
Brian Dufresne	Cornwall SDG Paramedic Services		Deputy Chief	bdufresne@cornwall.ca		601 Campbell Street		Cornwall	ON	K6H 5T9	P.O. Box 877		
Pascale Ricard	Cornwall SDG Paramedic Services		Deputy Chief	pricard@cornwall.ca		601 Campbell Street		Cornwall	ON	K6H 5T9	P.O. Box 877		
Linda Ford	Cornwall SDG Paramedic Services		Administrative Assistant		613-930-2787 x2129	601 Campbell Street		Cornwall	ON	K6H 7B7	P.O. Box 877		
Nicole Rodaro	Ontario Provincial Police	Facilities Section	Facilities Coordinator	Nicole.Rodaro@opp.ca	705-329-6812	777 Memorial Avenue	Floor 2	Orillia	ON	L3V 7V3			
Jennifer Chown	Ontario Provincial Police	Facilities Section	Environmental Facilities Coordinator	Jennifer.Chown@opp.ca	705-330-2746	777 Memorial Avenue	Floor 2	Orillia	ON	L3V 7V3			
Sergeant Sylvain Ladoucer	Ontario Provincial Police	SDG Detachment - Lancaster?	Glengarry Administrative Sergeant	Sylvain.Ladouceur@OPP.ca	613-330-8380	45 Pine St		Lancaster	ON	K0C 1N0			Added by Brandon. Detachment Address TBC…
Staff Sergeant Simon Turcotte	Ontario Provincial Police	SDG Detachment - Long Sault	Detachment Commander?	Simon.Turcotte@OPP.ca	613-861-4770	4 Mille Roches Rd		Long Sault	ON	K0C 1P0			Added by Brandon. Detachment Address TBC…
Stakeholders													
[redacted]	Ontario Trucking Association		Director, Policy and Public Affairs	[redacted]	[redacted]	[redacted]							
[redacted]	Ontario Federation of Snowmobile Clubs	District 1 - Upper Canada Snowmobile Region	Chief Executive Officer	[redacted]	[redacted]	[redacted]							
[redacted]	Ontario Federation of Agriculture	Zone 14	Member Service Representative	[redacted]	[redacted]	[redacted]							
To Whom It May Concern	Glengarry Federation of Agriculture				[redacted]	[redacted]							
[redacted]	[redacted]			[redacted]		[redacted]							
Utilities													
Larry Mussio	Bell Canada		Implementation Manager			75 Bridge St. East	Floor 2	Belleville	ON	K8N 1L9			
Glenn A Pattinson	Bell Canada	Engineering - Network & Technology Services	Access Network Coordinator	glenn.pattinson@bell.ca	613-360-0323				ON				
Manon Litalien	Cornwall Electric		Engineering Technician	manon.litalien@cornwallelectric.com	613-932-0123 x4226	1001 Sydney St		Cornwall	ON	K6H 3K1			Added by Brandon
Michelle Rogers	Union Gas		Utility Services and construction Manager			1653 Fortune Cres.		Kingston	ON	K7P 0E9			
To Whom It May Concern	Cogeco Connexion	Cogeco Connexion	Outside Plant Co-ordinator	Anthony.Cowman@cogeco.com		297 Front St.	PO Box 149	Belleville	ON	K8N 3E6			
To Whom It May Concern	Hydro One Networks Inc.			SecondaryLandUse@HydroOne.com									
Sun Hongxia	Hydro One Networks Inc.			Susan.SUN@HydroOne.com									
Adjacent Property Owners													
[redacted]													
Indigenous													
Cindy	Francis-Mitchell	Mohawk Council of Akwesasne	Grand Chief	grand.chief@akwesasne.ca	613-575-2250	CIA III 101 Tewesateni Rd., Kawehno:ke		Akwesasne	ON	K6H 5R7			
Abraham	Francis	Mohawk Council of Akwesasne	Consultation Coordinator	abraham.francis@akwesasne.ca	613-575-2250	CIA III 101 Tewesateni Rd., Kawehno:ke		Akwesasne	ON	K6H 5R7			
Cactus	Sunday	Mohawk Council of Akwesasne	ARRO Manager	cactus.sunday@akwesasne.ca	613-575-2250	CIA III 101 Tewesateni Rd., Kawehno:ke		Akwesasne	ON	K6H 5R7			
Kayla	Sunday	Mohawk Council of Akwesasne	Manager of Environment	kayla.sunday@akwesasne.ca	613-575-2250	CIA III 101 Tewesateni Rd., Kawehno:ke		Akwesasne	ON	K6H 5R7			
Adam	Jacobs	Mohawk Council of Akwesasne	Akwesasne Rights & Research Officer	arro@akwesasne.ca	613-575-2250	CIA III 101 Tewesateni Rd., Kawehno:ke		Akwesasne	ON	K6H 5R7			
Consultation	Coordinator	Métis Nation of Ontario	Consultation Unit	consultations@metisnation.org	613-798-1488	Suite 1100 - 66 Slater Street		Ottawa	ON	K1P 5H1			

Your Targeting Report

Mailing Campaign Details

09-26-2024

ANDREA DORTON **Mailing ID UZKAD116581516535818**

Thank you for taking advantage of our targeting service - a one stop solution designed to help you get the most out of your Smartmail Marketing™ campaigns.

- Anonymous Precision Targeter users will have their reports saved and accessible for 30 days from the day the report has been generated.
- Signed-In Precision Targeter users will have their reports saved and accessible for 13 months from the day the report has been generated.

Inside, find comprehensive insight into your selected trade area, including:

Variables	
Address Attributes	Houses, Apartments, Farms and Businesses
Number of Mail Pieces	537
Urban / Rural	All
Estimated Delivery Cost	$116.51
Delivery Mode (Route Type)	Letter Carrier (LC), Rural Route (RR), Suburban Service (SS), General Delivery (GD), Lock Box (LB), Call For (CF), Motorized Route (MR), Direct (DR)
Valid for Mailings From	24-09-13 To 24-10-17
Householder Types	Consumer's Choice

Not only does the attached report provide an in-depth look at your chosen trade area, it also harnesses the power of data analytics to help maximize your return on investment (ROI) by providing you with:

- A Route Ranking report that prioritizes your postal route selections based on your demographic criteria, enabling you to deliver your message to the people most likely to respond;
- A Postal Station Summary report that indicates the facilities responsible for your mailing;
- Maps, Impact Assessment, and many other campaign-enhancing resources.

Do you want to further improve your Smartmail Marketing™? Take advantage of our suite of data and targeting solutions:

Canada Complete Lists	Data Management Services	Analytics
Canada Complete lists provide one of the largest reach in Canada, drawing from Canada Post's mail delivery database of over 13 million residential addresses and close to a million business addresses. With our additional targeting filters, supplement your list by pinpointing specific audiences that best match what your best prospects look like.	With the help of Canada Post's Data Management Services, you can improve your address accuracy, identify movers, and suppress duplicate records. This will ensure clean, current, and accurate mail files - in doing so, you will have less undeliverable mail and an improved ROI.	Our analytics experts will work with you to ensure your consumer data delivers optimal results. For example, we canhelp identify highest-potential customers and prospects through penetration analysis, location intelligence, segmentation, modeling and profiling.

Questions? Contact your Canada Post Sales Representative or our Commercial Service Network at 1-866-757-5480.

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Your Targeting Report

Route Ranking Report

Reaching the right people with the right message is a key driver of campaign success. The map below shows your selected trade area and the routes that make up your coverage. The routes are colour coded according to the penetration of your selected demographic variable(s) to show how closely it matches your ideal prospect.



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Your Targeting Report

Route Ranking Report

Below you will find your Route Ranking Report, which provides you with a tabular view of the routes within your trade area ranked according to the value of the selected demographic variable(s). By looking at the "Cumulative Penetration" and the "Cumulative Points of Call" columns, you can easily determine which routes you need to target in order to meet your desired quota.

ANDREA DORTON

FSA	Delivery Mode (Route)	Depot	All Points Of Call	Cumulative Points of Call
K0C	RR0073	SUMMERSTOWN PO	537	537

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Your Targeting Report

Postal Station Summary

To avoid transportation charges, you may want to deposit your Neighbourhood Mail™ directly at each postal station responsible for your mailing. The table below provides you with a list of post offices where you need to induct your mailing, and how many pieces must be deposited at each location.

	HOUSES	APARTMENTS	FARMS	BUSINESSES	TOTAL POINTS OF CALL
SUMMERSTOWN POGD0001 SUMMERSTOWN ON K0C 2E0					
TOTAL	504	0	10	23	537
GRAND TOTAL	504	0	10	23	537

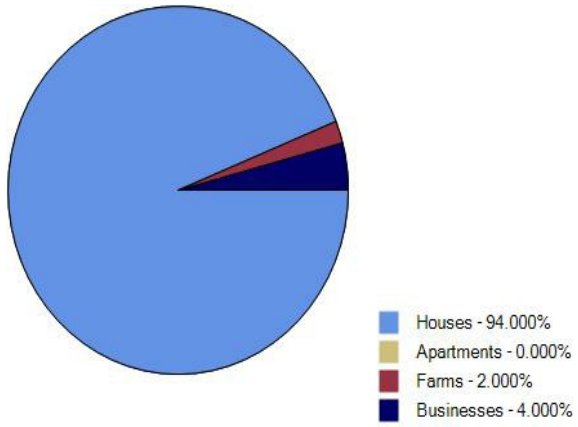
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Canada Post Confidential - This report is provided for use in accordance with the terms of use available at http://www.canadapost.ca/cpo/mc/personal/help/legal.jsf. Any other use is strictly prohibited. This report is provided "as is" and Canada Post disclaims any warranty whatsoever. All rights not expressly granted are reserved by Canada Post and its licensors. This report may be used only during the validity period noted above and must be destroyed following the expiry of such validity period.

Your Targeting Report

Trade Area Marketing Insights

Below, you will find some insights to your trade area. The provided charts give a simple visual representation of some key characteristics of your target area in order to help you better understand the dynamics of your market.

Address Attributes



This chart provides you with a breakdown of various delivery points within your trade area, based on your selected address attributes.

The majority of your area is characterized by:
Houses

Did you know...

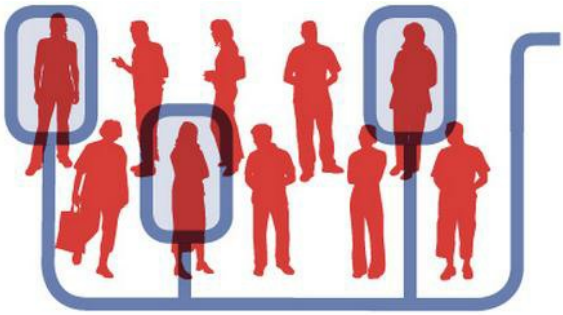
We can help you discover and harvest untapped market potential? We do so by generating a list of additional high value routes, typically located just outside your selected trade area, that meet or exceed your targeting criteria. To take advantage of this offering, simply accept our high value walk suggestions within the online application or request this feature when having an analysis run by our team of geospatial analysts.

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Your Targeting Report

Powerful Data & Targeting

Looking for more ways to harvest the campaign-boosting powers of data and analytics? We have options...



It's time to be more direct. Reach more prospects with Canada Complete lists from Canada Post

Canada's best list just got even better. Our lists provide one of the largest reach in Canada, drawing from our mail delivery database of over 13 million residential addresses and close to a million business addresses. By customizing your mail with a name and/or an address you can provide an instant boost to open rates and responses. With our additional targeting filters, supplement your list by pinpointing specific audiences based on geographic, demographic, and lifestyle criteria that best match what your best prospects look like.

Why choose Canada Complete?

- We have more addresses than anyone else and with the best market penetration in the country
- Gain access to the most complete list that can provide nationwide access to apartments and suite numbers
- Validated addresses that you know are deliverable - save money by reducing returned mail
- Exclude existing customers by suppressing addresses you already have - only pay for the records you need
- Canada's best list for accessing Canadian New Movers - a segment that spends $11B annually
- Enhance your list with a range of unique and exclusive targeting filters to reach your best audience

Ensure your mailing list is valid

Is bad address data hindering your campaign performance? Thanks to our ***Smart Data Cleaner***, it doesn't have to. This easy-to-use online tool lets you clean and update your customer and prospect mailing lists. Not sure if your list needs a scrub? Get a free diagnostic first.

Reach people by name and boost response

Neighbourhood Mail™ is a powerful and effective marketing solution. To take your targeting to a whole new level use Canada Post Personalized Mail™, and reach Canadians by name and address at their place of residence or work. Studies have shown that 87% of Canadians are likely to read mail that is addressed to them personally, and that Personalized Mail™ garners three times as much attention as Neighbourhood Mail™.

Turn your customer data into actionable insight with our Advanced Analytics Services

Data is the fuel that drives campaign performance, but it can sometimes be a challenge to analyze and take action on it. That's where our dedicated team of analytics experts comes in. Through **penetration analysis, location intelligence, segmentation, modeling** and **profiling** they can help enhance your response potential by identifying your highest potential prospects.

Want to learn more about our powerful Data & Targeting Solutions?

Visit our website: **www.canadapost.ca/datatargetingsolutions**

email us at: **data.targetingsolutions@canadapost.ca**

If you wish to speak with one of our Data and Targeting specialists, call us at **1-877-281-4137**

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Your Targeting Report

Glossary of Terms

1. **Address Attributes:** Describes the types of buildings present in your trade area, whether they are houses, apartments, farms, and/or businesses.
2. **All Points of Call:** The total number of physical locations (points of call) receiving your mailing on a given letter carrier's route, which can be houses, apartments, farms and/or businesses based on your selection criteria.
3. **Average Value:** The average value (%) of the chosen Statistics Canada demographic variables that can be associated with the letter carrier's route, which provides you with insight into your recipients.
4. **Cumulative Penetration:** The cumulative percentage of penetration associated with the letter carrier's routes based on the selected demographic variables.
5. **Cumulative Points of Call:** The cumulative point of call count associated with the letter carrier's routes, which has been calculated by adding the previous Delivery Mode rows in the report.
6. **Delivery Mode:** The area served by a letter carrier.
7. **Depot:** A postal facility established for the processing and delivery of mail. Example: Etobicoke, Ontario.
8. **Forward Sortation Area (FSA):** The first three characters (alpha-numeric-alpha) of a Postal Code ^{OM}, which represent a geographic area. Example: M9W
9. **Postal Station Summary:** This report indicates which postal stations are responsible for your targeted routes. The count of each point of call type (houses, apartments, farms, and/or businesses) is displayed for each depot. The total point of call count, listed at the end of the report, denotes the number of houses, apartments, farms, and/or businesses associated with each postal station.
10. **Route ID:** This represents the identifier assigned to each letter carrier's route. Its primary use is for the coordination of the mail delivery.
11. **Target Variables:** A report can have a minimum of one to a maximum of three Statistics Canada demographic variables selected. These variables are displayed in the value columns as a percentage (%) that can be associated with that entire Delivery Mode.
12. **Total Points of Call:** The total number of houses, apartments, farms, and/or businesses (based on your selection) associated with the depot in your Postal Station Summary. This number indicates how many pieces are required for each depot.
13. **Total:** This row represents the sum of each dwelling type (houses, apartments, farms, and/or businesses) within a depot.
14. **Valid for Mailings From:** Due to monthly route restructures, the results found within this report are valid between these dates. Mailing outside of these dates could cause delivery problems or pose a risk of non-delivery.

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project-team@hwy401fraserrdunderpass.com

From: Rodaro, Nicole (OPP) <Nicole.Rodaro@opp.ca>
Sent: October 9, 2024 8:37 AM
To: project-team@hwy401fraserrdunderpass.com
Cc: Chown, Jennifer (OPP)
Subject: OPP Contact Information Update Request

Flag Status: Flagged

[2024-034]

Good day,

Please update your contact list for present and future projects to the following:

Jennifer Chown cc'd
Nicole Rodaro (info in signature)

Kindly remove Wendy Robertson from your distribution list.

Communication by email is preferred and will expedite the process.

Kind Regards,

Nicole Rodaro | Facilities Coordinator
Ontario Provincial Police, BMB Facilities Section
777 Memorial Avenue, Orillia, ON L3V 7V3
Cell: 705-238-7008 Work: 705-329-6812

project-team@hwy401fraserrdunderpass.com

From: project-team@hwy401fraserrdunderpass.com
Sent: November 21, 2024 4:56 PM
To: 'Rodaro, Nicole (OPP)'
Cc: 'Chown, Jennifer (OPP)'; 'lee.collins@ontario.ca'; 'krystal.lacan@ontario.ca'
Subject: RE: OPP Contact Information Update Request

Hello,

On behalf of the Ministry of Transportation (MTO), thank you for your email in response to the Notice of Study Commencement for this project.

For future communications, we have updated our contact list with the information you have provided. We will continue to keep you all informed as the study progresses.

Thank you

The Highway 401 Fraser Rd Project Team
www.Hwy401FraserRdUnderpass.com

From: Rodaro, Nicole (OPP) <Nicole.Rodaro@opp.ca>
Sent: October 9, 2024 8:37 AM
To: project-team@hwy401fraserrdunderpass.com
Cc: Chown, Jennifer (OPP) <Jennifer.Chown@opp.ca>
Subject: OPP Contact Information Update Request

[2024-034]

Good day,

Please update your contact list for present and future projects to the following:

Jennifer Chown cc'd
Nicole Rodaro (info in signature)

Kindly remove Wendy Robertson from your distribution list.

Communication by email is preferred and will expedite the process.

Kind Regards,

Nicole Rodaro | Facilities Coordinator
Ontario Provincial Police, BMB Facilities Section
777 Memorial Avenue, Orillia, ON L3V 7V3
Cell: 705-238-7008 Work: 705-329-6812

Popescu, Simon

From: Lapointe, Carmen
Sent: October 9, 2024 2:32 PM
To: Fleming, Braden; Popescu, Simon
Cc: Kadoski, Brandon
Subject: FW: Hydro One Response: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement
Attachments: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Gents,

Just received our first response from the project “Notice of Study Commencement” letters sent.

Carmen

Carmen Lapointe, P.Eng., PMP
Senior Project Manager
Transportation Ontario - Highways
She/Her

T+ 1 613-690-1092
M+ 1 613-797-5718

-----Original Message-----
From: Collins, Lee (MTO) <Lee.Collins@ontario.ca>
Sent: Wednesday, October 9, 2024 2:27 PM
To: Lapointe, Carmen <Carmen.Lapointe@wsp.com>
Subject: FW: Hydro One Response: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement

HI Carmen,

Please see response from Hydro One for Fraser Rd.

Thank you,
Lee

-----Original Message-----
From: SUN Hongxia <Susan.SUN@HydroOne.com> On Behalf Of SECONDARY LAND USE Department
Sent: Wednesday, October 9, 2024 2:22 PM
To: Collins, Lee (MTO) <Lee.Collins@ontario.ca>
Cc: SECONDARY LAND USE Department <Department.SecondaryLandUse@hydroone.com>
Subject: Hydro One Response: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Please see the attached for Hydro One's Response.

Hydro One Networks Inc

SecondaryLandUse@HydroOne.com

Hydro One Networks Inc.

483 Bay Street
8th Floor South Tower
Toronto, Ontario M5G 2P5

HydroOne.com

October 09, 2024

Re: Highway 401 and Fraser Road Underpass Replacement

Attention:
Lee Collins, P.Eng.
MTO Project Manager
Ministry of Transportation – Project Delivery East

Thank you for sending us notification regarding Highway 401 and Fraser Road Underpass Replacement. In our preliminary assessment, we confirm there are no existing Hydro One Transmission assets in the subject area. Please be advised that this is only a preliminary assessment based on current information.

If plans for the undertaking change or the study area expands beyond that shown, please contact Hydro One to assess impacts of existing or future planned electricity infrastructure.

Any future communications are sent to Secondarylanduse@hydroone.com.

Be advised that any changes to lot grading and/or drainage within proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.

Sent on behalf of,

Secondary Land Use
Asset Optimization
Strategy & Integrated Planning
Hydro One Networks Inc.

project-team@hwy401fraserrdunderpass.com

From:	project-team@hwy401fraserrdunderpass.com
Sent:	November 21, 2024 4:56 PM
To:	'Susan.SUN@HydroOne.com'; 'SecondaryLandUse@HydroOne.com'
Cc:	'lee.collins@ontario.ca'; 'krystal.lacan@ontario.ca'; Lapointe, Carmen; Fleming, Braden
Subject:	RE: Hydro One Response: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement

Hello,

On behalf of the Ministry of Transportation (MTO), thank you for acknowledging receipt of the Notice of Study Commencement, and for confirming that there are no existing Hydro One Transmission assets in the subject area.

For future communications, we have updated our contact list with the information you have provided. We will continue to keep Hydro One informed on the project as the study progresses.

Thank you,

The Highway 401 Fraser Rd Project Team
www.Hwy401FraserRdUnderpass.com

-----Original Message-----
From: SUN Hongxia <Susan.SUN@HydroOne.com> On Behalf Of SECONDARY LAND USE Department
Sent: Wednesday, October 9, 2024 2:22 PM
To: Collins, Lee (MTO) <Lee.Collins@ontario.ca>
Cc: SECONDARY LAND USE Department <Department.SecondaryLandUse@hydroone.com>
Subject: Hydro One Response: 20241009-NoticeOfCommence-Highway 401 and Fraser Road Underpass Replacement

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Please see the attached for Hydro One's Response.

Hydro One Networks Inc

SecondaryLandUse@HydroOne.com

Popescu, Simon

From: Lapointe, Carmen
Sent: November 18, 2024 12:32 PM
To: Fleming, Braden; Popescu, Simon
Subject: Telephone Conversation - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

Follow Up Flag: Follow up
Flag Status: Completed

Hi Braden / Simon,

I received a call (November 18, 2024 @ 11:30 am) from, [redacted]. He asked me what the impacts would be regarding the proposed closure of Hwy 401 for the Fraser Rd. bridge demolition.

I indicated that MTO's intent is to minimize the impact on traffic during this project. Specifically, I noted that for the Fraser Rd. bridge demolition, that rolling closures, short duration overnight closures, single lane closures with
removal on weekends is being proposed. I indicated that a proposed detour using County Rds. 2 and 27 is be considered. In terms of the full closure of Fraser Rd., I noted to him that local detours would be in place. [redacted] noted that these detours would have no impacts on his business.

As for the detour .there was no widening, and the project was primarily pavement rehabilitation. He was curious what sort of input he could provide for this type of project, and I noted that any concerns he had with the roadway regarding safety could be provided, so that the Ministry has a record of the issue.

In closing, I told [redacted] to monitor the project website for updates and that if he had any questions, to please reach out to me or the project team.

[redacted] contact number is [redacted].

Please add this conversation into the tracking table - let me know if you have any questions or concerns,

Carmen

Carmen Lapointe, P.Eng., PMP
Senior Project Manager
Transportation Ontario - Highways
She/Her

T+ 1 613-690-1092
F+ 1 613-829-8299
M+ 1 613-797-5718

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

project-team@hwy401fraserrdunderpass.com

From: Highway 401 Fraser Road Underpass Project Team <wordpress@hwy401fraserrdunderpass.com>
Sent: July 31, 2025 11:16 AM
To: project-team@hwy401fraserrdunderpass.com
Subject: Highway 401 Fraser Road Underpass Web Contact

Flag Status: Flagged

From: [redacted]
Email: [redacted]
Mailing Address: [redacted]

Please email updates.

How would you like to receive study notices?
Email

--
This is a notification that a contact form was submitted on your website (Highway 401 and Fraser Road Underpass Replacement https://hwy401fraserrdunderpass.com).

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) Detail Design and Class Environmental Assessment Study
Comment/Response Tracking Table

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

Notice of Commencement

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
Agency				
1	St Lawrence Parks Commission Hollee Kew hollee.kew@parks.on.a	**Comment Received on October 2, 2024 via Project Inbox** This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. <holle.kew@ontario.ca>: host ontario-ca.mail.protection.outlook.com[52.101.190.2] said: 550 5.4.1 Recipient address rejected: Access denied. [YT2PEPF000001CA.CANPRD01.PROD.OUTLOOK.COM 2024-10-02T20:15:10.658Z 08DCE01F0F687D70] (in reply to RCPT TO command)	Updated email in contact list and re-sent notification	

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) Detail Design and Class Environmental Assessment Study
Comment/Response Tracking Table

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
2	OPP Denver Poole denver.poole@ontario.ca	**Comment Received on October 2, 2024 via Project Inbox** This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. <denver.poole@ontario.ca>: host ontario-ca.mail.protection.outlook.com[52.101.190.3] said: 550 5.4.1 Recipient address rejected: Access denied. [YT1PEPF00001E8B.CANPRD01.PROD.OUTLOOK.COM 2024-10-02T20:15:06.217Z 08DCE027B3D15786] (in reply to RCPT TO command)	No longer working at OPP – removed from contact list	
3	Hydro One Secondary Land Use SecondaryLandUse@HydroOne.com	**Comment Received on October 9, 2024 via Carmen Lapointe** Please see the attached for Hydro One's Response. ---------- Thank you for sending us notification regarding Highway 401 and Fraser Road Underpass Replacement. In our preliminary assessment, we confirm there are no existing Hydro One	Updated Contact List. Draft sent to MTO on November 6, 2024.	**Response sent November 21, 2024** Hello, On behalf of the Ministry of Transportation (MTO), thank you for acknowledging receipt of the Notice of Study Commencement, and for confirming that there are no existing Hydro One Transmission assets in the subject area.

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
		Transmission assets in the subject area. Please be advised that this is only a preliminary assessment based on current information. If plans for the undertaking change or the study area expands beyond that shown, please contact Hydro One to assess impacts of existing or future planned electricity infrastructure. Any future communications are sent to Secondarylanduse@hydroone.com. Be advised that any changes to lot grading and/or drainage within proximity to Hydro One transmission corridor lands must be controlled and directed away from the transmission corridor.		For future communications, we have updated our contact list with the information you have provided. We will continue to keep Hydro One informed on the project as the study progresses. Thank you
Public / Stakeholder Participant				
4	OPP Nicole Rodaro Nicole.Rodaro@opp.ca	**Comment Received on October 9, 2024 via Project Inbox** Good day, Please update your contact list for present and future projects to the following: Jennifer Chown cc'd Nicole Rodaro (info in signature)	Removed Wendy Robertson from Contact List. Added Nicole Rodaro and Jennifer Chown to	**Response sent November 21, 2024** Hello, On behalf of the Ministry of Transportation (MTO), thank you for your email in response to the Notice of Study Commencement for this project. For future communications, we have updated our contact list with the information you have provided. We will continue to keep you all informed as the study progresses.

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
		Kindly remove Wendy Robertson from your distribution list. Communication by email is preferred and will expedite the process.	Contact List and re-sent notification. Draft sent to MTO on November 6, 2024.	Thank you
5	[redacted]	**Comment Received on October 3, 2024 via Project Inbox** This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. <[redacted]>: connect to csdsmtp2.csdceo.on.ca[207.236.99.202]:25: Connection timed out	Updated email in Contact List and re-sent notification	
6	Hydro One Brian Watts	**Comment Received on October 3, 2024 via Project Inbox**	Updated email in Contact	

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) Detail Design and Class Environmental Assessment Study
Comment/Response Tracking Table

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
	brian.watts@hydroone.ca	This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. <brian.watts@hydroone.ca>: connect to hydroone.ca[52.139.43.132]:25: Connection timed out	List and re-sent notification	
7	[redacted]	**Comment Received on October 2, 2024 via Project Inbox** This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. <[redacted]>: Host or domain name not found. Name service error for name=district1ofsc.ca type=A: Host not found	Updated email in Contact List and re-sent notification	
8	OPP	**Comment Received on October 2, 2024 via Project Inbox**	Updated email in	

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) Detail Design and Class Environmental Assessment Study
Comment/Response Tracking Table

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
	Tony Collard tony.collard@opp.ca	Delivery has failed to these recipients or groups: tony.collard@opp.ca The email address you entered couldn't be found. Please check the recipient's email address and try to resend the message. If the problem continues, please contact your email admin.	Contact List and re-sent notification	
9	Cornwall SDG Paramedic Services Anita Rossignal	Undeliverable	Updated contact list to Linda Ford and re-sent notification via mail	
10	[redacted]	Undeliverable	Removed from Contact List	
11	[redacted]	Undeliverable	Updated mailing address and re-sent notification via mail	

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
12	Hydro One Brian Watts brian.watts@hydroone.com	**Comment Received on November 5, 2024 via Project Inbox** This is the Email Security Gateway at host barmail6.idig.net. I'm sorry to inform you that the message below could not be delivered. When delivery was attempted, the following error was returned. **Comment Received on November 5, 2024 via Project Inbox** <brian.watts@hydroone.com>: host hydroone-com.mail.protection.outlook.com[52.101.192.0] said: 550 5.4.1 Recipient address rejected: Access denied. [QB1PEPF00004E06.CANPRD01.PROD.OUTLOOK.COM 2024-11-05T21:34:38.658Z 08DCFBA836E579DB] (in reply to RCPT TO command)	Removed from contact list	
13	OPP Tony Collard anthony.collard@opp.ca	**Comment Received on November 5, 2024 via Project Inbox** Delivery has failed to these recipients or groups: anthony.collard@opp.ca	Removed from contact list	

Note: Comments are reproduced verbatim including typos and/or grammatical errors **Tracking Table Last Updated: March 31, 2026**

Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
		The email address you entered couldn't be found. Please check the recipient's email address and try to resend the message. If the problem continues, please contact your email admin.		
14	[redacted]	**Phone conversation with Carmen Lapointe on November 18, 2024**	No response required. Added to contact list.	**Summary Email from Carmen Lapointe** I received a call (November 18, 2024 @ 11:30 am) from, [redacted] He asked me what the impacts would be regarding the proposed closure of Hwy 401 for the Fraser Rd. bridge demolition. I indicated that MTO's intent is to minimize the impact on traffic during this project. Specifically, I noted that for the Fraser Rd. bridge demolition, that rolling closures, short duration overnight closures, single lane closures with removal on weekends is being proposed. I indicated that a proposed detour using County Rds. 2 and 27 is be considered. In terms of the full closure of Fraser Rd., I noted to him that local detours would be in place. [redacted] noted that these detours would have no impacts on his business. As for the detour, there was no widening, and the project was primarily pavement rehabilitation. He was curious what sort of input he could provide for

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Legend:

– Response Not Required / No further action required at this time

#	NAME / ADDRESS	COMMENT RECEIVED	ACTION / STATUS NOTES	RESPONSE
				this type of project, and I noted that any concerns he had with the roadway regarding safety could be provided, so that the Ministry has a record of the issue. In closing, I told [redacted] to monitor the project website for updates and that if he had any questions, to please reach out to me or the project team.
15	[redacted]	**Comment Received on July 31, 2025 via Project Inbox** From: [redacted] Email: [redacted] Mailing Address: [redacted] Please email updates. How would you like to receive study notices? Email	Added to contact list. No response required.	

TOWNSHIP OF SOUTH GLENGARRY

REGULAR MEETING MINUTES

July 14, 2025, 6:30 PM
Tartan Hall - Char-Lan Recreation Centre
19740 John Street, Williamstown

PRESENT: Mayor Lachlan McDonald
Deputy Mayor Martin Lang
Councillor Stephanie Jaworski
Councillor Sam McDonell
Councillor Trevor Bougie

STAFF PRESENT: CAO Jamie Fawthrop
GM Corporate Services/Clerk Kelli Campeau
GM Planning, Building & Enforcement Joanne Haley
Fire Chief Dave Robertson
GM Parks, Recreation & Culture Sherry-Lynn Harbers
GM Infrastructure Services Sarah McDonald
Deputy Clerk Kayce Dixon

1. CALL TO ORDER

Resolution No. 2025-167

Moved by Deputy Mayor Lang
Seconded by Councillor Jaworski

BE IT RESOLVED THAT the July 14th, 2025 Council Meeting of the Township of South Glengarry now be opened at 6:41 pm

CARRIED

2. O CANADA

3. DISCLOSURE OF PECUNIARY INTEREST

4. APPROVAL OF AGENDA

Resolution No. 2025-168

Moved by Councillor McDonell
Seconded by Councillor Jaworski

BE IT RESOLVED THAT the Council of the Township of South Glengarry approve the agenda as amended.

CARRIED

5. APPROVAL OF MINUTES

Resolution No. 2025-169

Moved by Councillor Bougie
Seconded by Councillor McDonell

BE IT RESOLVED THAT the minutes of the following meeting be adopted as circulated:

- Previous Meeting Minutes: June 23, 2025

CARRIED

5.1 Previous Meeting Minutes - June 23, 2025

6. PUBLIC MEETING

6.1 ZBLW-07-2025 - 2272234 Ontario Inc.

Ms. Haley advised that the purpose of the proposed amendment is to rezone the property legally described as part of Lot 27, Concession Rd 5, in the Geographic Township of Lancaster, now in the Township of South Glengarry, County of Glengarry (PIN 671420058) located at 21127 County Rd 18 from Core Commercial (CC) to Residential 3 (R3) to permit the existing building on the property to be converted to three (3) residential units.

There were no comments or questions from members of Council or the public.

7. PRESENTATIONS AND DELEGATIONS

7.1 MTO Fraser Road Underpass Replacement (WSP)

The delegate requested Council approval to amend the speed limit on Fraser Road for the duration of the project as well as support for the long duration closure and detour of Fraser Rd. The request was deferred to Administration for a report at a future meeting.

7.2 Request - South Lancaster Heritage District (Margaret Brown)

The delegate requested a moratorium on development in South Lancaster and that Council consider designating the area as a heritage district. Council directed Administration to provide a report at a future meeting.

8. ACTION REQUESTS

8.1 Award RFP 2025-12 – Supply and Delivery of One Ton Gas Truck (K. McIntosh)

Resolution No. 2025-170

Moved by Councillor McDonell
Seconded by Deputy Mayor Lang

BE IT RESOLVED THAT Staff Report 2025-075 be received and that the Council of the Township of South Glengarry award RFP 2025-12 for the supply and delivery of a one ton gas truck to Miller Hughes Ford Sales Limited in accordance with their submission of $94,979 plus HST, dated July 4th, 2025; and furthermore that the General Manager of Infrastructure Services be authorized to sign all relevant documents.

CARRIED

8.2 Williamstown Fair – 2025 Requested Items (S. Harbers)

Resolution No. 2025-171

Moved by Councillor Jaworski
Seconded by Councillor Bougie

BE IT RESOLVED THAT Staff Report 2025-076 be received and that the Council of the Township of South Glengarry approve the requests submitted by the St. Lawrence Valley Agricultural Society in support of the 2025 Williamstown Fair.

CARRIED

8.3 Cairn Interpretation Site Options – Receive Final Report (S. Harbers)

Resolution No. 2025-172

Moved by Deputy Mayor Lang
Seconded by Councillor Bougie

BE IT RESOLVED THAT Staff Report 2025-077 be received and that the Council of the Township of South Glengarry receive and accept the Consultation Report for the Cairn Island National Historic Site.

CARRIED

8.4 Insurance Renewal – 2025-2026 Term (K. MacDonald)

Resolution No. 2025-173

Moved by Councillor Bougie
Seconded by Councillor Jaworski

BE IT RESOLVED THAT Staff Report 2025-078 be received and that the Council of the Township of South Glengarry directs Administration to bind insurance with Intact Public Entities Inc. and CFC Underwriting through Halpenny Insurance Brokers as per their submission of $273,853 plus applicable taxes, and that the Mayor and Clerk be authorized to sign any relevant documents.

9. BY-LAWS

9.1 ZBLW-05-2025 - Laporte Zoning By-law Amendment (J. Haley)

Resolution No. 2025-174

Moved by Deputy Mayor Lang
Seconded by Councillor Bougie

BE IT RESOLVED THAT Staff Report 2025-079 be received and that By-law 2025-34, being a by-law to amend By-law 38-09 to rezone the lot legally described as Part of lot 17, Concession 1, being Part 2 on Reference Plan 14R6437, in the Geographic Township of Lancaster, now in the Township of South Glengarry, County of Glengarry, located on Fernwood Drive (PIN 671360646) from Provincially Significant Wetland (PSW) and Flood Plain Holding (FP-H) to Provincially Significant Wetland (PSW), Flood Plain and Residential One - Exception Twenty-Three (R1-23) to permit a single detached dwelling to be developed within 15 metres of the PSW boundary to the south,10 metres to the north, 5 metres to the east and 3.3 metres to the west and to reduce the Watercourse (fish habitat) setback from 30 metres to 15 metres, be read a first, second and third time, passed, signed and sealed in open Council this 14th day of July 2025. The Council of the Township of South Glengarry confirms that there were no comments from the public received and therefore there were no effects on the decision.

CARRIED

9.2 Appointment of Deputy Fire Chief (D. Robertson)

Resolution No. 2025-175

Moved by Councillor Jaworski
Seconded by Councillor McDonell

BE IT RESOLVED THAT Staff Report 2025-080 be received and that By-law 2025-035, being a by-law to appoint a Deputy Fire Chief for the Township of South Glengarry be read a first, second, and third time, passed, signed and sealed in open Council this 14th day of July 2025.

CARRIED

10. KEY INFORMATION REPORTS

10.1 Emergency Preparedness 2024 Compliance (J. Haley)

11. CONSENT AGENDA

Resolution No. 2025-176

Moved by Councillor Bougie
Seconded by Councillor McDonell

BE IT RESOLVED THAT Council accepts the items listed on the Consent Agenda.

11.1 Committee of Adjustment Minutes - June 23, 2025

11.2 Letter - Minister of Energy and Mines

11.3 Letter - Scope of Practice for Nurses

11.4 Letter - Senator Robert Black - Soil Health in Canada

11.5 Letter - Strong Mayor Powers (Town of Prescott)

11.6 Resolution - Blue Box Producers (Municipality of Tweed)

11.7 Resolution - Canadian Veterans (Town of Bradford West Gwillimbury)

11.8 Resolution - Special Economic Zones (City of Guelph)

12. ITEMS FOR CONSIDERATION

12.1 Resolution - Blue Box Producers (Municipality of Tweed)

Council requested that a support resolution be prepared for the next meeting.

13. BOARD AND COMMITTEE UPDATES

13.1 SDG County Council (Mayor McDonald & Deputy Mayor Lang)

13.1.a SDG Library Board Newsletter

13.2 Cornwall Regional Airport Commission (Deputy Mayor Lang and Councillors McDonell & Bougie)

13.3 Raisin Region Conservation Authority (Mayor McDonald & Deputy Mayor Lang)

13.4 Glengarry Archives Board (Councillors Jaworski & McDonell)

13.5 Glengarry Nor'Westers & Loyalist Museum (Councillor Jaworski)

13.6 Agricultural Resource Committee (Deputy Mayor Lang & Councillor McDonell)

13.7 Community Improvement Plan Advisory Committee (Councillors McDonell & Bougie)

13.8 Connectivity Committee (Councillors McDonell & Bougie)

13.9 Environment Committee (Deputy Mayor Lang & Councillor Jaworski)

13.10 Heritage Advisory Committee (Councillor Bougie)

14. NOTICE OF MOTION

15. CLOSED SESSION

Resolution No. 2025-177

Moved by Councillor McDonell
Seconded by Councillor Bougie

BE IT RESOLVED THAT Council convene to Closed Session at 8:00 pm to discuss the following item under Section 239 (2) of The Municipal Act S.O. 2001:

(2) a meeting or part of a meeting may be closed to the public if the subject matter being considered is;

(b) Personal information about an identifiable individuals, AND

(c) Potential acquisition or disposition of land

Specifically: Agreements relating to municipal property interests

Resolution No. 2025-178

Moved by Deputy Mayor Lang
Seconded by Councillor Jaworski

BE IT RESOLVED THAT Council rise and reconvene into open session at 9:12 pm without reporting.

CARRIED

Resolution No. 2025-179

Moved by Councillor Jaworski
Seconded by Councillor Bougie

BE IT RESOLVED that Administration be directed to carry out all actions as specified in the Closed Session minutes.

CARRIED

15.1 Agreements Relating to Municipal Property Interests

16. CONFIRMING BY-LAW

Resolution No. 2025-180

Moved by Councillor Jaworski
Seconded by Councillor McDonell

BE IT RESOLVED THAT By-law 2025-36, being a by-law to adopt, confirm and ratify matters dealt with by resolution be read a first, second and third time, passed, signed and sealed in open council this 14th day of July 2025.

CARRIED

17. ADJOURNMENT

Resolution No. 2025-181

Moved by Councillor McDonell
Seconded by Councillor Bougie

BE IT RESOLVED THAT the Council of the Township of South Glengarry adjourn to the call of the chair at 9:13 pm.

CARRIED

Mayor

Clerk

MEETING NOTES

JOB TITLE	GWP 4248-15-00, Fraser Rd. U/P (31X-0230/B0) Replacement (located 4.5 km west of Lancaster on Hwy 401)		
PROJECT NUMBER	CA0019704.4282	**DATE**	July 21, 2025
TIME	1:00 pm – 2:00 pm	**VENUE**	Via Teams Meeting
SUBJECT	Stakeholder Consultation Meeting		
CLIENT	MTO East Region		

ATTENDEES			
Name	**Company**	**Phone**	**Email**
MTO Project Team			
Lee Collins	Project Delivery PM	613-583-6752	Lee.Collins@ontario.ca
Consultant (WSP) Project Team			
Carmen Lapointe	Project Manager / Hwys Lead	613-690-1092	Carmen.Lapointe@wsp.com
Brandon Kadoski	Hwys Engineer	343-227-9153	Brandon.Kadoski@wsp.com
Braden Fleming	Environmental Lead	519-904-1721	Braden.Fleming@wsp.com
Simon Popescu	Environmental Planner	416-640-7268	Simon.Popescu@wsp.com
Stakeholders			
Dave Robertson	Twp. of South Glengarry Fire Dept.	613-347-1166 x2441	drobertson@southglengarry.com
Sgt. Sylvain Ladouceur	Ontario Provincial Police (OPP)	613-534-2223	sylvain.ladouceur@opp.ca
Brian Dufresne	Cornwall SDG Paramedic Services	613-930-2787 x2114	bdufresne@cornwall.ca
Salar Zulfiquar	Canadian National Railway (CN)	905-669-3242	salar.zulfiquar@cn.ca
Cadden Martins	United Counties of SDG		cmartins@sdgcounties.ca

ADDITIONAL DISTRIBUTION			
Name	**Company**	**Phone**	**Email**
Stakeholders			
Marc Gosset	Student Transportation of Eastern Ontario (STEO)	613-925-0022 x1107	marc.gosset@STEO.ca
Sarah McDonald	Twp. of South Glengarry	613-347-1166 x2502	smcdonald@southglengarry.com
James Levac	Twp. of South Glengarry		jlevac@southglengarry.com
Trevor Baker	United Counties of SDG	613-932-1515 x1237	tbaker@sdgcounties.ca
Matt Brownell	United Counties of SDG		mbrownell@sdgcounties.ca

Suite 300
2611 Queensview Drive
Ottawa, ON, Canada K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
wsp.com

MATTERS ARISING	ACTION
1.0 INTRODUCTIONS — C. Lapointe welcomed all parties to the Stakeholder Consultation Meeting and advised that the purpose of the meeting was to provide an overview of the project. — Agenda Items to be covered: contingency access to Lapierre road, Twp. of South Glengarry advance comments, council resolutions, OPP availability for detouring, confirm stakeholder contact information and an open discussion to provide stakeholders an opportunity to raise any concerns with the project. — Prior to proceeding, round table introductions were performed.	
2.0 PRESENTATION	
2.1 Project Overview — C. Lapointe reviewed the presentation materials previously presented to the Twp. of South Glengarry council, advising on the following the key points: — Replacement of Fraser Road underpass located 4.2 km west of Lancaster in the Twp. of South Glengarry within the United Counties of Stormont Dundas & Glengarry (SDG). — Classified as a Group B project under the MTO Class Environmental Assessment (EA). — Purpose is to replace aging infrastructure (built in 1968), to improve vertical clearance over Highway 401 (history of high load strikes), perform seismic upgrades, and accommodate future widening of Highway 401 to six (6) lanes. — The new structure will be a two-span slab on steel girder bridge (each span 34 m) with integral abutments, an approach embankment grade raise, embankment widening, installation of lightweight fill, pavement reconstruction, drainage improvements, and replacement of guiderail and concrete curb and gutter required for the new bridge.	
2.2 Construction Staging and Detour Routes <u>Fraser Road</u> — C. Lapointe advised that Fraser Road will be fully closed for up to two (2) construction seasons and a signed detour route in place that will take approximately 15-minutes to navigate. — Due to low traffic volumes, the level of service will not be impacted along the 14 km detour route along Airport Road, County Road 27, Gore Road, Kraft Road, and Diversion Road. — Advanced notice of the Fraser Road closure will be provided to the affected stakeholders, emergency service providers and local residents. — A sketch of the proposed detour route and associated signage was shared. <u>Highway 401</u> — C. Lapointe advised that construction staging on Highway 401 will consist of long-duration lane closures, rolling closures, and temporary full closures with detours. — Long duration lane closures utilizing temporary construction barriers are required throughout the duration of the project from May to November, including holiday long weekends. — Temporary short-term full closures of Highway 401 (12-18 hours) during off-peak hours are required for the rapid demolition of the existing structure and to install new bridge girders. — Highway 401 will be closed between Lancaster and Summerstown interchanges. During these temporary closures, traffic will utilize the existing Emergency Detour Route (EDR) along County Road 2. A sketch of the proposed 16.5 km detour route was shared. — Traffic analysis indicates these closures should be implemented during Friday and Saturday night weekend closures, and that both directions (EB and WB) can be closed concurrently with paid duty OPP assistance to manage traffic flow at the Lancaster interchanges. — C. Lapointe noted that that through consultation with the local Municipal Governments during preliminary design, that the MTO has agreed, where feasible, to only close Highway 401 in one direction at a time. It is therefore recommended that further discussions be held with local governments to confirm MTO's desired closure schedule during detailed design once construction timing is confirmed. — Advanced notice of the Highway 401 closures will be provided to the affected stakeholders, emergency service providers and local residents. The final contract package will include EMS and stakeholder notification requirements for the contractor to advise of the construction schedule and planned closures.	

2.3	Environmental and Construction/Design Schedule — C. Lapointe advised that the environmental impacts are expected to be minimal and confined to the Right-of-Way (ROW). — Erosion and sediment control as well as vegetation management are key components and an no archaeological resources were identified during the assessment. — In 2019 a public information centre was held during the preliminary design for Public and stakeholder consultation, and no objections were received. A notice of study commencement for the detailed design was sent out in October 2024. — C. Lapointe advised of the project website (https://hwy401fraserrdunderpass.com). — The actual construction will take approximately 150 working days, spread over two (2) construction seasons, and restrict the work during sensitive periods such as the migratory bird nesting season as well as the bat activity window. — WSP is currently in the detailed design phase and will be completing the 60% milestone at the end of August.	

3.0	**CONTINGENCY ACCESS TO LAPIERRE ROAD**
	— C. Lapointe advised that in the rare event that a train blocks the CN Rail crossing to the north while the bridge is closed, traffic access to Lapierre Road and Raisin River Road will be restricted. Approximately eight residences are located on Lapierre Road. Raisin River Road includes agricultural properties and leads to an inactive campground owned by the St. Lawrence Parks Commission. While there is a low potential of a train blocking access, this scenario would impact response times by Emergency Service Providers.
	— A meeting was recently held with SDG EMS and Fire to discuss mitigation options in the rare event there is a train blocking access to Fraser Road from the north. Although the Ministry normally does not allow any uncontrolled access to/from 400-series freeways, there's no other way to provide access to Lapierre Road other than Highway 401 in the event of a rail blockage to the north on Fraser Road.
	— A conceptual sketch was developed to provide a temporary EMS access road to Lapierre Road from the westbound shoulder of Highway 401 approximately 125 m west of Fraser Road.
	  — This granular access will accommodate the access/egress turning movements of a fire truck design vehicle during both stages of the Highway 401 construction staging.
	  — A locked gate would be provided to prevent access to/from the highway.
	  — A culvert would be installed to maintain positive drainage.
	  — TC-54s (Barrels) would be placed along the highway shoulder to prevent the contractor from parking equipment/vehicles in this area.
	  — Access will be from the westbound lanes only; no median crossings will be permitted.
	  — Temporary access will be removed at construction completion.
	— D. Robertson inquired if there would be physical barrier in front of the access road during Highway 401 staging. WSP confirmed that the construction barrier will end east of the access, however emergency vehicles will have to turn between barrels along the centreline of the westbound lanes.
	— D. Robertson noted that winter maintenance (snow removal) will need to be considered.
	— B. Dufresne (SDG Paramedics) and S. Ladouceur (OPP) advised that they have no concerns with the conceptual contingency access.
	— Further discussion is required to obtain MTO endorsement for the temporary contingency access.
		MTO
		
		WSP

4.0	**TOWNSHIP OF SOUTH GLENGARRY ADVANCE COMMENTS**	
4.1	Fraser Road Closure - Additional Signage — Twp. of South Glengarry inquired about consideration for additional "local traffic only" signage at either end of Fraser Road, especially during the full closures of Highway 401. — This request is related to an increase in transport traffic being routed on to municipal roads by navigation systems. — The detour route signage was reviewed, noting that the "local traffic only" signage is strategically placed on the north side of the bridge prior to Lapierre road such that it only applies to those residents. The south side of the bridge does not have a local traffic sign because there are no residents located between the airport road and the underpass. — C. Lapointe noted that this configuration is the MTO standard for signing.	

	— The MTO is not opposed to the Township installing their own local traffic signage at either end of Fraser, should they desire to do so.	
4.2	Recent Active Transportation Plan — The Township has advised that they have recently completed an Active Transportation Plan, which identifies Fraser Road as a future cycling route, and the Township would like to explore if there is an opportunity to consider bike lanes or shoulders wider than 1.50 m. — Further discussion with the Township is required to determine the proposed timeline to implement this municipal active transportation plan.	Twp. of South Glengarry / WSP
4.3	Council Resolution – Posted Speed — Currently, there is no posted speed limit of Fraser Road. — WSP/MTO will need to request council resolution to reduce the posted speed on Fraser Road from 80 km/h to 60 km/h. This was noted as okay by the previous administration, but no resolution from Council was made. Since this is a new Council composition, there may be some different thoughts on the proposed posted speed.	Twp. of South Glengarry / WSP
4.4	Fraser Road Paving Limits — The Township Council will ask if the MTO is paving Fraser Road within the study limits. — Currently the proposed paving limits are just north of Raisin River Road. — During the presentation to Council, the question was asked whether there was any intent to pave up to the CN Rail crossing. This inquiry is currently under review by WSP and the MTO but also requires input from CN. — C. Lapointe noted that CN is on the call and requested insight with respect to coordination requirements, specifically with respect to railway clearance envelopes, minimum offset distances from the railway, and the conditions that require CN flaggers. — With respect to work limits, S. Zulfiquar advised that the general rule of thumb is that any work occurring within 30 feet, or any work that can affect the 30 foot zone, requires scene involvement (i.e. CN permits and flagging). — C. Lapointe requested clarification whether the 30-foot zone is measured from the middle of the tracks or the edge of the nearest rail. CN confirmed that the measurement is from the edge of rail on the closest track. — Further discussions related to the CN at-grade railway crossing are detailed in Section 7.2.	
5.0	**TWP. OF SOUTH GLENGARRY COUNCIL RESOLUTIONS** — C. Lapointe advised that the following council resolutions are to be sought. — Establish 60 km/hr permanent posted speed limit on Fraser Road across the structure. — Support of the long duration closure and detour of Fraser Road. — A separate meeting between WSP, MTO and the Twp. of South Glengarry is required for further discussion regarding Sections 4.0 and 5.0 of these meeting notes.	Twp. of South Glengarry / WSP Twp. of South Glengarry / MTO / WSP
6.0	**OPP RESOURCES AND AVAILABILITY FOR DETOURING** — C. Lapointe reiterated the need for OPP assistance during the full closure of Highway 401 and inquired about the advanced notification timeline required to secure the resources. — S. Ladouceur advised that OPP will require the number of paid-duty officers a few months in advance of the proposed dates to coordinate staff and make the necessary arrangements. — B. Kadoski inquired if OPP can provide current paid-duty rates (officer, cruiser, admin fee, etc.) for inclusion in the final contract package. OPP advised that they could provide this information. — WSP to follow-up with OPP via email to request rates. — ***Secretarial Note: OPP provided WSP with current paid-duty rates via e-mail July 23, 2025.***	WSP / OPP
7.0	**OPEN DISCUSSION**	
7.1	Student Transportation of Eastern Ontario (STEO) — B. Kadoski advised that during previous phone conversations, Mr. Gossett advised that STEO is less concerned with the Highway 401 closures, as they do not transport students on 400 series highways. — An email (transportation@STEO.ca) was provided for the advanced notification of the Fraser Road closure.	

7.2	CN Rail — S. Zulfiquar stated that CN will require information from the Road Authority on the traffic volumes (AADT), types of vehicles using the crossing, and if those volumes will be increasing the signal timing will likely require adjustment. — B. Kadoski provided the traffic volumes for Fraser Road. Currently, the Average Annual Daily Trips (AADT) is 160, and in 2045 the forecasted AADT is 180. — S. Zulfiquar expressed concern with the increased traffic from the detour route that will be using the CN Rail at-grade crossing. — C. Lapointe confirmed that the Fraser Road closure will detour traffic from Fraser Road onto Diversion Road to the north of the rail crossing, reducing the traffic volumes over the crossing. However, there will be some construction vehicles using the crossing to access the site. — S. Zulfiquar stated that CN's preference would be that construction equipment does not use the at-grade crossing to access the site and inquired if the access plan can be modified to accommodate this preference. — WSP advised that this is not the only site access, nor is it the primary access. The Contractor will also be accessing the site from Highway 401, as well as from the south side of Fraser Road. There is a requirement to access the site from the north end to construct the new embankment. — S. Zulfiquar expressed concern that dump trucks and construction equipment using the crossing could muddy up the tracks and CN will be looking for compensation from the Contractor. If site access cannot be modified, then additional discussions will be required to determine a plan moving forward. — It was agreed that a follow-up meeting between WSP, MTO and CN is required for further discussion with respect to the paving limits near the railway level crossing on Fraser Road, CN flagging requirements, and agreements related to construction access over the at-grade crossing.	WSP / MTO / CN
8.0	**STAKEHOLDER CONTACT INFORMATION CONFIRMATION** — B. Kadoski shared the stakeholder notification list and requested confirmation of the respective stakeholder contact details to ensure the correct information is included in the final contract package. — B. Kadoski noted that SDG Director of Transportation and Planning Services (Ben de Haan) is no longer with SDG. C. Martins advised that a new director will be starting in the coming weeks and will provide the updated contact information once confirmed. C. Martins also suggested that the SDG Manager of Operation (Trevor Baker) be included and provided the emergency after hours number for inclusion in the contract package. — B. Dufresne provided the email (emsdutyofficer@cornwall.ca) for inclusion in the advance notification list and confirmed that Paramedic Services Chief (Bill Lister) be removed. — S. Ladouceur confirmed the mailing address for the OPP Long Sault Detachment. — S. Zulfiquar advised that a mailing address will be provided in a follow-up email.	SDG / WSP WSP CN
9.0	**NEXT MEETING** — Additional Stakeholder Consultation meetings are not anticipated unless deemed necessary. MTO/WSP may reach out to individual stakeholders throughout the remainder of the design.	

These notes are considered to be an accurate summary of all items discussed. Written notice of discrepancies, errors or omission must be given within five (5) business days, otherwise the meeting notes will be accepted as written.

STAKEHOLDER'S MEETING AGENDA

01 Presentation

02 Presentation Questions

03 Contingency Access to Lapierre Road

04 Twp. of South Glengarry Advance Comments

05 Twp. of South Glengarry Council Resolutions

06 OPP Resources & Availability for Detouring

07 Open Discussion

08 Confirm Stakeholder Contact Information

PRESENTATION TO STAKEHOLDERS

MTO EAST REGION

GWP 4248-15-00

FRASER ROAD UNDERPASS REPLACEMENT

Monday, July 21, 2025

AGENDA

01 Project Overview

02 Why Replacement is Needed

03 Preferred Design Solution

04 Construction Staging

05 Environmental Considerations

06 Public & Stakeholder Consultation

07 Project Timeline

08 Next Steps

09 Questions

PROJECT OVERVIEW

- **Location: Fraser Road crossing Highway 401, ~4.2 km west of Lancaster**
- **Structure ID: Site No. 31X-230**
- **Project Classification: Group “B” under MTO Class EA**
- **Purpose: Replace aging structure, improve vertical clearance, accommodate future improvements of Highway 401**



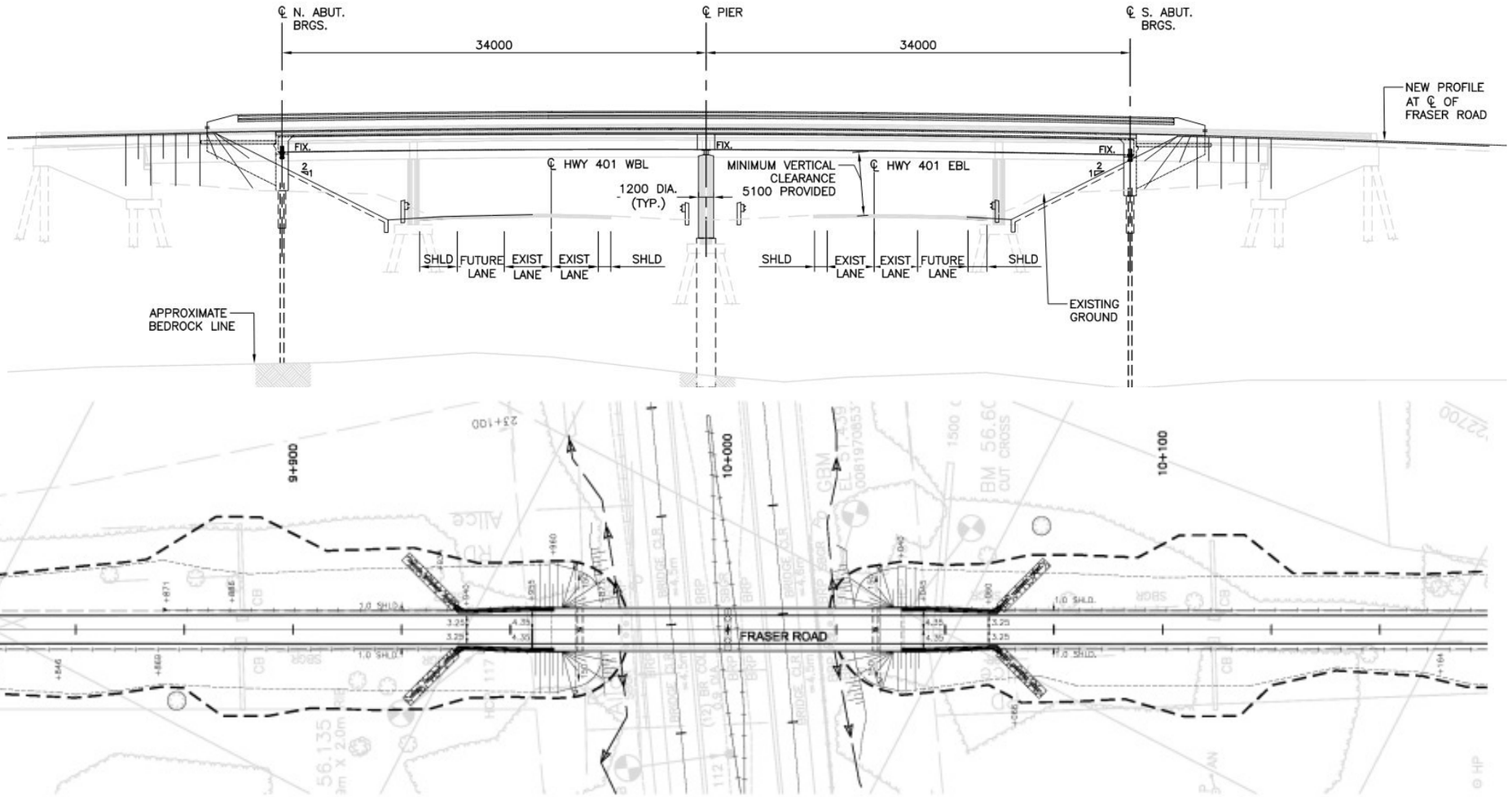
WHY REPLACEMENT IS NEEDED

- **Built in 1968 - multiple rehabilitations since**
- **Structural condition - fair, but functionally deficient**
  - Vertical clearance below standard (4.57 m)
  - History of high-load strikes
  - Does not meet current seismic or design standards

PREFERRED DESIGN SOLUTION

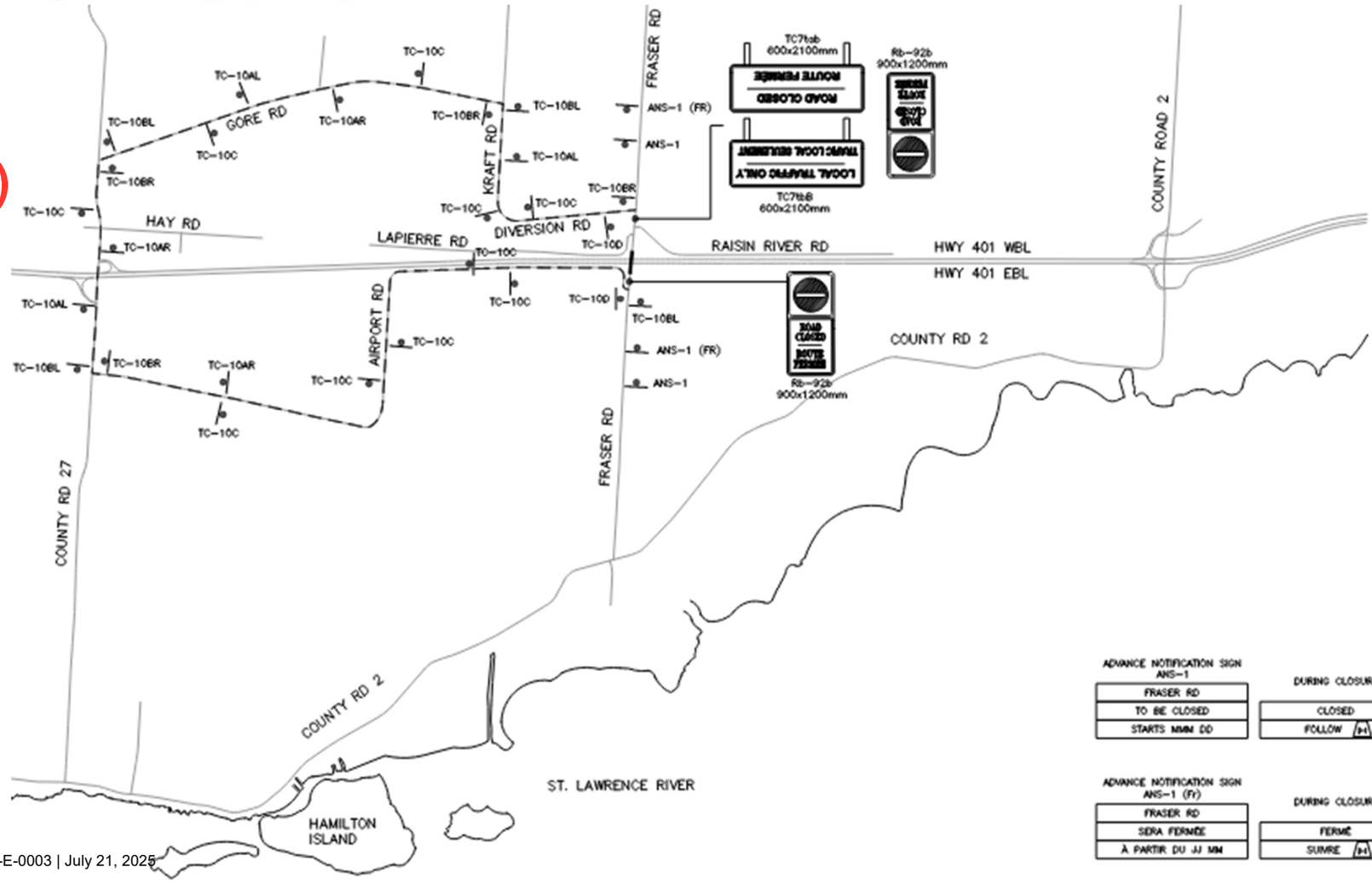
- Online replacement (same alignment)
- Two-span slab-on-steel box girder (2 x 34 m)
- Integral abutments with raised profile
- Designed to allow future 6-lanes of Highway 401

PREFERRED DESIGN SOLUTION



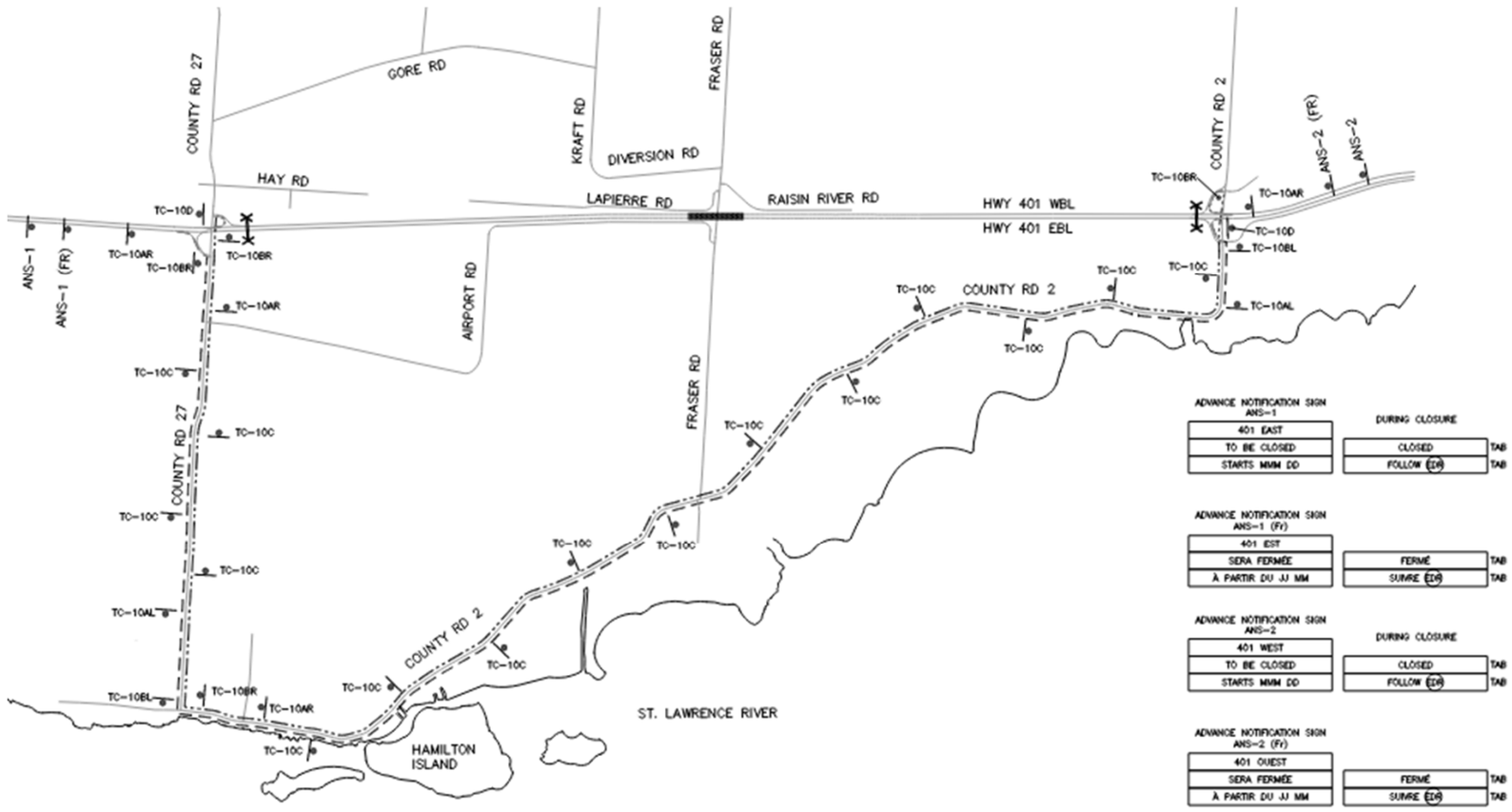
CONSTRUCTION STAGING

- **Full closure of Fraser Road (up to 2 seasons)**
- **Signed detours for local traffic and emergency services**



CONSTRUCTION STAGING

- **Closure of Highway 401 required to:**
  - Facilitate bridge demolition (12 hrs.)
  - Facilitate girder placement for new bridge (8 hrs.)
- **Signed detours for local traffic and emergency services**
- **Use of Emergency Detour Routes (EDRs) for Highway 401**



ENVIRONMENTAL CONSIDERATIONS

- Impacts minimal and confined to ROW
- Sensitive habitats protected via timing and mitigation
- Erosion Sedimentation Control and vegetation management are key
- No archaeological resources were identified

PUBLIC & STAKEHOLDER CONSULTATION

- **Online Public Information Centre (PIC) held in 2019**
- **No objections received during TESR review**
- **Notice of Study Commencement – October 2024**
- **Project Website: https://hwy401fraserrdunderpass.com/**
- **Ongoing coordination with:**
  - United Counties of Stormont, Dundas & Glengarry
  - Township of South Glengarry
  - Emergency Services & STEO
  - Indigenous communities
  - Local landowners

PROJECT TIMELINE

- **Estimated construction duration: 150 working days**
  - Migratory Bird Nesting Period (April 1 – August 31)
  - Bat Active Period (April 1 – September 30)
- **Proposed over two construction seasons**
  - May - November

NEXT STEPS

- **Council Resolutions**
- **Detail Design Phase:**
  - 60% Design Completion - August 2025
- **Continue stakeholder engagement**
- **Contact Information:**

Consultant PM:	MTO PM:
Carmen Lapointe, P.Eng., PMP Senior Project Manager WSP Canada Inc. 2611 Queensview Drive, Suite 300 Ottawa, ON K2B 8K2 Tel: 613-690-1092 E-mail: **Carmen.Lapointe@wsp.com**	Lee Collins, P.Eng. Senior Project Engineer Ministry of Transportation (MTO) 1355 John Counter Blvd, PO Box 4000 Kingston, ON K7L 5A3 Tel: 613-583-6752 E-mail: **Lee.Collins@ontario.ca**

THANK YOU!

METRIC

PLATE No

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WP No X

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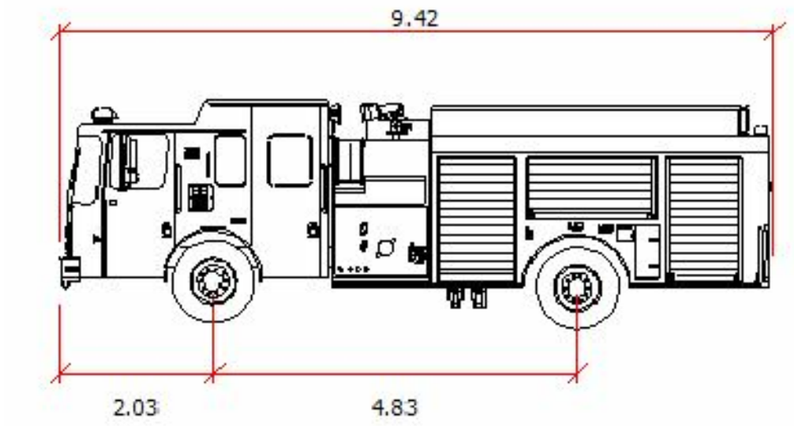
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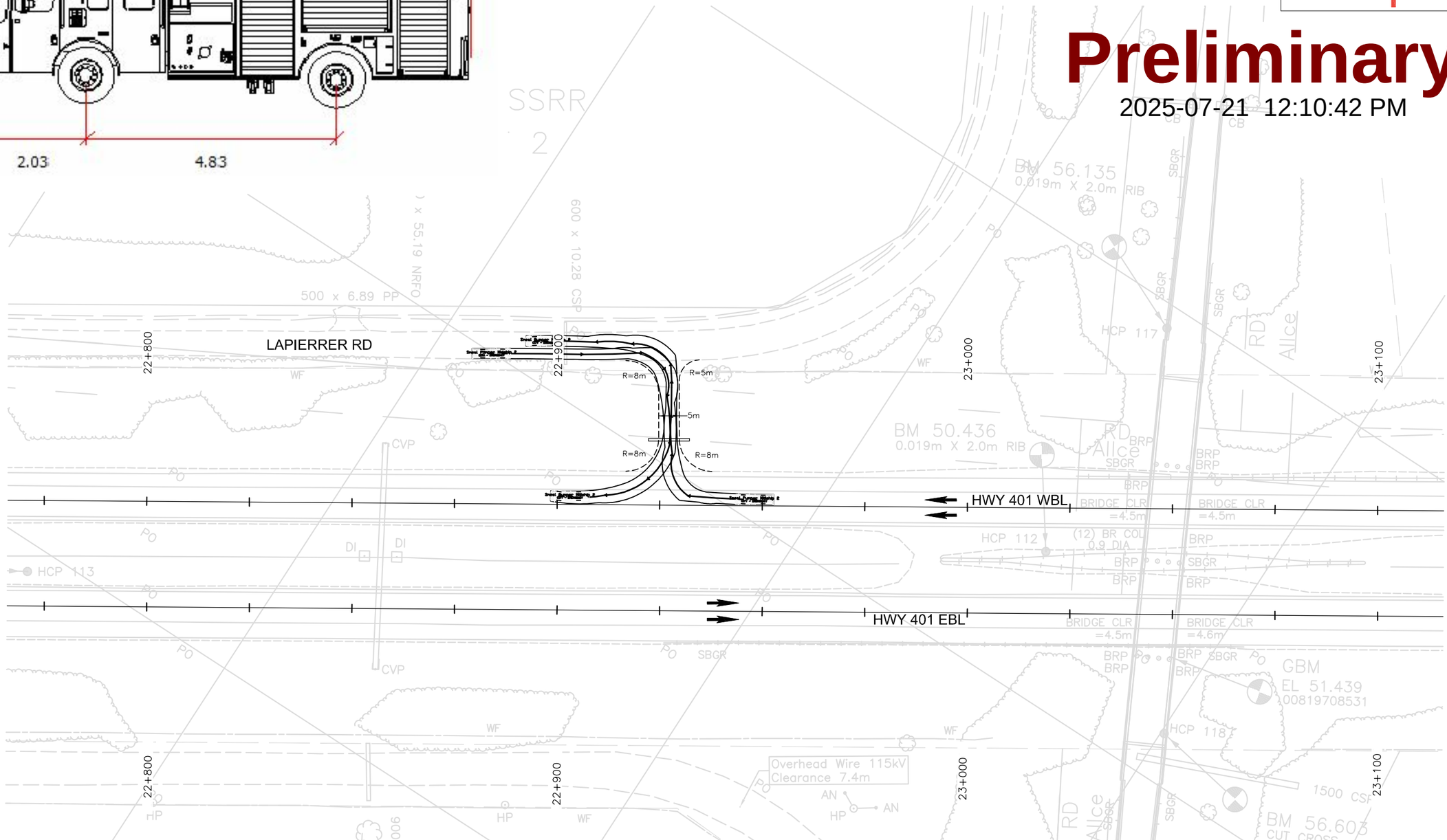
SHEET 01

wsp

Preliminary

2025-07-21 12:10:42 PM





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MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

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DRAWING NAME: CA0019704.4282-N02.DWG

DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

METRIC

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WP No X

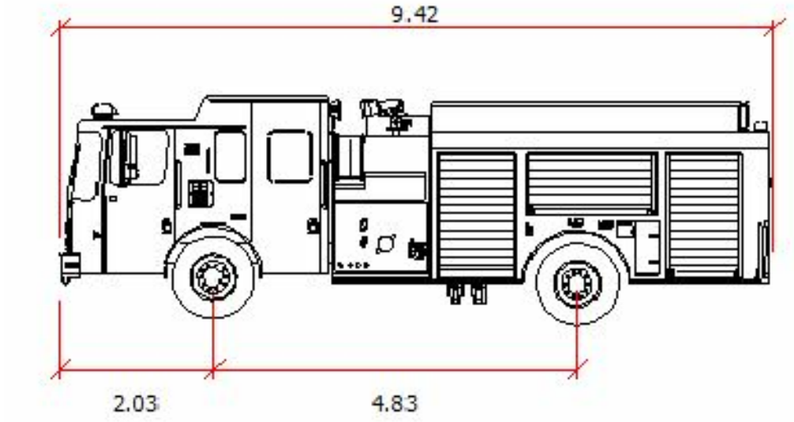
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STA Survey ____ TO STA Revised ____

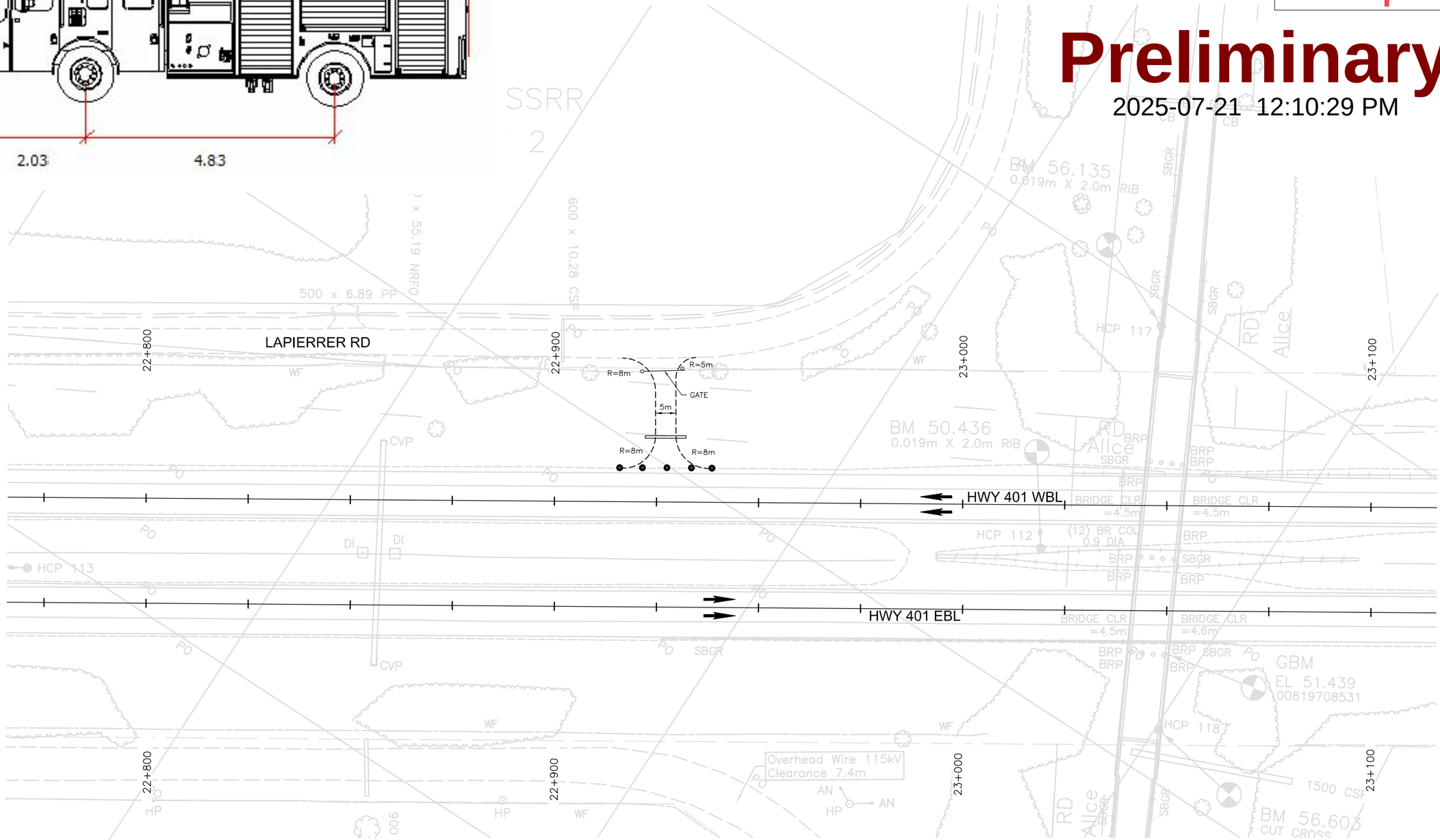
SHEET 02

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Preliminary

2025-07-21 12:10:29 PM





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DRAWING NAME: CA00197704.4282-N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

From: Salar.Zulfiqar
Sent on: September 3, 2025 2:21:38 PM
To: Lapointe, Carmen
CC: Collins, Lee (MTO); Kadoski, Brandon
Subject: RE: Summary of Discussion Pointe - Meeting w/ CN Rail - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)
Attachments: Work Permit Application 2025.pdf (622.48 KB)

Follow up: Follow up
Start date: October 7, 2025 8:00:00 PM
Due date: October 7, 2025 8:00:00 PM

Hi Carmen,

Please see attached – this outlines everything that the contractor needs to work around CN's right of way / tracks.

Thanks,

Salar Zulfiquar
Senior Public Works Officer | Public Works - *East*
T: 905-669-3242 | salar.zulfiquar@cn.ca
What's New at CN | www.cn.ca

From: Lapointe, Carmen <Carmen.Lapointe@wsp.com>
Sent: Tuesday, September 02, 2025 7:55 AM
To: Salar Zulfiquar <Salar.Zulfiquar@cn.ca>
Cc: Collins, Lee (MTO) <lee.collins@ontario.ca>; Kadoski, Brandon <Brandon.Kadoski@wsp.com>
Subject: FW: Summary of Discussion Pointe - Meeting w/ CN Rail - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

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Good morning, Salar,

I hope you had a good long weekend.

I'm just following up on our last meeting and hoping that you might be able to send us a sample work permit application and any additional documentation, as needed, for inclusion in the tender document.

WSP is working towards a 60% milestone submission and would like to have the necessary CN Rail related specifications included in the tender document.

If you have any questions and/or concerns, please don't hesitate to reach out us.

Regards,

Carmen

Carmen Lapointe, P.Eng., PMP
Senior Project Manager
Transportation Ontario - Highways
She/Her)

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M +1 613-797-5718

From: Lapointe, Carmen
Sent: August 26, 2025 9:23 AM
To: lee.collins <Lee.Collins@ontario.ca>; Salar.Zulfiquar <salar.zulfiquar@cn.ca>
Cc: Kadoski, Brandon <Brandon.Kadoski@wsp.com>
Subject: Summary of Discussion Pointe - Meeting w/ CN Rail - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

Lee et al,

Please find a summary of discussion points from yesterday's meeting with CN Rail which mainly addressed design tie-in near the CN rail line, traffic control and safety, and permitting requirements. Action items are noted in bold italics.

- The project involves a significant grade raise for the new Fraser Road bridge over Highway 401, affecting the tie-in point of Fraser Road near the CN rail line.
- CN Rail prefers the paving to extend up to or over the rail, but current design ends before the rail due to the grade change tie-in.
- Two options discussed:
  - Maintain current tie-in south of the rail.
  - Extend paving to the rail, contingent on avoiding delays in the current design/tender schedule.
- Traffic control plans must ensure no queuing or single-lane alternating traffic over the railway tracks - CN requires that northbound and southbound traffic remain in their respective lanes when crossing the tracks (Transport Canada requirement).
- Full road closures are preferred by CN for safety.
- Placement of flaggers and traffic control personnel must comply with CN's offset requirements.
- No new agreements are required if the crossing is not modified and no additional infrastructure (e.g., sidewalks, bike lanes) is introduced.
- Existing agreements are between CN and the Township of South Glengarry; any future active transportation upgrades would require revisiting agreements.
- Contractors may need a work permit from CN if their activities use the crossing for construction access or impact the CN right-of-way.
- ***CN to provide WSP a sample work permit application (PDF format) for inclusion in the tender package (CN Rail).***
- Permit processing typically takes 8-10 weeks; flagging arrangements require 4–6 weeks.
- ***Standard CN specification regarding insurance and damage will be included in the tender documents (WSP).***
- ***CN will provide any additional documentation as needed for inclusion in the tender document (CN Rail).***
- ***Operational constraint to be included in the tender document restricting Contractors from implementing single-lane alternating traffic control over the rail tracks and the need to coordinate with CN for permits and flagging (WSP).***

If you would like some additional points added or existing points revised, please let me know and I will revise the discussion point list.

Regards,

Carmen

Carmen Lapointe, P.Eng., PMP
Senior Project Manager
Transportation Ontario - Highways
She/Her

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From: Docksteader, Chad
Sent on: November 14, 2025 12:49:46 PM
To: Kadoski, Brandon
CC: Pattinson, Glenn; Lapointe, Carmen; Collins, Lee (MTO); Gitkow, Alexandre (MTO); Power, Kenton (MTO); Dittrich, Paul
Subject: RE: BELL FOTS - Anticipated Settlement & Tolerances Discussion - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

Follow up: Follow up
Start date: November 13, 2025 7:00:00 PM
Due date: November 13, 2025 7:00:00 PM

Hey Brandon,

After further review, we believe the predicted settlements won't negatively impact our cable. You should be clear to proceed as planned.

Thanks,

Bell
Chad Docksteader
Specialist, Network Provisioning
343-540-9729

From: Kadoski, Brandon <Brandon.Kadoski@wsp.com>
Sent: Thursday, November 13, 2025 11:52 AM
To: Docksteader, Chad <chad.docksteader@bell.ca>
Cc: Pattinson, Glenn <glenn.pattinson@bell.ca>; Lapointe, Carmen <Carmen.Lapointe@wsp.com>; Collins, Lee (MTO) <lee.collins@ontario.ca>; Gitkow, Alexandre (MTO) <Alexandre.Gitkow@ontario.ca>; Power, Kenton (MTO) <kenton.power@ontario.ca>; Dittrich, Paul <paul.dittrich@wsp.com>
Subject: [EXT]RE: BELL FOTS - Anticipated Settlement & Tolerances Discussion - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

Hi Chad,

I'm writing to follow up on the status of Bell's engineering team's review of the provided technical package to determine whether the predicted settlements require mitigation, reinforcement, or relocation.

Can we still expect feedback by the end of this week?

Thank-you,
Brandon

Brandon Kadoski, P.Eng.
Engineer

Vacation Alert – I will be on vacation from November 17th-28th (inclusive)

T +1 343-227-9153
M +1 613-442-0001

wsp

From: Kadoski, Brandon
Sent: November 6, 2025 4:07 PM
To: chad.docksteader@bell.ca
Cc: Pattinson, Glenn <glenn.pattinson@bell.ca>; Lapointe, Carmen <Carmen.Lapointe@wsp.com>; Collins, Lee (MTO) <lee.collins@ontario.ca>; Gitkow, Alexandre (MTO) <Alexandre.Gitkow@ontario.ca>; Power, Kenton (MTO) <kenton.power@ontario.ca>; Dittrich, Paul <paul.dittrich@wsp.com>
Subject: RE: BELL FOTS - Anticipated Settlement & Tolerances Discussion - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

Hi Chad,

Following up on our discussion this morning, I've attached the background information and settlement predictions for Bell Canada's review.
Below are the documents included:

- BELL FOTS - Background PDR and ON1CALL_(2024).pdf
- BELL FOTS - Revised Dwgs for Test Pits_(April 2025).pdf
- BELL FOTS - Current Dwgs - from SUE Investigation_(Aug-Nov 2025).pdf
- Fraser Road UP Replacement - Utility Conflict Summary Table_Rev1-3.pdf
- BELL FOTS - Settlement Model Results.pdf

Thank-you,
Brandon

Brandon Kadoski, P.Eng.
Engineer

Vacation Alert – I will be on vacation from November 17th-28th (inclusive)

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M +1 613-442-0001



From: Lapointe, Carmen <Carmen.Lapointe@wsp.com>
Sent: November 6, 2025 11:29 AM
To: Collins, Lee (MTO) <lee.collins@ontario.ca>; Gitkow, Alexandre (MTO) <Alexandre.Gitkow@ontario.ca>; Power, Kenton (MTO) <kenton.power@ontario.ca>; chad.docksteader@bell.ca; Dittrich, Paul <paul.dittrich@wsp.com>; Kadoski, Brandon <Brandon.Kadoski@wsp.com>
Subject: BELL FOTS - Anticipated Settlement & Tolerances Discussion - LVR Agreement #4023-E-003 - WIO#3 Fraser Road U/P Replacement (CA0019704.4282)

To all,

Please find a summary of discussion points from today's meeting between MTO, WSP and Bell Canada. Action items are noted in ***bold italics***.

Meeting Attendees:

MTO	
Lee Collins	MTO Project Manager
Alexandre Gitkow	MTO Corridor Management
Kenton Power	MTO Foundations
WSP	
Carmen Lapointe	WSP Project Manager
Brandon Kadoski	WSP Hwy Design Engineer
Paul Dittrich	WSP Foundations Designated Contact
Bell Canada	

Chad Docksteader	Specialist, Network Provisioning

The purpose of the meeting was to present and discuss the results of a settlement analysis related to the Bell fibre optic line at the Fraser Road Bridge replacement location, outlining predicted settlements, technical constraints, and the need for Bell's engineering review to determine next steps.

- **Project Background and Stakeholders:** C. Lapointe introduced the project team, including WSP and MTO representatives, and explained to C. Docksteader from Bell that the meeting was convened to discuss the impact of the Fraser Road Bridge replacement on the Bell fibre optic line, following confirmation of the line's location and initial settlement analysis.
- **Technical Findings and Settlement Predictions:** B. Kadoski detailed the investigative process, including the unsuccessful test pitting and ground penetrating radar, and explained that the Bell fibre optic line, installed in 1986 by direct drilling, is expected to experience a maximum long-term settlement of approximately 50 mm, exceeding Bell's previously provided tolerances.
- **Analysis Methodology and Interpretation:** P. Dittrich clarified the time-dependent nature of the predicted settlements, showing that the maximum settlement occurs over decades, and emphasized the importance of considering both total and differential settlements, as well as the exaggerated scale of the graphical representations.
- **Next Steps and Required Actions:** Bell agreed to review the technical package with Bell's engineering team to determine if the existing cable can withstand the predicted settlements or if mitigation, reinforcement, or relocation is required; C. Lapointe committed to sending a cleaned-up information package (including updated drawings and analysis) to Bell within a few days, with the expectation of feedback by late next week (Week of November 10th). ***(WSP / Bell)***
- **Potential Mitigation Strategies:** P. Dittrich and K. Power discussed the possibility of increasing the thickness of the EPS (lightweight fill) behind the south abutment to reduce settlements but noted that further analysis is required to determine the effectiveness and extent of this mitigation.
- **Discussion of Bell Fibre Optic Line Service Life and Replacement Considerations:** K. Power raised questions about the service life of the Bell fibre optic line and if there is a defined design life. C. Docksteader indicated that he would inquire internally at Bell regarding the service life or design life of the existing Bell cable at the project location and report findings to the project team. It was noted that any resulting constraints might influence decisions about replacement or realignment during the bridge project. ***(Bell)***
- **Project Timeline and Coordination with Bell:** C. Lapointe outlined the project schedule, indicating a target for 90% Design Completion in December and emphasizing the need for timely input from Bell to avoid delays, with both parties agreeing on a process for information exchange and feedback.

If you would like some additional points added or existing points revised, please let me know and I will revise the discussion point list.

Regards,

Carmen

Carmen Lapointe, P.Eng., PMP
Senior Project Manager
Transportation Ontario - Highways
She/Her

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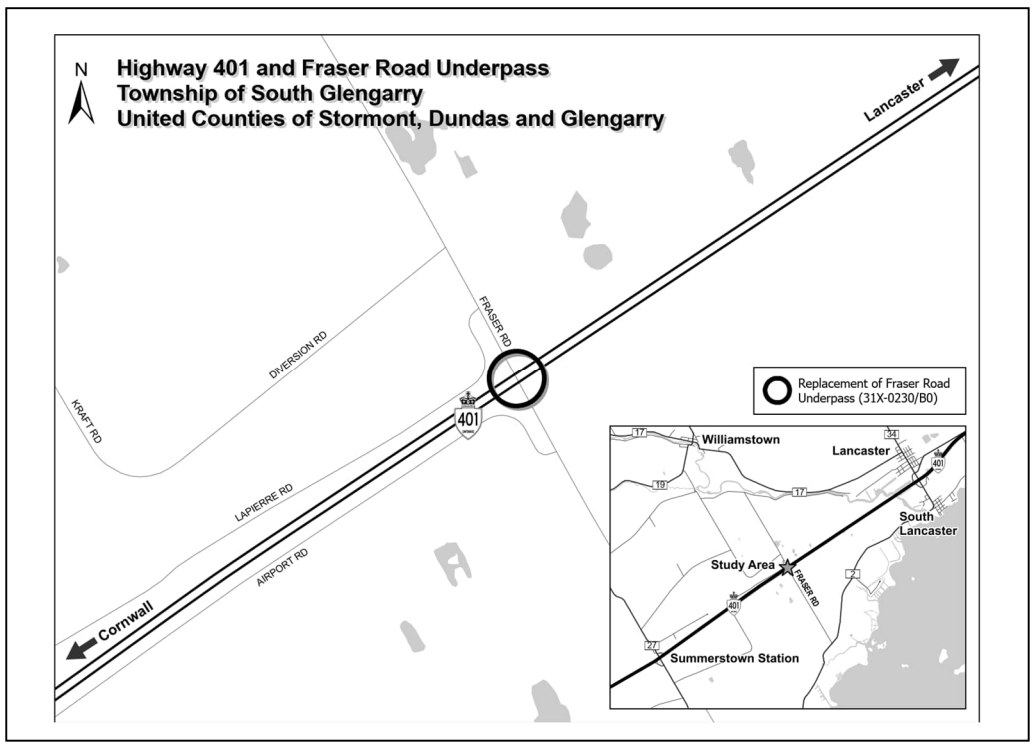
NOTICE OF STUDY COMPLETION

HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00)

DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

THE STUDY

The Ontario Ministry of Transportation (MTO) retained WSP Canada Inc. (WSP) to complete the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass. The underpass is located approximately 4.5 km west of Lancaster on Highway 401, within the Township of South Glengarry in the United Counties of Stormont, Dundas and Glengarry (the Project). The Detail Design Study developed the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction. The structure requires replacement due to its deteriorated condition and insufficient vertical clearance over Highway 401. The new bridge is designed to accommodate the future Highway 401 footprint, which will expand to six lanes – adding one outside lane in each direction. The Project location is shown in the key map below.



The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rail as required for the new structure and vertical alignment improvements.

THE PROCESS

This project adhered to the approved environmental planning process for Group 'B' projects under the MTO *Class Environmental Assessment* (Class EA) *for Provincial Transportation Facilities* (2000). As part of this process, interested parties are notified of the proposed works and given an opportunity to provide comments or request additional information. A Design and Construction Report (DCR) has been prepared to outline the environmental impacts and mitigation measures associated with the Detail Design. The DCR is available for a 30-day public comment period from **April 1, 2026,** to **April 30, 2026,** on the project website and at the Lancaster Branch of the Stormont, Dundas and Glengarry County Library (195 Military Road Lancaster, Ontario).

CONSULTATION AND COMMENTS

The Project Team will respond to all comments generated during the 30-day public comment period. In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

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

The request should be sent in writing or by email to the following:

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

Director, Environmental Assessment Branch
Ministry of Environment Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario M4V 1P5
E-mail: EABDirector@ontario.ca

For the latest updates and additional information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com. If you have any questions or comments, please contact the Project team by reaching out to one of the following Project Team members:

Lee Collins, P.Eng.
MTO Project Manager
Ministry of Transportation – Project Delivery East
Phone: (613) 583-6752
E-mail: Lee.Collins@ontario.ca

Carmen Lapointe, P.Eng., PMP
Consultant Project Manager
WSP Canada Inc.
Phone: (613) 690-1092
E-mail: Carmen.Lapointe@wsp.com

If you require accessibility accommodations to participate in this project, please contact one of the Project Team members listed above. Comments and information are being collected to assist the MTO in meeting the requirements of the Ontario *Environmental Assessment Act*. Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. Except for personal information, all submitted comments will form part of the public record.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

AVIS DU GOUVERNEMENT DE L'ONTARIO

AVIS D'ACHÈVEMENT D'ÉTUDE

RÉFECTION DES PASSAGES SOUTERRAINS DE L'AUTOROUTE 401 ET DU CHEMIN FRASER (GWP 4248-15-00)

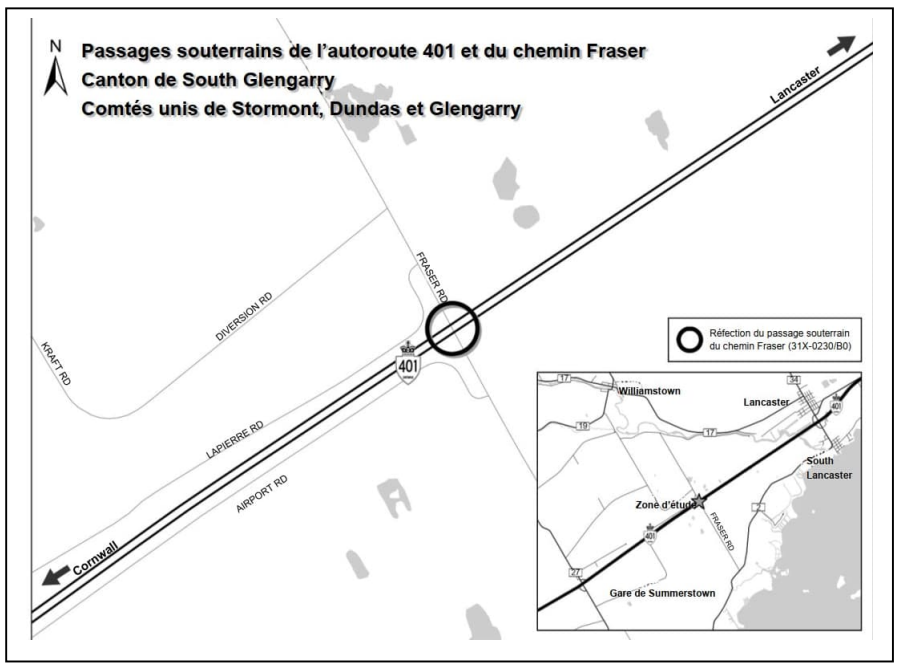
ÉTUDE DE CONCEPTION DÉTAILLÉE ET ÉVALUATION ENVIRONNEMENTALE DE PORTÉE GÉNÉRALE

L'ÉTUDE

Le ministère des Transports de l'Ontario (MTO) a retenu les services de WSP Canada Inc. (WSP) pour réaliser l'étude de conception détaillée et l'évaluation environnementale de portée générale pour remplacer les passages souterrains du chemin Fraser, à 4,5 km à l'ouest de Lancaster sur l'autoroute 401 dans le canton de South Glengarry, dans les comtés unis de Stormont, Dundas et Glengarry (le projet). L'étude de conception détaillée a permis d'élaborer le plan recommandé pour le remplacement des passages souterrains en fonction de la conception préliminaire approuvée, y compris la préparation des dessins contractuels et du cahier des charges pour la construction. La structure doit être remplacée en raison de son état de détérioration et de son dégagement vertical insuffisant au-dessus de l'autoroute 401. Le nouveau pont est conçu pour s'adapter à l'empreinte future de l'autoroute 401, qui sera élargie à six voies, soit l'ajout d'une voie extérieure dans chaque direction. L'emplacement du projet figure sur la carte-index ci-dessous.

Le projet comprend :

- Réfection du passage inférieur existant le long du tracé horizontal existant
- Nivellement du profil du remblai d'approche en fonction de la nouvelle profondeur de la structure et de l'augmentation du dégagement vertical sur l'autoroute 401
- Élargissement du remblai
- Reconstruction de la chaussée
- Améliorations du drainage
- Remplacement des bordures et caniveaux
- Installation des glissières de sécurité nécessaires à la nouvelle structure et aux améliorations de l'alignement vertical



LE PROCESSUS

Ce projet a respecté le processus de planification environnementale approuvé pour les projets du groupe « B » en vertu de l'*Évaluation environnementale de portée générale pour les routes provinciales* (2000) du MTO. Dans le cadre de ce processus, les parties intéressées sont informées des travaux proposés et ont la possibilité de présenter des observations ou de demander des renseignements supplémentaires. Un rapport sur la conception et la construction a été préparé pour décrire les impacts environnementaux et les mesures d'atténuation associés à la conception détaillée. Ce rapport est disponible pour une période de consultation publique de 30 jours, du **1er avril 2026** au **30 avril 2026**, sur le site Web du projet et à la succursale de Lancaster de la bibliothèque du comté de Stormont, Dundas et Glengarry (195, chemin Military, Lancaster, Ontario).

CONSULTATION ET COMMENTAIRES

L'équipe de projet répondra à toutes les observations reçues pendant la période de consultation publique de 30 jours. De plus, une demande peut être présentée au ministère de l'Environnement, de la Protection de la nature et des Parcs pour obtenir un arrêté exigeant une étude plus approfondie (c.-à-d. exigeant une approbation d'évaluation environnementale individuelle ou complète avant de pouvoir procéder), ou pour que des conditions soient imposées (p. ex. exiger des études supplémentaires), uniquement au motif que l'arrêté demandé pourrait prévenir, atténuer ou corriger les effets négatifs sur les droits ancestraux et issus de traités protégés par la Constitution. Les demandes fondées sur d'autres motifs ne seront pas prises en considération. Les demandes doivent inclure les coordonnées du demandeur et son nom complet pour le ministère.

Les demandes doivent préciser le type d'arrêté demandé (demande de conditions supplémentaires ou demande d'évaluation environnementale individuelle ou complète), la façon dont un arrêté pourrait prévenir, atténuer ou corriger ces effets négatifs potentiels, ainsi que tout renseignement à l'appui des déclarations contenues dans la demande. Cela permettra au ministère de commencer efficacement l'examen de la demande.

La demande doit être envoyée par écrit ou par courriel à l'adresse suivante :

Ministre de l'Environnement, de la Protection de la nature et des Parcs
Ministère de l'Environnement, de la Protection de la nature et des Parcs
5e étage, 777, rue Bay
Toronto (Ontario) M7A 2J3
Courriel : minister.mecp@ontario.ca

Directrice, Direction des évaluations environnementales
Ministère de l'Environnement, de la Protection de la nature et des Parcs
1er étage, 135, avenue St. Clair Ouest
Toronto (Ontario) M4V 1P5
Courriel : EABDirector@ontario.ca

Pour obtenir les dernières mises à jour et des renseignements supplémentaires sur le projet, veuillez consulter le site Web du projet à l'adresse suivante : www.Hwy401FraserRdUnderpass.com. Si vous avez des questions ou des observations, veuillez communiquer avec l'équipe de projet en joignant l'un des membres suivants :

Lee Collins, P.Eng.
Gestionnaire du projet du MTO
Ministère des Transports – Mise en œuvre des projets – Est
Téléphone : (613) 583-6752
Courriel : Lee.Collins@ontario.ca

Carmen Lapointe, P.Eng., PMP
Gestionnaire du projet et consultant
WSP Canada Inc.
Téléphone : (613) 690-1092
Courriel : Carmen.Lapointe@wsp.com

Si vous avez besoin de mesures d'adaptation en matière d'accessibilité pour participer à ce projet, veuillez communiquer avec l'un des membres de l'équipe de projet mentionnés ci-dessus. Les commentaires et les renseignements requis sont recueillis pour aider le MTO à satisfaire aux exigences de la *Loi sur les évaluations environnementales* de l'Ontario. Les renseignements seront recueillis conformément à la *Loi sur l'accès à l'information et la protection de la vie privée*. À l'exception des renseignements personnels, toutes les observations soumises feront partie du dossier public.

Des renseignements sont disponibles en français en composant le (613) 690-1092 (Carmen Lapointe).

March 27, 2026

«FirstName» «LastName»
«JobTitle»
«Company», «Branch»
«Address1»
«City», «Province» «PostalCode»

Re: Notice of Study Completion
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00)
Detail Design and Class Environmental Assessment Study

Dear «FirstName» «LastName»:

The Ontario Ministry of Transportation (MTO) retained WSP Canada Inc. (WSP) to complete the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass. The underpass is located approximately 4.5 km west of Lancaster on Highway 401, within the Township of South Glengarry in the United Counties of Stormont, Dundas and Glengarry (the Project).

The Detail Design Study developed the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction. The structure requires replacement due to its deteriorated condition and insufficient vertical clearance over Highway 401.

The new bridge is designed to accommodate the future Highway 401 footprint, which will expand to six lanes – adding one outside lane in each direction. The Project location is shown in the enclosed Notice.

The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;

Suite 300
2611 Queensview Drive
Ottawa, ON, Canada K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
wsp.com

- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rail as required for the new structure and vertical alignment improvements.

This project adhered to the approved environmental planning process for Group 'B' projects under the MTO Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000). As part of this process, interested parties are notified of the proposed works and given an opportunity to provide comments or request additional information.

A Design and Construction Report (DCR) has been prepared to outline the environmental impacts and mitigation measures associated with the Detail Design. The DCR is available for a 30-day public comment period from **April 1, 2026**, to **April 30, 2026**, on the project website and at the Lancaster Branch of the Stormont, Dundas and Glengarry County Library (195 Military Road Lancaster, Ontario).

The purpose of this letter is to inform you that the study has been completed and invite your feedback on the DCR. If you have any questions or comments, please contact the Project team by reaching out to Carmen Lapointe, WSP Consultant Project Manager, at (613) 690-1092 or Carmen.Lapointe@wsp.com.

For the latest updates and additional information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act* (FOIPPA). Except for personal information, all submitted comments will form part of the public record. If you require accessibility accommodations to participate in this project, please contact the undersigned.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

Sincerely,

Carmen Lapointe, P.Eng., PMP
WSP Project Manager

Encl. Notice of Study Completion

cc: Lee Collins, MTO Project Manager, MTO Eastern Region
Erin Pipe, MTO Environmental Planner, MTO Eastern Region
Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

Ministry of Transportation

Engineering Program Delivery East

Project Delivery East

1355 John Counter Boulevard
Postal Bag 4000
Kingston ON K7L 5A3

Ministère des Transports

Livraison du programme d'ingénierie dans l'Est
Zone d'exécution du projet de l'Est

1355, boulevard John Counter CP/Service de sacs 4000
Kingston ON K7L 5A3

March 25, 2026

MPP Nolan Quinn
Stormont-Dundas-South Glengarry
120 Second Street West, Suite 100
Cornwall, ON K6J 1G5

Re: Notice of Study Completion
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00)
Detail Design and Class Environmental Assessment Study

Dear MPP Nolan Quinn:

The Ontario Ministry of Transportation (MTO) retained WSP Canada Inc. (WSP) to complete the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass. The underpass is located approximately 4.5 km west of Lancaster on Highway 401, within the Township of South Glengarry, in the United Counties of Stormont, Dundas and Glengarry (the Project).

The Detail Design Study developed the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction. The structure requires replacement due to its deteriorated condition and insufficient vertical clearance over Highway 401.

The new bridge is designed to accommodate the future Highway 401 footprint, which will expand to six lanes – adding one outside lane in each direction. The Project location is shown in the enclosed Notice.

The Project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rail as required for the new structure and vertical alignment improvements.

This project adhered to the approved environmental planning process for Group 'B' projects under the MTO Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000). As part of this process, interested parties are notified of the proposed works and given an opportunity to provide comments or request additional information.

A Design and Construction Report (DCR) has been prepared to outline the environmental impacts and mitigation measures associated with the Detail Design. The DCR is available for a 30-day public comment period from **April 1, 2026**, to **April 30, 2026**, on the project website and at the Lancaster Branch of the Stormont, Dundas and Glengarry County Library (195 Military Road Lancaster, Ontario).

Please be advised that the attached Ontario Government Notice (OGN) advertising the Study Completion will be published in the *Cornwall Seaway News* and the *Cornwall Express, Community Press* on **April 1, 2026**.

The purpose of this letter is to inform you that the study has been completed and invite your feedback on the DCR. If you have any questions or comments, please contact the Project team by reaching out to Carmen Lapointe, WSP Consultant Project Manager, at (613) 690-1092 or Carmen.Lapointe@wsp.com.

For the latest updates and additional information about the Project, please visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act* (FOIPPA). Except for personal information, all submitted comments will form part of the public record. If you require accessibility accommodations to participate in this project, please contact the undersigned.

Des renseignements sont disponibles en français en composant (613) 690-1092 (Carmen Lapointe).

Yours truly,

Lee Collins, P.Eng.
MTO Project Manager
Ministry of Transportation – Project Delivery East
Email: lee.collins@ontario.ca
Phone: (613) 583-6752

Encl. Notice of Study Completion

cc: Carmen Lapointe, Consultant Project Manager, WSP Canada Inc.
Erin Pipe, MTO Environmental Planner, MTO Eastern Region
Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

Ministry of Transportation

Regional Director's Office
East Region
1355 John Counter Boulevard
Kingston, Ontario K7L 5A3
Tel.: 647-638-5359
Fax: 613-547-1777

Ministère des Transports

Bureau du directeur régional
Opérations de l'est
1355 Boulevard John Counter
Kingston, Ontario K7L 5A3
Tél.: 647-638-5359
Téléc.: 613-547-1777

March 25, 2026

«Title» «FirstName» «LastName»
«JobTitle»
«Address1»
«Address2»
«City», «Province» «PostalCode»

Re: Notice of Study Completion
Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00)
Detail Design and Class Environmental Assessment Study

Dear «Title» «FirstName» «LastName»:

The Ontario Ministry of Transportation (MTO) retained WSP Canada Inc. (WSP) to complete the Detail Design and Class Environmental Assessment Study (Class EA) for the replacement of the Fraser Road Underpass. The underpass is located approximately 4.5 km west of Lancaster on Highway 401, within the Township of South Glengarry, in the United Counties of Stormont, Dundas and Glengarry (the Project).

The purpose of this letter is to inform you that the study has been completed and invite your feedback on the Design and Construction Report (DCR), which has been prepared to outline the environmental impacts and mitigation measures associated with the Detail Design. The project includes:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement reconstruction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rail as required for the new structure and vertical alignment improvements.

The new bridge is designed to accommodate the future Highway 401 footprint, which will expand to six lanes – adding one outside lane in each direction. The Project location is shown in the enclosed Notice.

This project adhered to the approved environmental planning process for Group 'B' projects under the MTO Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000). As part of this process, interested parties are notified of the proposed works and given an opportunity to provide comments or request additional information. The DCR is available for a 30-day public comment period from **April 1, 2026** to **April 30, 2026** on the project website and at the Lancaster Branch of the Stormont, Dundas and Glengarry County Library (195 Military Road Lancaster, Ontario).

The Preliminary Design phase for this project was completed in 2020 which evaluated alternatives and recommended the replacement of the underpass structure as the technically preferred alternative. The structure requires replacement due to its deteriorated condition and insufficient vertical clearance over Highway 401. A Transportation Environmental Study Report was prepared as part of the Preliminary Design phase and it documented the existing conditions of the study area, the evaluation of the alternatives, and identified the preferred plan and commitments to future work. The Detail Design Study developed the recommended plan for the replacement of the underpass based on the approved Preliminary Design, including the preparation of contract drawings and tender documents for construction.

If you have any information with respect to any environmental, social, and cultural values your community may have within the study area; have comments or questions that you would like to share; or you would like to meet with the MTO Project Team, please contact me. For the latest updates and additional information about the Project, please also visit the Project website at: www.Hwy401FraserRdUnderpass.com.

Information collected during this project will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. Except for personal information and other protected information, all information and submitted comments will form part of the public record. Please contact me if you require accessibility accommodations to participate in this project.

If you have any questions or comments, or if you require further information regarding this project, please feel free to contact me, Franca Sacchetti, Regional Director, East Region at franca.saccetti@ontario.ca, or Peter Copping, Indigenous Liaison Specialist at peter.a.copping@ontario.ca. The MTO will continue to engage with you as this project progresses.

Sincerely,

Franca Sacchetti

Regional Director, East Region

Encl. Notice of Study Completion

cc: Lee Collins, MTO Project Manager, MTO Eastern Region
Erin Pipe, MTO Environmental Planner, MTO Eastern Region
Peter Copping, MTO Indigenous Liaison Specialist
Carmen Lapointe, Consultant Project Manager, WSP Canada Inc.

Braden Fleming, Consultant Environmental Planner, WSP Canada Inc.

APPENDIX B

Terrestrial Ecosystem Existing Conditions and Impact Assessment Report

REPORT

Terrestrial Ecosystem Existing Conditions and Impact Assessment Report

Agreement #4023-E-003 - Work Item #3 - Fraser Road Underpass (Site No. 31X-0230/B0) Replacement (GWP 4248-15-00)

Submitted to:

Ministry of Transportation

Submitted by:

WSP Canada Inc.
1931 Robertson Road, Ottawa, ON
K2H 5B7 Canada

(613) 592-9600

CA0019704.4282

15 October 2025

Distribution List

PDF: Ministry of Transportation

PDF: WSP Canada Inc.

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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation to conduct the Detail Design and Class Environmental Assessment (Class EA) for the replacement of the Fraser Road Underpass (Site No. 31X-0230/B0), located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project). The underpass and its embankments (the Site), as well as an area covering a 120-metre radius surrounding the underpass, is the study area for this report (Figure 1). The study area was assessed during a two-day field investigation in August 2024.

The Fraser Road Underpass was constructed in 1968 with rehabilitation in 1975, 1984, and 2009. The structure requires replacement due to its existing condition and deficient vertical clearance over Highway 401. A Preliminary Design Study and Transportation Environmental Study Report were completed in 2020 by Dillon Consulting Limited which found that the recommended course of action is replacement of the structure.

The following report describes the terrestrial ecosystem existing conditions at the site, an assessment of impacts based on the proposed works, and mitigation measures. Findings and recommendations in this report are based upon the Endangered Species Act, 2007 (ESA) prior to amendments on June 5, 2025.

2 APPROACH

The study described in the current document was conducted following the guidance described in the Ministry of Transportation (MTO) Environmental Reference for Highway Design (MTO, 2013) with the purpose of fulfilling the requirements of an Ontario Ministry of Transportation Class EA for Provincial Transportation Facilities (Ontario 2000).

2.1 Background Information

For the purposes of this report, the term Species At Risk (SAR) refers to those species listed as endangered, threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and protected under the Species at Risk Act, 2002 (SARA), and/or listed on the Species at Risk in Ontario (SARO) list and protected under the ESA. Species of Conservation Concern (SCC) refers to all special concern species and provincially rare species (Sub-National S1-S3).

The following sources were used to provide background information for this report.

- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Searches of online databases including:
  - Natural Heritage Information Centre Database (NHIC; MNR, 2024)
  - Ontario Breeding Bird Atlas (OBBA, 2024)
  - eBird Basic Dataset (EBD; Sullivan, et al., 2009)
  - Ontario Reptile and Amphibian Atlas (ORAA, 2023)
  - Ontario Butterfly and Moth Atlas (OBA, 2024; OMA, 2024)
  - iNaturalist (iNaturalist)
  - Bat Conservation International Bat Profiles (BCI)

- Database of Vascular Plants of Canada (Canadensys, 2024)
- Terrestrial Ecosystem Impact Assessment Report Fraser Road Underpass (Dillon Consulting Limited, 2020)

A table of species of SAR and SCC was compiled using the sources above, and the probability of occurrence of each species in the study area was estimated. Estimation probability of occurrence incorporated each species' distribution and habitat requirements as well as existing knowledge about the environment in the study area and anthropogenic structures which may facilitate each species' occurrence. SAR and SCC with a moderate to high probability of occurrence in the study area were included in the finalized table.

The results of this review are discussed below.

2.1.1 Atlas of the Mammals of Ontario

The Atlas of the Mammals of Ontario was reviewed to identify SAR mammals that occur within 1 km of the study area. Upon review, five SAR were identified:

- Gray Fox (*Urocyon cinereoargenteus*) – Threatened (ESA and SARA);
- Eastern Red Bat (*Lasiurus borealis*) – Endangered (ESA);
- Hoary Bat (*Lasiurus cinereus*) – Endangered (ESA);
- Little Brown Myotis (*Myotis lucifugus*) – Endangered (ESA and SARA); and
- Northern Myotis (*Myotis septentrionalis*) – Endangered (ESA and SARA);

2.1.2 Natural Heritage Information Centre Database

The NHIC database was accessed on July 30, 2024, in a one-kilometre square encompassing the study area (18WQ3595). One SAR was identified:

- Eastern Wood-pewee (*Contopus virens*) – Special Concern (ESA and SARA).

The search identified three species that are rare in Ontario as designated by NHIC: Common Gallinule (*Gallinula galeata*), American Coot (*Fulica americana*), and Blue-winged Teal (*Spatula discors*). Additionally, the one-kilometre square including the study area includes habitat belonging to a Colonial Waterbird Nesting Area, a type of significant wildlife habitat (SWH). An unevaluated wetland was identified as occurring in the study area (Figure 3).

2.1.3 Ontario Breeding Bird Atlas Database

The OBBA database was searched on July 30, 2024, for the single 10 km square encompassing the study area (18TWQ39). The following 11 SAR were identified:

- Bank Swallow (*Riparia riparia*) – Threatened (ESA and SARA);
- Barn Swallow (*Hirundo rustica*) – Special Concern (ESA) and Threatened (SARA);
- Black Tern (*Chlidonias niger*) – Special Concern (ESA);
- Bobolink (*Dolichonyx oryzivorus*) – Threatened (ESA and SARA);
- Canada Warbler (*Cardellina canadensis*) – Special Concern (ESA) and Threatened (SARA);

- Chimney Swift (*Chaetura pelagica*) – Threatened (ESA and SARA);
- Eastern Meadowlark (*Sturnella magna*) – Threatened (ESA and SARA);
- Eastern Wood-pewee (*Contopus virens*) – Special Concern (ESA and SARA);
- Grasshopper Sparrow (*Ammodramus savannarum*) – Special Concern (ESA) and Special Concern (SARA);
- Least Bittern (*Ixobrychus exilis*) – Threatened (ESA) and Threatened (SARA);
- Wood Thrush (*Hylocichla mustelina*) – Special Concern (ESA) and Threatened (SARA).

In addition to the identified SAR, Black-crowned Night-heron (*Nycticorax nycticorax*) was identified, which is rare in Ontario during the breeding season and very rare in Ontario during the non-breeding season. Great Egret (*Ardea alba*) was identified and is rare in Ontario in the non-breeding season and very rare in Ontario in the breeding season.

2.1.4 eBird Database

The eBird database was searched on July 30, 2024, for observations of SAR and species of note within 10 km of the study area, 1 km of the study area, and inside of the study area. The most recent observations found within the category closest to the study area were identified. Of these, 11 SAR was identified within 10 km of the study area:

- Within 1.8 km of the study area (2020)
  - Eastern Wood-pewee (*Contopus virens*) within 1.8 km – Special Concern (ESA and SARA).
- Within 2.5 km of the study area (2020-2024)
  - Bank Swallow (*Riparia riparia*) within 2.5 km – Threatened (ESA and SARA);
  - Barn Swallow (*Hirundo rustica*) within 2.5 km – Special Concern (ESA) and Threatened (SARA);
  - Black Tern (*Chlidonias niger*) within 2.5 km – Special Concern (ESA);
  - Bobolink (*Dolichonyx oryzivorus*) within 2.5 km – Threatened (ESA and SARA);
  - Canada Warbler (*Cardellina canadensis*) within 2.5 km – Special Concern (ESA) and Threatened (SARA);
  - Chimney Swift (*Chaetura pelagica*) within 2.5 km – Threatened (ESA and SARA);
  - Eastern Meadowlark (*Sturnella magna*) within 2.5 km – Threatened (ESA and SARA);
  - Wood Thrush (*Hylocichla mustelina*) within 2.5 km – Special Concern (ESA) and Threatened (SARA).
- Within 3 km of the study area (2014-2024)
  - Grasshopper Sparrow (*Ammodramus savannarum*) within 3.0 km – Special Concern (ESA and SARA);
  - Least Bittern (*Ixobrychus exilis*) within 3.0 km – Threatened (ESA and SARA).

Great Egret (*Ardea alba*) is rare in Ontario in the non-breeding season and very rare in Ontario in the breeding season and was identified as occurring within 1 km of the study area in 2024. Black-crowned Night-heron

(*Nycticorax nycticorax*) is rare in Ontario during the breeding season and very rare in Ontario during the non-breeding season and was identified within 2.5 km of the Study area in 2024.

2.1.5 Ontario Reptile and Amphibian Atlas

The ORAA database was searched on July 30, 2024, for the single 10 km square encompassing the study area (18TWQ39). The search returned three SAR including:

- Midland Painted Turtle (*Chrysemys picta marginata*) – Special Concern (SARA);
- Northern Map Turtle (*Graptemys geographica*) – Special Concern (ESA and SARA); and
- Snapping turtle (*Chelydra serpentina*) – Special Concern (ESA) and Special Concern (SARA).

2.1.6 Ontario Butterfly and Moth Atlas

The OBA and OMA were searched on July 30, 2024, and one SAR was identified within the single 10 km square containing the study area (18TWQ39):

- Monarch (*Danaus plexippus*) – Special Concern (ESA), Endangered (SARA).

2.1.7 iNaturalist Database

The iNaturalist database was searched on July 30, 2024. As a source of data contributing to other resources such as atlas databases, iNaturalist was searched to gather information that is more refined in terms of timing and geographic scale. Two relevant SAR observations were identified:

- Monarch (*Danaus plexippus*) within 2.5 km of the study area – Special Concern (ESA), Endangered (SARA); and
- Midland Painted Turtle (*Chrysemys picta marginata*) within 2.5 km of the study area in 2024 – Special Concern (SARA).

2.1.8 Bat Conservation International Bat Profiles

On July 30, 2024, the BCI database was searched for SAR occurring within 1 km of the study area. The search resulted in the identification of five SAR:

- Eastern Red Bat (*Lasiurus borealis*) – Endangered (ESA);
- Eastern Small-footed Myotis (*Myotis leibii*) – Endangered (ESA);
- Hoary Bat (*Lasiurus cinereus*) – Endangered (ESA);
- Tricolored Bat (*Perimyotis subflavus*) – Endangered (ESA and SARA); and
- Silver-haired Bat (*Lasionycteris noctivagans*) – Endangered (ESA);

2.1.9 Database of Vascular Plants of Canada

The VASCAN database was searched on July 30, 2024, for SAR occurring within 1 km of the study area. Three SAR plants were identified:

- American Ginseng (*Panax quinquefolius*) – Threatened (ESA), Endangered (SARA), and very rare in Ontario and Canada (NHIC);

- Butternut (*Juglans cinerea*) – Endangered (ESA), Endangered (SARA), and very rare in Ontario and in Canada (NHIC);
- Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) – Endangered (ESA), Endangered (SARA), and very rare in Ontario and in Canada (NHIC).

2.1.10 Terrestrial Ecosystem Impact Assessment Report

The Terrestrial Ecosystem Impact Assessment Report Fraser Road Underpass (Dillon Consulting Limited, 2020) was reviewed to identify additional SAR and SCC that may occur within 1 km of the study area. Field investigations conducted and reported by Dillon Consulting Limited did not indicate probable occurrence of any specific SAR, however, bat habitat surveys conducted in 2018 and 2019 identified features with the potential to serve as bat roosts: trees in the study area south of Highway 401 as well as crevices and cracks in the north and south abutments of the underpass. Additionally, bat guano was reported underneath both the north and south abutments in 2018 and underneath the north abutment in 2019.

2.1.11 SAR Screening

Based on the desktop review, a screening was performed to identify any SAR or SCC that have moderate to high probability of occurring in the study area. This SAR screening was then updated according to results from field investigations conducted in 2024 (see below; Appendix A – SAR Screening).

3 FIELD INVESTIGATIONS

Two days of field investigations were conducted on August 7 and 12, 2024. Field surveys included coverage of the site and a 120-m radius surrounding the site (i.e., the study area). Private property within the 120-m radius that was not permitted for entry was investigated from within the MTO property limit. The field investigation chronology can be found in Table 1: Field Investigation Chronology. A description of surveys conducted during field investigations, including field methods can be found below.

Table 1: Field Investigation Chronology.

Date (2024)	Staff	Weather Conditions	Description of Work
August 7	Trysta Bastien & Broderick Crosby	15-19°C, winds 0-10 km/h, clear skies	Bird point-count surveys, Ecological Land Classification, inspection of structure for roost and nest features
August 12	Trysta Bastien & Broderick Crosby	17-20°C, winds 3-30 km/h, partly cloudy skies	Bat exit survey

3.1 Methods

3.1.1 Ecological Land Classification

Investigations included the classification of vegetative communities throughout the study area on August 7, 2024, using the “Ecological Land Classification for Southern Ontario: First Approximation and its Application” (Lee *et al*., 1998) with 2008 code updates (Lee H., 2008) for other communities, where appropriate. During Ecological Land Classification (ELC) surveys, plant species of conservation concern were identified and reported. ELC was used to inform investigations of habitat for SAR and SCC.

3.1.2 Bat Species and Bat Habitat

Given prior evidence of bat roosting within the Fraser Road Underpass (Dillon Consulting Limited, 2020), 2024 field surveys included the investigation of bat habitat and the presence of SAR bats in the study area. To determine the presence of bat species and any features that may provide bat habitat, a Bat Exit Survey was conducted with the Fraser Road Underpass as the designated roost feature following the guidelines described in Bats and Bat Habitats: Guidelines for Wind Power Projects (MNRF, 2011). Two experienced professionals conducted the exit survey.

On August 7, 2024, roost exit points on the Fraser Road Underpass were identified. The presence of roosting bats was confirmed by the presence of a Big Brown Bat (*Eptesicus fuscus*; no conservation status) within the eastern side of the south abutment. Additionally, concentrations of guano (species unknown) were identified underneath most sections of the north abutment as well as a small section underneath the south abutment. Following the confirmation of bat roosting within the Fraser Road Underpass, the bat detection portion of the survey was conducted on August 12, 2024. Although guidance requires exit surveys to be conducted before July, project constraints only allowed for field surveys to be conducted in early August. Survey dates were selected based on predicted weather conditions to ensure survey weather requirements were met. Inspection of the structure included identification of cracks, crevices, and otherwise narrow or sheltered areas of the underpass.

The bat detection portion of the survey began 30 minutes before sunset on August 12, 2024, and concluded 1 hour and 30 minutes after sunset. Each surveyor was stationed at a previously identified exit point. Detection of bats exiting the structure was performed by visual observation and facilitated by audio detection equipment. Each surveyor was equipped with an Echo Meter Touch (EMT) connected to a smart phone with the detector microphone aimed at the exit point. The Echo Meter App was set to ‘Live Mode’ with the automated species classifier set to include all bat species that occur in Ontario. Each surveyor also set up a Song Meter Mini Bat autonomous recording unit (ARU) in an open area near the exit point with the microphone directed toward the exit point. Both ARUs were set to record for a 5-second duration when triggered and were operating during the entirety of the detection portion of the exit survey. Additionally, each surveyor was equipped with a thermal camera used to visualize the locations of bats after sunset when visual identification by eye was limited. Evidence of bat presence such as guano as well as incidental observations of bats were also recorded during field investigations.

ARU data were processed and analyzed using SonoBat software features. Sonobat Data Wizard was used to attribute file names and scrub the data set of noise files. The high-grade noise scrubber setting was used. Bat call files were processed with SonoBat 30 call analysis software (Sonobat, Arcata, CA, USA) with the “north-northeastern US and southern Ontario” classifier for automated classification. To identify calls to the species level, SonoBat measures numerous (30+) variables of call sequences (e.g. maximum frequency, minimum frequency, duration, and call slope; Table 2: Bat call analysis criteria used to inform SonoBat 30 Auto-classification and Manual Call Analysis.). SonoBat regional classifiers are based on the most robust, species-confirmed full-spectrum reference library available and integrate quantitative machine learning with algorithms that incorporate more than three decades of expert acoustic classification. Manual call analysis was also performed on a subset of data to test attribution of call sequences to the non-bat category (i.e., birds, rodents, or static discharge). Part of the manual call analysis includes visual comparison to reference files. Call analysis software may give false positive identifications or false negative non-identifications, and the likelihood of these erroneous identifications is related to the presence of various factors, including echoes, multiple bats, naturally overlapping call characteristics and poor recording quality. All files were manually analysed to confirm identifications. Calls were grouped as “undetermined high- or low- frequency species” (i.e., low frequency above or below 35 kHz), or

"undetermined bats" when species or group determinations could not be made. A Myotis category was also created that included calls identified as undifferentiated Myotis species (Mysp), as well as high-frequency calls not identified to the species or genus level. Calls that were categorized as fragments of bat calls were listed as Potential Bat Passes (PBP, unknown) and could be bat calls or non-bat noise. Calls that were recorded but are definitively not bat calls were labeled as noise.

Note: bat passes cannot always be identified to species level. This can be due to either poor quality of the recording (i.e., signal-to-noise ratio), or ambiguity of the call type. Some bat species have very similar calls, and all bats have variability in their call repertoires. Some bat calls are quite diagnostic and can be confidently identified to species while other bat passes can only be identified to a Genus or to a group of species. Many calls were impossible to classify to species, as is typical of bat acoustic data.

Table 2: Bat call analysis criteria used to inform SonoBat 30 Auto-classification and Manual Call Analysis.

Bat Species or Group	Criteria* (values indicated are one standard deviation below and above each respective mean)
Bat	Calls with poor call quality that hinders discrimination of other call characteristics
High-frequency Bat	Broad band FM calls with a Lo f >35Khz but where poor call quality hinders discrimination of other call characteristics
Undifferentiated Myotis Species	Broad band FM calls with a Lo f >32Khz, distinctive downward 'toes' are visible at the end of call pulses.
Little Brown Myotis	Lo f 35-38 kHz, f_c 38-41 kHz, Hi f 61-78 kHz, upper 6.7-14, lower 2.3-4.6, dur 4.9-6.7 Longer duration calls (duration >7 and lower slope <3) are distinctive
Northern Myotis	Lo f 32-42 kHz, f_c 40-47 kHz, Hi f 95-114 kHz, upper 18-30, lower 7.4-16, dur 3.1-4.6
Eastern Small-footed Myotis	Lo f 42-39 kHz, f_c 42-46 kHz, Hi f 86-104 kHz, upper 27-40, lower 7-12, dur 2.5-3.9 Frequency modulation sweep a smooth curve (i.e., no inflection), beginning steeply and then increasing in curvature. May have a well-defined downward tail. Some calls may have an inflection, but the smoothly curved variant is diagnostic.
Tricolored Bat	Lo f 40-43 kHz, f_c 37-44 kHz, Hi f 54-81 kHz, upper 1.7-14, lower 0.4-1.7, dur 5.8-8.4 Strongly inflected, almost vertical frequency modulation changing to low slope below 47 kHz for the majority of the call
Eastern Red Bat	Lo f 37-43 kHz, f_c 37-44 kHz, Hi f 54-81 kHz, upper 4.4-16, lower 0.7-3.2, dur 4.6-9.1 U-shaped calls (up–turn at end of call); may exhibit variable f_c across sequence
Low-frequency Bat**	Short band FM calls with a Lo f <35Khz but where poor call quality hinders discrimination of other call characteristics
Big Brown Bat	Lo f 25-28 kHz, f_c 26-30 kHz, Hi f 42-56 kHz, upper 3.3-8.3, lower 0.7-2.9, dur 5.3-11. Calls with Hi f above 65kHz are diagnostic (distinguished from silver-haired bat)
Silver-haired Bat	Lo f 24-27 kHz, f_c 25-28 kHz, Hi f 33-51 kHz, upper 1.7-9.3, lower 0-2.7, dur 4.8-13, calls with flat slope ≥26 kHz are diagnostic (distinguished from big brown bat)

Bat Species or Group	Criteria* (values indicated are one standard deviation below and above each respective mean)
Hoary Bat	Lo f 18-22 kHz, f_c 18-22 kHz, Hi f 21-31 kHz, upper 0.3-4.1, lower -0.1-0.2, dur 7-15, call may have pronounced or subtle U-shape

* **Lo *f***: lowest apparent frequency, ***f*c**: frequency of the call at its lowest slope or the lowest frequency for consistent FM sweeps, **Hi *f***: highest apparent frequency, **upper**: the slope of the upper portion or onset of the call (kHz/ms), **lower**: the slope of the lower portion or body of the call (kHz/ms), **dur**: call duration (ms).

** Used for manual call identification. SonoBat attributes high- or low-frequency species groupings based on individual calls identified to the species level (SonoBat 2017).

3.1.3 Bird Species and Bird Habitat

To determine the presence of bird SAR in the Study area, two point-count surveys were conducted on August 7, 2024, following the Ontario Forest Bird Monitoring Program (OFBMP) protocol (Cadman, Dewar, & Welsh, 1998). The survey date was selected according to project constraints and predicted weather conditions facilitating activity of birds. Point-count surveys began at 09:00 and concluded at 09:38. Although point-counts of this type are typically stationed at least 250 m apart, two point-counts could only be accommodated by placing two survey stations within 250 m of one another. To address this, the directionality of the circle diagram from both surveys was used to identify cases where duplicate detections of a species were possible.

Each survey was conducted for a period of 10 minutes, during which all birds detected by sight and sound by an experienced professional were recorded. Detections were binned into time windows: 0-3 minutes, 3-5 minutes, and 5-10 minutes. Approximate distance of each detection from the survey station was also recorded in bins: 0-50 m, 50-100 m, and >100 m. Sources of ambient noise were recorded.

Bird habitat within the study area was assessed by inspecting the Fraser Road Underpass for nests and for structures facilitating bird nesting. Incidental observations of birds and their locations were recorded during field investigations.

3.1.4 Monarch and Monarch Habitat

To determine the presence of Monarch and Monarch habitat, experienced professionals recorded incidental observations of Monarch. Instances of milkweed were also recorded.

3.1.5 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) assessment is considered a tool of Ontario's Planning Act and corresponds to policies within the Provincial Planning Statement (PPS; Ontario, 2024). Under MTO jurisdiction, SWH policies per the PPS do not apply. However, the SWH assessment does provide insight into SAR habitats and sensitive environmental features that may be in or surrounding the study area, and thus are included in this report. Preservation of these features is encouraged to protect Ontario's biodiversity.

Throughout field investigations, surveyors recorded species, environmental features, and ecological features that are indicative of SWH in Ecoregion 6E. In cases where SWH may be found in the study area but outside of MTO property limits, SWH was recorded as potential. SWHs in the study area were also recorded as 'potential' when further field investigation would be required for SWH designation.

3.2 Existing Conditions

3.2.1 Vegetation

Vegetation Communities

Three Ecosite classes were identified by ELC in the study area (Figure 2). Mineral Cultural Meadow (Meadow; Ecosite: CUM1) occurs within the 15-20 m buffer zone within the Right of Way (ROW) alongside Highway 401 and Fraser Road, as well as within highway medians. These areas are characterized by mowed grass with occasional trees and shrubs. A Mineral Cultural Woodland (Woodland; CUW1) was identified as an inclusion within the Meadow bound by Airport Road, Highway 401, and Fraser Road. Meadow also occurs in the study area southwest of Airport Road. This portion of the study area appears to have previously been agricultural and is now comprised of Mineral Cultural Meadow dominated by forbs and grasses.

The study area contains one unevaluated wetland: Maple Mineral Deciduous Swamp (Swamp; Ecosite: SWD3) occurs east of Fraser Road on both sides of Highway 401 beyond buffer zones. The canopy is dominated by maples while the sub-canopy and understorey are dominated by Green Ash (*Fraxinus pennsylvanica*). The ground layer is sparse, dominated by Sensitive Fern, but with a significant surface area susceptible to flooding.

Agricultural areas are found northwest of Lapierre Road (Soya) and in the southeast corner of the study area where Airport Road joins Fraser Road (field corn).

During ELC surveys, 39 plant taxa were identified (Appendix B – List of Plant Taxa). None of the plants identified during ELC surveys are SAR or SCC. Common Milkweed (*Asclepias syriaca*) plants, which provide habitat for Monarch, were found in one of the Meadow communities (see Section 5.2.3 for further information).

Black Ash

Black Ash was not recorded in the study area within MTO property limits. Swamp areas in the study area provide suitable habitat, but without access to those areas, presence/absence could not be confirmed.

Invasive Plant Species

An invasive species is a species that is not native to an ecosystem and results in the degradation of the environment once established. Invasive species are known to outcompete native biota for resources within an ecosystem and are difficult to remove once introduced. The primary method to combat these species is to prevent their spread into new areas.

Within the study area, four species of invasive plant were identified:

- Common Buckthorn (*Rhamnus cathartica*);
- Common Reed (*Phragmites australis* ssp. *australis*);
- Purple Loosestrife (*Lythrum salicaria*); and
- Wild Parsnip (*Pastinaca sativa*).

Common Reed, Purple Loosestrife, and Wild Parsnip were observed throughout the meadow south of Airport Road, a portion of the study area that is not part of the site and is not expected to be impacted or altered by construction activities. Common Reed presence in the study area can be seen in Figure 3. Common Buckthorn was recorded at the edges of the inclusion woodland as well as along edges between deciduous swamp and meadows.

Noxious Plant Species

Noxious plants have been designated by authorities as being harmful to agricultural or horticultural crops, natural habitats or ecosystems, or humans or livestock. Wild Parsnip is invasive and is considered a noxious plant as it can be harmful to humans. The plant produces a sap that contains chemicals which can irritate human skin when the contact area is exposed to sunlight. Wild Parsnip was observed in the meadow south of Airport Road, a portion of the study area that is not part of the project site and is not expected to incur a health hazard provided that construction activities are contained within the project site.

3.2.2 Wildlife

Bat Species and Bat Habitat

Inspection of the study area confirmed bat roosting activity on the Fraser Road Underpass (see Appendix D – Field Survey Photographs). Inspection also identified features suitable for roosting by bat SAR on or in natural and anthropogenic structures in the study area. During surveys on August 7, 2024, a Big Brown Bat was observed roosting in the joint of the eastern side of the south abutment. Concentrations of bat guano (species unknown) were identified underneath most sections of the north abutment and underneath a small section of the south abutment. The confirmation of roosting in the abutments prompted surveyors to select the two abutments as targets for Bat Exit surveys. The underpass also contains areas sheltered on at least two sides (sheltered from above and one side) which may be suitable as roost sites. See Figure 3 for bat observations and records of bat sign within the underpass.

Snags with peeling bark were identified in the meadow (specifically the woodland inclusion) southwest of Fraser Road and Highway 401 which are suitable as roost sites (see Appendix D – Field Survey Photographs; see Figure 3 for locations of snags).

The north and south abutments were selected as target features for the Bat Exit survey. A surveyor was positioned approximately 5 m from each abutment to conduct the survey. During the 2-hour survey period, temperature varied from 17 to 20°C. Wind varied from approximately 3 to 10 km/h with occasional gusts of up to approximately 39 km/h. Sky conditions remained partly cloudy throughout the survey period. During the survey, two bat observations were made at the north abutment station. The first observation was visual: an individual flew over the underpass travelling east to west. The second observation was made by EMT detection. The species could not be determined for either observation.

Analysis of the ARU recordings revealed five species confirmed to be present. The species recorded most often were Big Brown Bat (10 passes), followed by Little Brown Myotis (4 passes), Hoary Bat (2 passes), Silver-haired Bat (2 passes), and Eastern Red Bat (1 pass). Additionally, the calls most often recorded that were not identifiable to species were low-frequency unknown (4 passes), followed by high-frequency unknown (2 passes), and undifferentiated Myotis species (2 passes). Recordings that were not bat calls (i.e., animal noise, mechanical noise, etc.) were categorized as noise (3 passes). A total of 30 bat calls were manually vetted, representing 100% of the total calls recorded.

SAR bat activity and potential SAR bat activity were confirmed via recording in the study area. Confirmed SAR bat activity included four Little Brown Myotis passes (two recorded at both the north and south stations), two Hoary Bat passes (both recorded at the north station), two Silver-haired Bat passes (both recorded at the south station), and one Eastern Red Bat pass (recorded at the north station).

Additionally, two undifferentiated Myotis species and two high-frequency unknown bat passes were detected at both stations combined. Undifferentiated Myotis species bat passes have the potential to be any *Myotis* spp.,

while high-frequency unknown bat passes have the potential to be *Myotis* bats (Little Brown, Northern), Tricolored bats, or Eastern Red Bats. Since Little Brown Myotis was the only *Myotis* spp. confirmed, it is likely that the remaining undifferentiated Myotis species bat passes also belong to Little Brown Myotis. Additionally, based on the ratio of confirmed high-frequency recordings (one Eastern Red Bat; four Little Brown Myotis), it is likely that the remaining undifferentiated passes are predominantly Myotis species.

Based on the activity levels and patterns of high-frequency bats, it is likely that there are *Myotis* maternity roosts present on or near the site. The level of activity observed just after sunset suggests that the bats may be roosting on-site. While it is not possible to determine definitively from acoustic data where maternity roosts are located (i.e., on- or off-site), it is likely that the bats are using a network of roosts that include trees and/or structures both on and off the site.

Note: bat detectors have a limited range (~30 m) for bats depending on many factors (detector set up, temperature, humidity, ambient noise). It is also not possible to tell the number of bats being recorded, because there is no reliable method to differentiate between five passes made by one bat flying over five times or five bats flying over once. Additionally, it is not possible to confirm roosting with acoustics alone. At this point in time, the only confirmed species using the underpass for roosting is Big Brown Bat. That said, higher rates of bat passes around dusk, when combined with detailed habitat information, can be used to suggest that a maternity roost may be present in the area of detection.

Bird Species and Bird Habitat

Overall, one SAR bird was identified during field investigations: two Barn Swallow individuals were incidentally observed foraging over the meadow dominated by forbs and grasses in the southwest portion of the study area (Figure 3). During point-count surveys, temperature varied between 15 and 19°C, wind speeds were approximately 0 to 11 km/h, and skies were clear. A total of eight species of bird were recorded during point-counts, none of which are SAR or SCC. One of the species encountered, Gray Catbird (*Dumetella carolinensis*), is rare in Ontario during the non-breeding season. A table of bird species identified during point-counts and their conservation statuses and categories can be found in Appendix C – List of Bird Species.

During inspection of the Fraser Road Underpass, no nests were discovered. Inspection revealed that the underpass is suitable for nesting by Barn Swallow, Cliff Swallow (*Petrochelidon pyrrhonota*; no conservation status), and Eastern Phoebe (*Sayornis phoebe*; no conservation status). The culvert was identified as suitable nesting habitat for Barn Swallow, and no nests were found. The Swamp areas within the study area are assumed to be suitable nesting habitat for birds, including the SAR birds Canada Warbler, Eastern Wood-pewee, and Wood Thrush. As the Swamp areas are on inaccessible private property, no nest searches were conducted in these areas. No suitable nesting habitat was found for Bank Swallow, Grasshopper Sparrow, or Eastern Meadowlark, however, if meadows are left unmaintained, they may become suitable nesting habitat for Eastern Meadowlark. Agricultural areas within the study area serve as potential foraging habitat for Barn Swallow, Bank Swallow, Grasshopper Sparrow, and Meadowlark.

Monarch and Monarch Habitat

A Monarch was observed on August 7, 2024, in the Meadow area southwest of Fraser Road and Highway 401 (Figure 3). Common Milkweed plants were found infrequently in the same location of the study area (Figure 3). In Canada, Milkweed found in open areas provides habitat for Monarch as its larval stage depends on Milkweed for forage.

3.2.3 Significant Wildlife Habitat

During field investigations, three potential SWHs were identified in the study area. None of these SWHs have been confirmed as they require targeted field surveys and/or additional information beyond the scope of this study. The potential types of SWH are described below:

- Colonially-Nesting Bird Breeding Habitat (Trees/Shrubs): Maple Mineral Deciduous Swamp is one type of Ecosite that can host colonially-nesting waterbirds. Such colonies require live or dead standing trees with water below or nearby. Presence of at least five nests would be required to confirm the SWH. Without access to the swamp and without timed field investigations, the presence of this SWH could not be confirmed.
- Bat Maternity Colonies: Swamp in the study area may support maternal roosting colonies of bats. Evidence of maternal colonies would be required to confirm the presence of this SWH. Although roost features within the swamp are unassessed, the presence of Big Brown Bat and Silver-haired Bat in the study area suggest that maternity colonies are possible.
- Amphibian Breeding Habitat (Woodland): Swamp in the study area may provide this type of SWH. Given the depressed areas of floor with extensive cover of decaying leaf-litter, this area likely foods annually and provides habitat for amphibian egg-laying. Confirmation of the presence of breeding pools would be required to confirm the presence of this SWH.

Although waterfowl stopover and staging habitat was identified during the background review as a potential SWH within the study area, site conditions are unlikely to provide hydrology suitable for the accumulation of sheet water or meltwater. Additionally, no areas of open water occur within the study area.

4 PROPOSED WORKS

The existing condition of the underpass as well as its deficient vertical clearance over Highway 401 prompt a replacement of the existing underpass. Project works include the following:

- Replacement of the existing underpass along the existing horizontal alignment;
- Profile grading of the approach embankment to accommodate the new structure depth and increased vertical clearance on Highway 401;
- Embankment widening;
- Pavement construction;
- Drainage improvements;
- Replacement of curb and gutter; and,
- Installation of guide rails as required for the new structure and vertical alignment improvements.

5 IMPACT ASSESSMENT

5.1 Vegetation

The majority of works are expected to be contained within the footprints of the bridge and the proposed embankment. Vegetation removal is anticipated where embankment widening will occur (rights-of-way adjacent to Fraser Road as far north as Raisin River Road and as far south as Airport Road). Vegetation communities that are expected to be affected by this removal include meadow and woodland. No rare or sensitive plant species are expected to be impacted by vegetation removal. If vegetation clearing extends beyond the ROW areas, deciduous forest and its associated SAR and SCC habitat may be impacted as well.

Indirect impacts in these areas could include the release of contaminants (e.g. construction-generated sediment) beyond working limits.

5.1.1 Invasive Plant Species

Invasive plant species were recorded in the meadow along Airport Road, along the edges of the woodland, and along the edges of the swamp. The removal of vegetation in areas near observations of invasive species (i.e., Common Buckthorn, Common Reed, Purple Loosestrife, and Wild Parsnip) have the potential to allow invasive species to spread and colonize such areas.

5.1.2 Noxious Plant Species

A noxious plant species is a plant that an agricultural or other governing authority has designated as a plant that is harmful to agricultural or horticultural crops, natural habitats or ecosystems, or humans or livestock. Wild Parsnip was identified along the edges of the woodland. This species produces sap that has chemicals that can irritate human skin. The sap can cause human skin to be irritated by sunlight.

5.2 Wildlife

Field investigations confirmed the presence of six wildlife SAR and SCC, and the study area provides habitat that is suitable or is assumed to be suitable for an additional nine wildlife SAR and SCC that were not detected during field investigations. Direct impacts to wildlife may occur if wildlife enter the construction zone or construction staging or if vegetation is removed. Indirect impacts include contaminated surface runoff resulting from sediment and/or spills released into sensitive habitats.

5.2.1 Bats

Field investigations confirmed the presence of four bat SAR: Little Brown Myotis, Hoary Bat, Silver-haired Bat, and Eastern Red Bat. Bat roosting within the structure of the underpass was confirmed by the observation of a Big Brown Bat nestled within the south abutment as well as guano found throughout areas beneath the north abutment. There is a high probability that Little Brown Myotis uses the structure as a roost given the species' presence at the site as well as its propensity to roost within anthropogenic structures. There is a moderate probability that Silver-haired Bat uses the structure as a roost given its presence in the study area and its occasional use of anthropogenic structures as roosts. ROW areas adjacent to the structure and nearby woodlands likely provide foraging habitat for Little Brown Myotis, Hoary Bat, Silver-haired Bat, and Eastern Red Bat given that these are open areas at the edge of woodlands.

Potential direct impacts of the proposed works to bats, including bat SAR, include:

- Replacement of the underpass: without usage of timing windows, bats may be directly harmed if they are within the underpass structure during construction. Additionally, bats will temporarily be excluded from

roosting within the underpass during its replacement. Woodland and swamp may offer alternative roost sites during underpass replacement.

- Vegetation removal in meadow and woodland areas: bats are likely to use open areas found in meadow communities to forage. Removal of vegetation in the meadow may exclude bats from foraging there. Also, woodland provides roost sites, therefore, removal of trees and snags in the woodland excludes bats from using those features as roost sites.
- Use of heavy machinery in the study area: the vibrations and sound produced by heavy machinery have been demonstrated to negatively affect the ability of bats to use echolocation to capture prey. Heavy machinery should be used according to timing windows to minimize the impact of sound and vibrations on bat behavior.

Contamination by surface runoff into wetlands (i.e., the swamp) is a potential indirect impact to bats in the study area. Runoff may negatively impact the vegetation community and prey insects that bats are assumed to be using within the study area.

5.2.2 Birds

One SAR bird (Barn Swallow) and eight other bird species were recorded during field investigations. Due to the timing of field work, it is unknown whether any of these species breed in the study area.

Following the Migratory Birds Convention Act (MBCA; Canada, 1994) and the Migratory Birds Regulations, 2022 (MBR, 2022; Canada, 2022), migratory birds, their eggs, and active nests used by migratory birds are protected, prohibiting disturbance or destruction. Active nests include those that contain eggs or live young. Schedule 1 of the MBR, 2022 identifies 18 migratory bird species whose nests are protected year-round (regardless of whether they are active or not) and must be confirmed inactive for a defined period (ranging between 12 and 36 months depending on the species) before they can be disturbed or destroyed. Nests in this category must also be registered at the start of the defined period. During field investigations, no evidence of nesting by these species was observed.

Anthropogenic structures in the study area, including the underpass and the culvert, were found to provide suitable habitat for nesting of Barn Swallow and Cliff Swallow. Although Barn Swallow were confirmed present in the study area during field investigations, no nests were found during field investigations, and no evidence of breeding was recorded for Barn Swallow. The timing of field investigations meant that the use of the study area for bird SCC breeding could not be determined.

It is recommended that all tree removals and bridge demolition activities take place outside of the bird nesting period (April 1 to August 31). Proponents can apply for a damage or danger permit to remove or actively deter migratory birds from structures if it can be demonstrated that the bird activity is causing damage to the structure or poses a health and safety concern for people (e.g., large nesting gull colonies generating waste in public places). Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific purposes or to prevent damage being caused by birds, however, there are currently no permits available to exempt development, including maintenance and rehabilitation activities.

To minimize impacts on migrating birds, the use of timing windows for vegetation removal and erosion and sediment control (ESC) structures is recommended.

5.2.3 Monarch

Milkweed provides habitat for Monarch in open areas such as meadows, fields, and other disturbed environments. Milkweed was found in the southwest portion of the study area, within the ROW between Fraser Road and Airport Road (meadow). An adult Monarch was recorded in this vicinity during field investigations. Vegetation removal is needed for widening of the embankment, and this work is expected to impact the Milkweed found. Given that Milkweed is infrequent in the study area, and that nearby environments are open and likely support Milkweed, proposed works are likely to have minimal impact on Monarch in the study area.

5.3 Significant Wildlife Habitat

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (OMNRF, 2015) provide descriptions of wildlife habitats and guidance on criteria for determining the presence of candidate and confirmed wildlife habitats. SWH includes the following categories as defined in the Significant Wildlife Habitat Technical Guide and Ecoregion Criteria:

- Seasonal concentration areas;
- Rare vegetation communities or specialized habitat for wildlife;
- Habitat for species of conservation concern; and
- Wildlife movement corridors.

A SWH screening has been completed based on the background review of the species and ELC communities that occur in the study area. Table 3: SWH Screening outlines the SWHs that have the potential to be pertinent to the study area and the site conditions.

Table 3: SWH Screening

Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) **Rationale:** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	▪ Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. ▪ Most nests in trees are 11 to 15 m from ground, near the top of the tree. **Information Sources** ▪ Ontario Breeding Bird Atlas, colonial nest records. ▪ Ontario Heronry Inventory 1991 available from Birds Canada or NHIC (OMNRF). ▪ Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony	**Studies confirming:** ▪ Presence of 5 or more active nests of Great Blue Heron or other listed species. ▪ The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. ▪ Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by	**Moderate Probability:** ▪ ELC Ecosite SWD3 occurs in the eastern portion of the Study area. SWD3 Ecosite extends eastward outside of the study area and is of a size to potentially support colonial bird nesting Interior of SWD3 unassessed for suitable nesting trees due to inaccessibility ▪ Reports of Great Blue Heron, Black-crowned Night-Heron, Great Egret,

Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			▪ Aerial photographs can help identify large heronries. ▪ Reports and other information available from CAs. ▪ MNRF District Offices. ▪ Local naturalist clubs.	evidence such as the presence of fresh guano, dead young and/or eggshells. ▪ SWHMiST Index #5 provides development effects and mitigation measures.	and Green Heron within 5-km of the study area.
Bat Maternity Colonies **Rationale;** Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	▪ Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). ▪ Maternity roosts are not found in caves and mines in Ontario. ▪ Maternity colonies located in Mature deciduous or mixed forest stands, with >10/ha large diameter (>25cm dbh) wildlife trees. ▪ Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. ▪ Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred. **Information Sources** ▪ OMNRF for possible locations and contact for local experts ▪ University Biology Departments with bat experts.	▪ Maternity Colonies with confirmed use by; ▪ >10 Big Brown Bats ▪ >5 Adult Female Silver-haired Bats ▪ The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. ▪ Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #12 provides development effects and mitigation measures.	**High Probability:** ▪ Presence of both Big Brown Bat and Silver-haired Bat in the study area. ▪ Presence of roost SWD Ecosite within the Study area as well as presence of multiple roost features (Fraser Road Underpass as well as snags in woodland area). ▪ Presence of roost features in SWD3 Ecosite unassessed due to inaccessibility.
Amphibian Breeding Habitat (Woodland) **Rationale:** These habitats are extremely important to amphibian biodiversity within a landscape and	Blue-spotted Salamander Eastern Newt Gray Treefrog Spotted Salamander Spring Peeper	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	▪ Presence of a wetland, pond or woodland pool (including vernal pools) >500m2 (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. ▪ Woodlands with permanent ponds or those containing water in most years until	**Studies confirm:** ▪ Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with	**High Probability:** ▪ Extensive Mineral Deciduous Swamp Ecosite in eastern portion of study area that extends eastward beyond study area. ▪ Ground layer of Mineral Deciduous Swamp exhibits signs of seasonal flooding: widespread

Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
often represent the only breeding habitat for local amphibian populations	Western Chorus Frog Wood Frog	Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	mid-July are more likely to be used as breeding habitat. **Information Sources** ▪ Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records ▪ Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. ▪ OMNRF Districts ▪ OMNRF wetland evaluations ▪ Field Naturalist clubs ▪ Canadian Wildlife Service Amphibian Road Call Survey Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Call Level Codes of 3. ▪ A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. ▪ The habitat is the wetland area plus a 230m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. SWHMiST Index #14 provides development effects and mitigation measures.	depressed areas with extensive cover of leaf litter and minimal live vegetation.

6 MITIGATION MEASURES

The following mitigation measures are recommended to reduce potential impacts on natural heritage features and functions.

6.1 General

- Vehicle maintenance and refueling shall be controlled to prevent the entry of petroleum products or other deleterious substances, such as debris, waste, rubble, or concrete material, into the natural environment, as per Ontario Provincial Standard Specifications (OPSS) 182 – General Specification for Environmental Protection for Construction In and Around Waterbodies and On Waterbody Banks and NSP 001A850 – Equipment Refueling, Maintenance, and Washing.
- Waste management shall be completed per OPSS 180 – General Specification for the Management of Excess Materials:
  - All construction-related materials, equipment, and construction-generated materials (e.g., runoff from exposed soils, stockpiled soils, or other materials from clearing and grubbing) shall be properly stored/contained, maintained, filtered, and otherwise handled and managed at a distance of at least 30 m away from sensitive areas (i.e., woodland and wetland).

6.2 Erosion and Control

- Develop and implement an ESC Plan for the site that minimizes the risk of sedimentation of wetlands during all phases of the project.
- Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized.
- The plan should, where applicable, include:
  - Installation of effective erosion and sediment control measures before starting to work to prevent sediment from entering wetlands.
  - Regular inspection of erosion and sediment control measures and structures during construction.
  - Repairs to ESC measures and structures if damage occurs.
  - Removal of non-biodegradable erosion and sediment control materials once the site is stabilized.

6.3 Vegetation

An estimated 23 trees, including 3 dead trees, are anticipated to be removed for this project. Proposed works may also result in tree injury, including potentially damaging roots and/or branches through excavation and mobilization of equipment. Specific mitigation measures have been described in the Arborist Report and should also include:

- Re-stabilize and re-vegetate all exposed surfaces as soon as possible using seeding with Standard Roadside seed mix as specified in OPSS 803 – Construction Specification for Vegetative Cover.
- Vegetation damage and removal should be minimized to the smallest footprint of work needed.
- The work zone extent adjacent to naturally occurring vegetation communities should be identified and protected using visual fencing (e.g. snow fencing) to prevent encroachment.
- If any trees are proposed for removal, the Contractor shall use tree felling and grubbing procedures as outlined in OPSS 201, Construction Specification for Clearing, Close Cute Clearing and Grubbing.
- Temporarily disturbed vegetated areas shall be restored and/or re-vegetated to minimize invasion and colonization by non-native species.

6.4 Wildlife

Three types of candidate Significant Wildlife Habitat have been identified as potentially occurring within the study area: Colonially-nesting Bird Breeding Habitat (Trees/shrubs), Bat Maternity Colonies, and Amphibian Breeding Habitat (Woodland). The following mitigation measures are recommended to avoid impacts to these areas:

- Wildlife incidentally encountered during construction shall not knowingly be harmed and shall be allowed to move away from the construction area on its own.
- If wildlife encountered during construction does not move from the construction zone, the Contract Administrator will contact the Ministry of Natural Resources (MNR) and MTO Environmental; the Contractor shall not move the wildlife.

- If vegetation clearing or grubbing occurs during the period when most birds in the study area breed (between April 1 and August 31), it shall be preceded by bird nest surveys conducted by an avian specialist not more than two days (48 hours) before the work.
- If an active bird nest is found, an avian specialist shall determine whether the nest belongs to a protected species and if this is the case, shall establish a suitable buffer around the nest within which work is halted until the nestling birds are fully fledged and the nest is unoccupied.
- The Contractor shall not destroy active nests (nests with eggs or young birds), or wound or kill birds, or species protected under the MBCA and/or Regulations under the MBCA.
- Avoid the use of mesh or netting-type stabilization material on site for erosion control measures to prevent the entanglement of wildlife.
- A general awareness of the potential for wildlife in the construction zone and avoidance of harm to wildlife is sufficient.

6.5 Species at Risk

The existing Fraser Road underpass provides potential habitat for SAR bats and Barn Swallow (Special Concern). While not observed directly utilizing the structure, SAR bats were detected flying above and could potentially use the structure for either day roosting or maternity roosting. The agricultural fields and meadow communities within the study provide potential habitat for Barn Swallow, Eastern Meadowlark, Grasshopper Sparrow, and Monarch butterflies. The swamp community provides potential habitat for Black Ash, Canada Warbler, Eastern Wood Peewee, and Wood Thrush. The following mitigation measures will protect impacts to Species at Risk and their habitats:

- Implement Contractor awareness and encounter protocols for SAR in contract documents.
- The Contractor shall minimize removal of trees in the woodland inclusion of the meadow to avoid removal of bat roost habitat.
- It is recommended that all tree removals and bridge demolition activities take place outside of the SAR bat active period (April 1 to September 30) and the breeding bird active period (April 1 to August 31).
- If a SAR is encountered within or adjacent to the construction site, the Contractor will stop work and contact the Ministry of the Environment, Conservation, and Parks (MECP) and MTO Environmental.
- If construction activities are such that continuing construction in that area would result in a contravention of the ESA, all activities will stop, and the Contract Administrator will contact the MECP SAR Biologist to discuss mitigation options.

7 CONCLUSIONS

Findings and recommendations in this report are based upon the ESA prior to amendments on June 5, 2025. Construction and staging for the replacement of the Fraser Road Underpass is expected to be contained within the footprint of the bridge and within the rights-of-way adjacent to Highway 401, Fraser Road, Airport Road, and Lapierre Road. Impacts on sensitive vegetation, SAR, and SAR habitat features are expected to be minimal.

The areas where vegetation will be removed are primarily those with existing evidence of anthropogenic disturbance (e.g., cultural communities). Meadows can recover quickly post-removal. If works extend beyond ROW areas, they have the potential to impact breeding habitat of SCC including Canada Warbler, Eastern Wood-pewee, Wood Thrush, Little Brown Myotis, Hoary Bat, Silver-haired Bat, and Eastern Red Bat.

Direct impacts to wildlife may occur by wildlife travelling into the construction zone or construction staging and by removal of vegetation. To avoid incidental take of birds, bird nests, and bats, the usage of timing windows for vegetation removal and construction is recommended.

A possible indirect impact is contaminated surface runoff into wetlands, and such contamination may impact breeding and foraging habitat for birds and bats, including several SAR. It is recommended that an ESC plan is implemented to minimize the risk of contamination of wetlands during all phases of the project. Based on this assessment, impacts on sensitive habitat features, SAR, SAR habitat and SCC can be minimized through mitigation in particular including adhering to avoidance of clearing and demolition during the proposed timing SAR bat active period (April 1 to September 30).

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Signature Page

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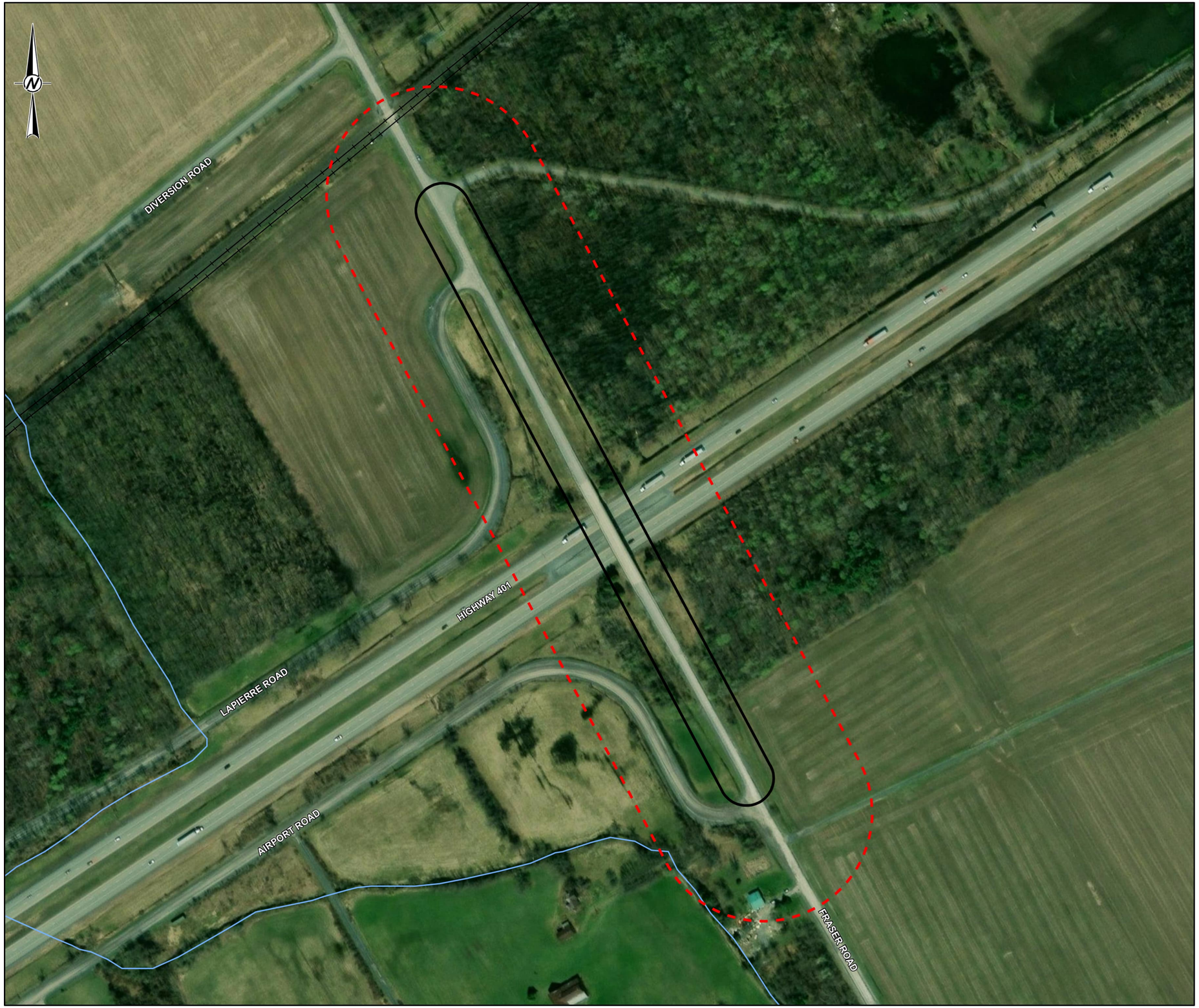


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FIGURES



KEY MAP



LEGEND

- SITE
- STUDY AREA
- WATERCOURSE
- RAILWAY

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3. PROJECTION: NAD 1983 UTM ZONE 18N, TRANSVERSE MERCATOR

CLIENT
MINISTRY OF TRANSPORTATION ONTARIO

PROJECT
ASSESSMENT OF PAST USES, HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

TITLE
PROJECT SITE AND STUDY AREA

CONSULTANT

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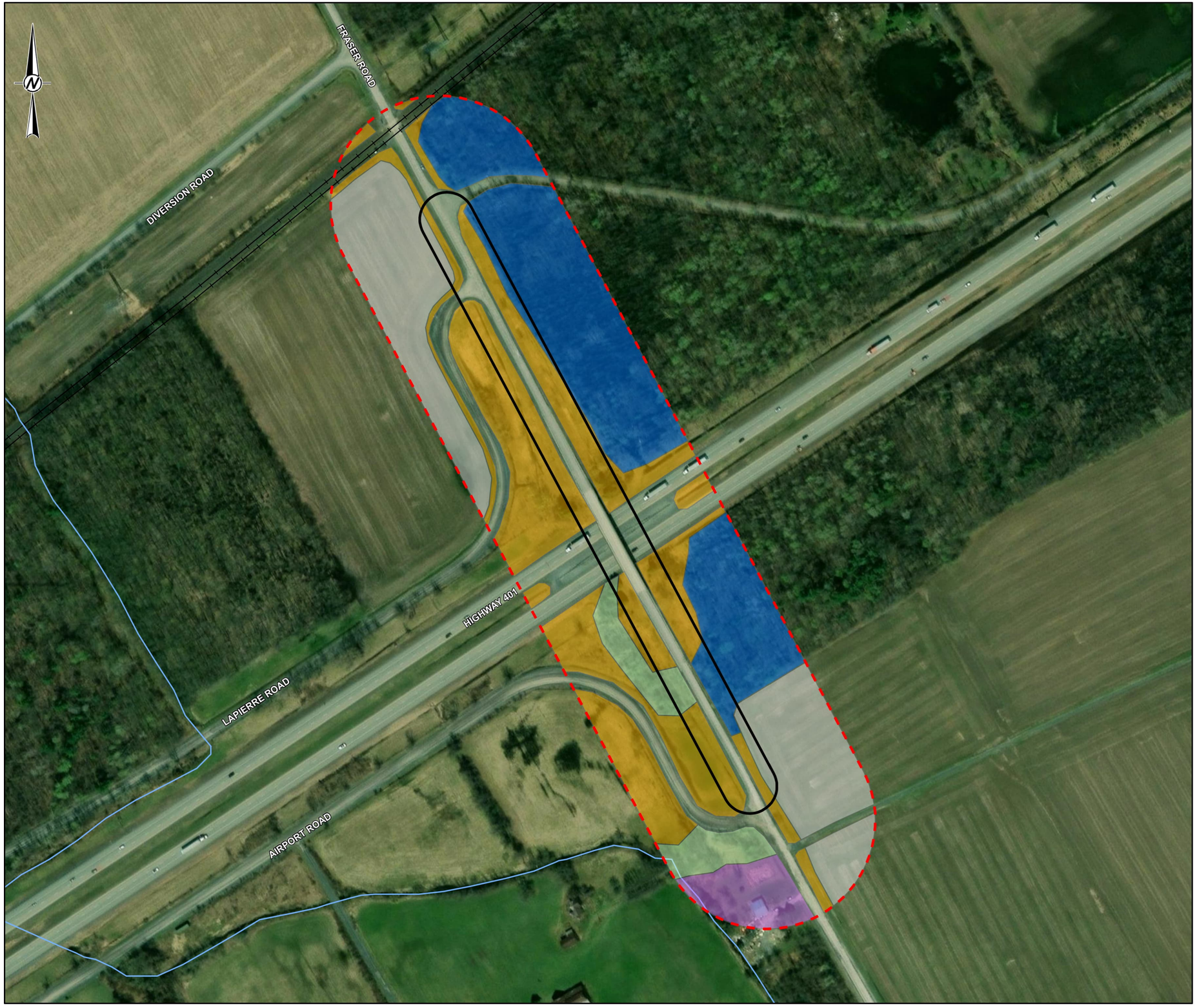
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LEGEND

- SITE
- STUDY AREA
- WATERCOURSE
- RAILWAY

ECOLOGICAL LAND CLASSIFICATION

- CUM1 - MINERAL CULTURAL MEADOW
- CUW1 - MINERAL CULTURAL WOOODLAND
- SWD3 - MINERAL DECIDUOUS SWAMP
- AGRICULTURAL LAND
- RESIDENTIAL LAND

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PROJECT
ASSESSMENT OF PAST USES, HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

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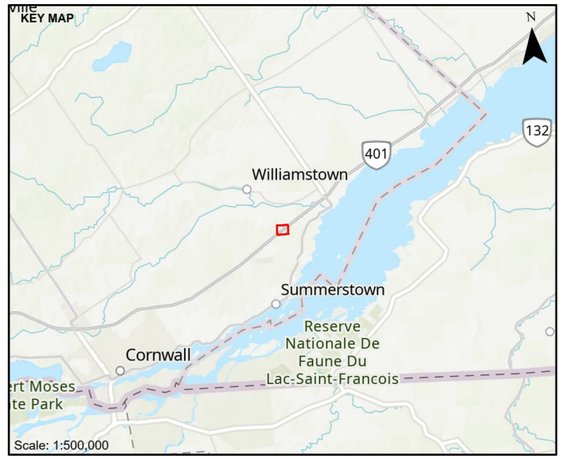
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LEGEND

FIELD OBSERVATIONS

- BARN SWALLOW
- BAT GUANO
- BIG BROWN BAT
- MILKWEED
- MONARCH
- SNAG
- PHRAGMITES
- SITE
- STUDY AREA
- WATERCOURSE
- RAILWAY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

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REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: ESRI, CGIAR, USGS, PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR, MICROSOFT
3. PROJECTION: NAD 1983 UTM ZONE 17N, TRANSVERSE MERCATOR

CLIENT
MINISTRY OF TRANSPORTATION ONTARIO

PROJECT
ASSESSMENT OF PAST USES, HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

TITLE
FIELD OBSERVATIONS AND NATURAL FEATURES

CONSULTANT

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APPENDIX A

SAR Screening Table

Appendix A: SAR Screening

Common Name	Scientific Name	Conservation Statuses	Habitat Requirements	Probability to Occur in the Study Area*
Bank Swallow	*Riparia riparia*	ESA: Threatened SARA: Threatened	In Ontario, Bank Swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and riverbanks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	**Moderate** - Although nesting habitat is not found in the study area, foraging habitat is present in the form of agricultural fields. Recent occurrence records indicate the species has been observed approximately 2.5 km from the study area.
Barn Swallow	*Hirundo rustica*	ESA: Special Concern SARA: Threatened	In Ontario, Barn Swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared rights-of-way, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 2019).	**Confirmed** - Two individuals observed foraging during field investigations. The culvert and the underpass provide suitable nesting structures. Additionally, the study area is surrounded by agricultural areas and meadows, increasing habitat suitability.
Canada Warbler	*Cardellina canadensis*	ESA: Special Concern SARA: Threatened	In Ontario, breeding habitat for Canada Warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010).	**Moderate** - The study area includes swamp which is assumed to be suitable to nesting. The species has been recorded approximately 2.5 km from the study area.
Eastern Meadowlark	*Sturnella magna*	ESA: Threatened SARA: Threatened	In Ontario, Eastern Meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2019). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970).	**Moderate** - The agricultural areas and meadows are not suitable to nesting but may be suitable for foraging. The species have been recorded approximately 2.5 km from the study area.
Eastern Wood-pewee	*Contopus virens*	ESA: Special Concern SARA: Special Concern	In Ontario, Eastern Wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees (COSEWIC 2012).	**Moderate** - Swamp areas provide suitable nesting and foraging habitat. The species has been recorded approximately 2.5 km from the study area.
Grasshopper Sparrow	*Ammodramus savannarum*	ESA: Special Concern SARA: Special Concern	In Ontario, Grasshopper Sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	**Moderate** - The study area provides potentially suitable habitat as it is adjacent to agricultural fields. The species has been recorded approximately 3.0 km from the study area.
Wood Thrush	*Hylocichla mustelina*	ESA: Special Concern SARA: Threatened	In Ontario, Wood Thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70 %), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	**Moderate** - Swamp areas in and near the study area provide suitable nesting and foraging habitat. The species has been recorded approximately 2.5 km from the study area.
Monarch	*Danaus plexippus*	ESA: Special Concern SARA: Endangered	In Ontario, Monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there is Milkweed (*Asclepias* spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	**Confirmed** - Monarch observed during field investigations. Additionally, in the study area, Common Milkweed is found in the southwest portion in meadow areas.
Eastern Red Bat	*Lasiurus borealis*	ESA: Endangered SARA: none (COSEWIC: Endangered)	Eastern Red Bats occupy a wide diversity of habitats across their geographic range. They use both deciduous and coniferous forests, of any age class. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. They typically roost among the foliage of trees and occasionally shrubs. Male Eastern Red Bats in particular have been observed to use saplings as roosts, which is rarely reported for reproductive females. They forage in both forested and non-forested habitats. Heavily disturbed habitats are generally avoided. Eastern Red Bats migrate to overwintering areas in the southern United States but their migration routes are not known.	**Confirmed** - Individual detected by ARU during exit survey. Presence of roost trees and snags as well as presence of foraging habitat.
Eastern Small-footed Myotis	*Myotis leibii*	ESA: Endangered	In Ontario, Eastern Small-footed Myotis is not known to roost in trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles, but it occasionally inhabits buildings. Entrances of caves or abandoned mines where humidity is low, and temperatures are cool and sometimes subfreezing may be used as hibernacula (Humphrey 2017).	**Moderate** - Despite no species occurrence records within 10 km of the study area, the presence of roosting features and previously identified bat guano indicate presence of bats that roost on anthropogenic structures.

Common Name	Scientific Name	Conservation Statuses	Habitat Requirements	Probability to Occur in the Study Area*
Little Brown Myotis	*Myotis lucifugus*	ESA: Endangered SARA: Endangered	In Ontario, this species' range is extensive and covers much of the province. It will roost in both natural and man-made structures. Roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (ECCC 2018).	**Confirmed** - At least one individual detected by ARUs during exit surveys. Presence of roost features in the form of trees, snags, and anthropogenic roost structures provide habitat.
Hoary Bat	*Lasiurus cinereus*	ESA: Endangered SARA: none (COSEWIC: Endangered)	Hoary Bats occupy a wide diversity of habitats across their geographic range. They use both deciduous and coniferous forests, of any age class. Trees used as maternity roosts tend to be large diameter and tall, reaching or exceeding the height of the surrounding canopy. They typically roost among the foliage of trees and occasionally shrubs. They forage in the open, and suitable habitats may include wetlands, grasslands and open fields with patchily distributed trees. Heavily disturbed habitats are generally avoided. Hoary Bats migrate to overwintering areas in the southern United States but their migration routes are not known.	**Confirmed** - At least one individual detected by ARUs during exit surveys. Presence of roost features in the form of trees and snags as well as open areas for foraging provide suitable habitat.
Northern Myotis	*Myotis septentrionalis*	ESA: Endangered SARA: Endangered	In Ontario, this species' range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (ECCC 2018).	**Moderate** - Roost structures, trees and caves within the study area. No known species occurrences within 10 km of the study area.
Silver-haired Bat	*Lasionycteris noctivagans*	ESA: Endangered SARA: none (COSEWIC: Endangered)	Silver-haired Bats occupy a wide diversity of habitats across their geographic range. They roost in a variety of large diameter coniferous and deciduous trees. Roosting occurs primarily under bark and in the cavities of trees, and occasionally buildings. They forage in young and old forest, as well as forest openings (canopy gaps), but are concentrated along forest edges and intact forest. Silver-haired Bats overwinter in the United States, southeastern British Columbia and sometimes the Great Lakes region. In British Columbia, they have been documented hibernating in mines, rock crevices, trees, and snags. Little else is known about their winter ecology.	**Confirmed** - At least one individual detected by ARUs during exit surveys. Presence of roost features in the form of trees, snags, and anthropogenic roost structures provide roost habitat. Foraging habitat is present.
Tricolored Bat	*Perimyotis subflavus*	ESA: Endangered SARA: Endangered	In Ontario, Tricolored Bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year (ECCC 2018).	**Moderate** - Despite no species occurrence records within 10 km of the study area, the presence of roosting features and previously identified bat guano indicate presence of bats that roost on anthropogenic structures.
Black Ash	*Fraxinus nigra*	ESA: Endangered SARA: none (COSEWIC: Threatened)	Found throughout Ontario in moist ecosystems; commonly found in northern swampy woodlands (MNRF 2018). This species typically grows on mucky or peaty soils and is considered a facultative wetland species (Reznicek et al. 2011).	**Moderate** - Black Ash was not observed within MTO property, however, the swamp in the study area serves as suitable habitat.

APPENDIX B

List of Plant Taxa

Appendix B: List of Plant Taxa

Common Name	Scientific Name
Apples	*Malus*
Asters and Allies	*Astereae*
Basswood	*Tilia americana*
Black-eyed Susan	*Rudbeckia hirta*
Bur Oak	*Quercus macrocarpa*
Carrots	*Daucus*
Cattails	*Typha*
Clovers	*Trifolium*
Common Buckthorn	*Rhamnus cathartica*
Common Milkweed	*Asclepias syriaca*
Dogwoods	*Cornus*
Elms	*Ulmus*
Freman's Maple	*Acer x freemanii*
Goldenrods	*Solidago*
Grapevines	*Vitis*
Grasses	*Poaceae*
Green Ash	*Fraxinus pennsylvanica*
Highbush Cranberry	*Viburnum opulus*
Horsetails	*Equisetidae*
Manitoba Maple	*Acer negundo*
Paper Birch	*Betula papyrifera*
Phragmites	*Phragmites*
Pines	*Pinus*
Purple Loosestrife	*Lythrum salicaria*
Ragweeds	*Ambrosia*
Red Maple	*Acer rubrum*
Sensitive Fern	*Onoclea sensibilis*
Silver Maple	*Acer saccharinum*
Spotted Joe-Pye Weed	*Eutrochium maculatum*
Spruces	*Picea*
Staghorn Sumac	*Rhus typhina*
Trembling Aspen	*Populus tremuloides*
Vetches	*Vicia*
Virginia Creeper	*Parthenocissus quinquefolia*
White Ash	*Fraxinus americana*
White Meadowsweet	*Spiraea alba*
White Oak	*Quercus alba*
Wild Parsnip	*Pastinaca sativa*
Willows	*Salix*

APPENDIX C

List of Bird Species Identified During Point-count Surveys

Appendix C: List of Bird Species.

Common Name	Scientific Name	G-rank[1]	S-rank[2]	COSSARO Status[3]	ESA Status[4]	MNR Area Sensitive[5]	Area Sensitive Birds - Ecoregion 6E[6]	Habitat Use[7]	Protected Under MBCA
American Crow	*Corvus brachyrhynchos*	G5	S5					E	
American Goldfinch	*Spinus tristis*	G5	S5					E	✓
Blue Jay	*Cyanocitta cristata*	G5	S5					I/E	
Eastern Kingbird	*Tyrannus tyrannus*	G5	S4B					E	✓
Gray Catbird	*Dumetella carolinensis*	G5	S5B,S3N					I/E	✓
Northern Cardinal	*Cardinalis cardinalis*	G5	S5					I/E	✓
Northern Flicker	*Colaptes auratus*	G5	S5					I/E	✓
Song Sparrow	*Melospiza melodia*	G5	S5					E	✓
Total Species:	***8***								**6**

[1] G-Rank (global)

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to Extinction.

G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to Extinction.

G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common - demonstrably secure under present conditions.

[2] S-Rank (provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure - Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental.

SE Exotic - not believed to be a native component of Ontario's fauna.

SZN Non-breeding migrants/vagrants.

SZB Breeding migrants/vagrants.

[3] COSSARO (Committee on the Status of Species at Risk in Ontario) Status

The provincial review process is implemented by COSSARO (Status as of November 25, 2024).

COSSARO is an independent advisory panel to the Ontario Ministry of Environment, Conservation and Parks (MECP) that assesses the status of species at risk of extinction. http://cossaroagency.ca/

COSSARO Conservation Status Ranks

EXT Extinct - A species that no longer exists anywhere in the world.

EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.

END Endangered - A species that is facing imminent Extinction or extirpation.

THR Threatened - A species that is likely to become Endangered if steps are not taken to address factors threatening to lead to its Extinction or extirpation.

SC Special Concern – A species that may become Threatened or Endangered because of a combination of biological characteristics and identified threats.

[4] ESA (Endangered Species Act) Status

Provincial status from MECP (Status as of November 25, 2024). https://www.ontario.ca/page/species-risk-ontario

ESA Conservation Status Ranks

EXT Extinct - A species that no longer exists anywhere in the world.

EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.

END Endangered - A species that is facing imminent Extinction or extirpation.

THR Threatened - A species that is likely to become Endangered if steps are not taken to address factors threatening to lead to its Extinction or extirpation.

SC Special Concern – A species that may become Threatened or Endangered because of a combination of biological characteristics and identified threats.

[5] **MNR Area Sensitive Species**

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

[6] **Area Sensitive Birds – Ecoregion 6E**

From: Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules For Ecoregion 6E. January, 2015. Regional Operations Division, Southern Region Resources Section. 39pp.

[7] **Habitat Use**

I=interior species, I/E=interior edge species, E=edge species (Freemark and Collins, 1989); M/F=Marsh/Fen, S/B=Treed Swamp/Bog. Interior bird species require habitat which is often found 100m from the forest edge while Interior/Edge species are found within both interior and edge habitat. Often Interior and Interior/Edge are more sensitive to urban encroachment as they require these large, relatively undisturbed forest habitats to support viable populations. The increasing urbanization of rural areas often results in increased parasitism and predation as well as disturbance from human recreational activities (e.g. illegal bike trails, dumping and pets.) (Freemark, K. and Collins, B. 1989. Landscape ecology of birds breeding in temperate forest fragments. – In: Hagan III, J. M. and Johnston, D. W. (eds), Ecology and conservation of neotropical migrant landbirds. Smithsonian Inst. Press, pp. 443–454)

APPENDIX D

Field Survey Photographs

Appendix D: Field survey photographs



Photo 1: Big Brown Bat roosting within the Fraser Road Underpass south abutment.



Photo 2: Guano underneath vicinity of abutments.



Photo 3: Guano underneath vicinity of abutments.



Photo 4: Guano underneath vicinity of abutments.



Photo 5: Potential bat roost features within cultural woodland



Photo 6: Potential bat roost features within cultural woodland



Photo 7: Potential bat roost features within cultural woodland

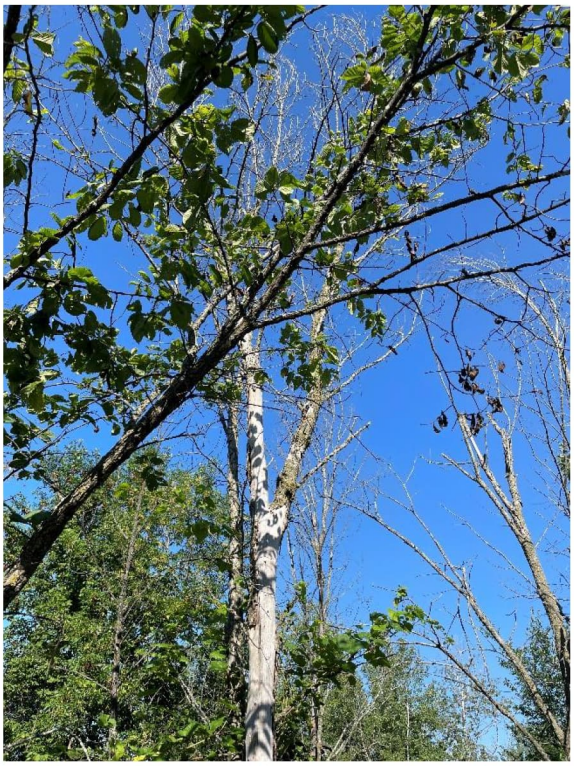


Photo 8: Potential bat roost features within cultural woodland



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APPENDIX C

Arborist Report

MINISTRY OF TRANSPORTION ONTARIO – EAST REGION

AGREEMENT #4023-E-003 - WORK ITEM #3 GWP 4248-15-00 - FRASER ROAD UNDERPASS (SITE NO. 31X-0230/B0) REPLACEMENT

Arborist Report

FEBRUARY 28, 2025



AGREEMENT #4023-E-003 - WORK ITEM #3
GWP 4248-15-00 - FRASER ROAD UNDERPASS (SITE NO. 31X-0230/B0) REPLACEMENT

ARBORIST REPORT

MINISTRY OF TRANSPORTION ONTARIO – EAST REGION

PROJECT NO.: CA0019704.0000
DATE: FEBRUARY 28, 2025

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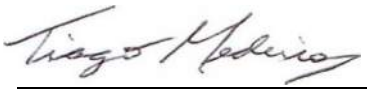


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February 28, 2025

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B SITE PHOTOS
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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation (MTO) to conduct the Detail Design and Class Environmental Assessment (Class EA) for the replacement of the Fraser Road Underpass (Site No. 31X-0230/B0), located 4.5 km west of Lancaster on Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry (the Project).

As a part of environmental due diligence works, WSP has completed an inventory and assessment of trees within the study area. Tree Preservation Plans have been prepared in association with this report.

1.1 STUDY AREA

The study area is located at Fraser Road and Highway 401 in the Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry. The study area is on the north and south of Highway 401 along Fraser Road. Refer to Figure 1 below for the approximate limits of the study area

Figure 1: Study Area



Note: The Study Limit is outlined in red. Image taken from Google Earth.

1.2 REPORT FRAMEWORK

The arborist report was prepared with the following parameters:

- Trees with a diameter at breast height (DBH) of 10 cm or greater within the study area's limit of work were inventoried.
- Dead trees have been noted and indicated within this report.
- Trees were assessed for species, quantity, dripline radius, condition, and location (located using topographic survey).
- Recommendations have been provided in **Section 6.2** of this report for tree protection, tree injury, and removals based on the limit of work.
- This report is to be read in conjunction with:
    - Appendix A: Tree Preservation Tables;
    - Appendix B: Site Photos; and
    - Appendix C: Tree Preservation Plans (TP-1 and TP-2).

2 EXISTING CONDITIONS

2.1 BUILT FORM

The study area consists mostly of individual trees with some tree groupings along an asphalt road. There are wooded areas surrounding the study area in the northern and southern portion of the site and landscaped green areas on the east and west sides of the road.

2.2 TREED VEGETATION

Trees within the study area are mostly planted species, with a few naturally occurring species at the limits of dense vegetation. Inventoried trees span from young to mature ranging in size from under 12 to 40cm DBH.

Species composition is detailed below:

- Abundant: Green Ash (*Fraxinus pennsylvanica*) and Trembling Aspen (*Populus tremuloides*)
- Occasional: Little Leaf Linden (*Tilia americana*), American Elm (*Ulmus americana*)

2.3 CONDITION

Tree health ranges between good and dead with a majority observed to be in good condition. Signs of decline and defects were observed on a small number of trees including:

- Multiple stems
- Suckers
- Dieback
- Dead wood
- Girdling roots
- Evidence of Emerald Ash Borer emergence/exit holes
- Vine growth

3 POLICY CONTEXT

This section summarizes the various municipal, regional, provincial, and federal planning policies and regulations related to the tree inventory and apply to the project.

3.1 MINISTRY OF TRANSPORTATION ONTARIO (MTO)

Environmental work, including fieldwork, is to be in accordance with the MTO Environmental Reference for Highway Design (ERD). Section 3.2 of the MTO ERD Terrestrial Ecosystems details the requirements for vegetation assessments, i.e. study area, field investigations, including but not limited to:

- List of plant species observed and any significant species;
- Species at Risk; and
- Vegetation communities

Applicability to Project

- Inventoried trees within the limit of work are not located within the MTO right-of-way, therefore this policy is not applicable.

3.2 CANADA FOOD AND INSPECTION AGENCY

Canada Food and Inspection Agency (CFIA) Directive D-03-08: Phytosanitary Requirements to Prevent the Introduction into and Spread within Canada of the Emerald Ash Borer (EAB), *Agrilus planipennis* (Fairmaire), applies to Ash species (*Fraxinus spp*.) observed on properties that are located within the EAB Regulated Areas of Canada, prepared by the CFIA and dated June 2019. This area covers all south and central Ontario and western Quebec. Ash trees that require removal are subject to this directive.

- The CFIA restricts the movement of all Ash material including wood, bark, chips or bark chips from being transported outside of the Regulated Area. A Movement Certificate is required by the CFIA for any Ash material leaving the Regulated Area.
- Ash are permitted to be chipped on site and/or removed or cut down and removed from site. Chipped Ash material that is to remain on site must be ground or chipped to a size of less than 2.5 cm in any two dimensions. All Ash material chipped or whole that is to be removed from site must be disposed of within the Regulated Areas of Canada.
- Refer to the CFIA website for a current map of the "*Emerald Ash Borer Regulated Areas of Canada".*

Applicability to Project

- Several Green Ash trees (*Faxinus pennsylvanica*) were located within the study area. Some of the trees do show signs of EAB infestation (e.g. exit holes, loose bark, dieback, dead).

3.3 ENDANGERED SPECIES ACT, 2007

Species designated as Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO), otherwise known as Species at Risk in Ontario (SARO), and their habitats (i.e., areas essential for breeding, rearing, feeding, hibernation and migration) are automatically afforded legal protection under the Endangered Species Act, 2007 (ESA) (Government of Ontario 2007). The ESA (Subsection 9 (1)) states that:

- "No person shall,

  a) kill, harm, harass, capture or take a living member of a species that is listed on the SARO List as an extirpated, endangered or threatened species;

  b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade;

     (i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;

     (ii) any part of a living or dead member of a species referred to in subclause (i);

     (iii) anything derived from a living or dead member of a species referred to in subclause (i); or,

  c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii)".

- Clause 10(1) (a) of the ESA states that:
- "No person shall damage or destroy the habitat of a species that is listed on the SARO list as an endangered or threatened species".

Applicability to Project

- No woody Species at Risk were found within the study area.
- Given the evidence of Species at Risk bats roosting within the study area on the Terrestrial Ecosystem Existing Conditions and Impact Assessment Report, tree removals and canopy pruning are to be coordinated outside of the active period for bats (e.g. from the beginning of April up to the end of September). Overall clearing of trees would be permitted between October 1 to March 31.

3.4 MIGRATORY BIRDS CONVENTION ACT, 1994

The Migratory Birds Convention Act, MBCA (1994) and Migratory Birds Regulations, MBR (2014) protect most species of migratory birds anywhere they are found in Canada, including surrounding ocean waters, regardless of ownership. General prohibitions under the MBCA and MBR protect migratory birds, their nests and eggs and prohibit the deposit of harmful substances in waters / areas frequented by them.

- The MBR includes an additional prohibition against incidental take, defined by Environmental Canada as: "The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs."
- Environment Canada implements policies and guidelines to protect migratory birds, their eggs and their nests. There is guidance on the Environment Canada website to minimize the risk of incidental take effects on migratory birds, achieve compliance with the law and maintain sustainable populations of migratory birds.
- Compliance with the MBCA and MBR is best achieved through a due diligence approach, which identifies potential risk, based on a site-specific analysis in consideration of the Avoidance Guidelines and Best Management Practices information on the Environment Canada website.

Applicability to Project

- The MBCA and its regulations are applicable to the project. Migratory bird species subject to the MBCA may be present within the study area and may use various habitats on the subject property (e.g. trees, grass and other herbaceous material). Recommended measures to reduce the possibility of contravention to the MBCA and its regulations are provided in Section 6.0;

- Tree removals and canopy pruning are to be coordinated outside of the Migratory Bird Nesting Season (April 1 to August 31). Overall clearing of trees would be permitted between October 1 to March 31.
- If tree works must be completed within the Migratory Bird Nesting Season, surveying for nests and nest activity will be conducted to ensure compliance with the Act. Nest surveys will be performed by a qualified Biologist no sooner than 48 hours before tree pruning is to take place.

4 FIELD SURVEYS

4.1 TREE INVENTORY METHODOLOGY

The field observations were conducted on October 17, 2024, within the study limits. Field observations included:

- Tree information including tree number, species, DBH, dripline radius and general health condition;
- Most of the tree locations were surveyed in the field using a topographic survey. Tree locations that were missed on the survey are shown with approximate locations;
- Dead trees are indicated in the inventory and on the plans (TP1 and TP2); and
- Tree Groupings were assigned a Tree Inventory number starting with 'TG.' Individual trees have a number beginning with 'T'.

4.2 TREE INVENTORY RESULTS

A total of **26** trees were inventoried:

- **23** individual trees (Tree Numbers: T1-T23), including three (3) trees removed prior to the arborist survey; and
- **3** trees within one tree grouping (TG1).

Refer to the following table for a breakdown of trees per location noted in **Section 2.2**.

Table 4.1 – Tree Locations

LOCATION	TREE NUMBERS	TOTAL
Township of South Glengarry	T1-T23, TG1	26
Total		**26**

5 DEFINITIONS

The following are the definitions of the assessment categories utilized in our tree assessment:

Table 5.1 – Definitions

ACRONYM / DEFINITION	DESCRIPTION
Tree Number	This number refers to the number on the tree tag or alpha-numeric, alphabetical or tree grouping label listed in Table 1: Tree Inventory and Preservation Charts and labelled on the Tree Preservation Plans (e.g. T1 or TG1).
Tree Grouping	A tree grouping is more than one (1) tree located within proximity of other trees with no separation between the canopies.
DBH	This refers to the diameter (in centimetres) at breast height and is measured at 1.4 m above the ground for each tree.
Tree Protection Zone	This is the area around a tree that is to be protected through tree protection measures (e.g. hoarding). No construction activities are to be undertaken within this zone.
Suppressed	Refers to trees that have their crowns completely overtopped by adjacent trees and received limited to very limited sunlight.
Co-dominant Stem	Stems equal in size and relative importance that make up the overall crown of the tree.
Union	Junction point where two or more stems meet. A ‘U’ shaped junction indicates a well-formed union. A ‘V’ shaped junction indicates a weakly formed union, whereas stems grow and increase in girth, weak bark called ‘included bark’ forms within the junction and stems start to push apart causing vertical cracks and loss of structure.
Compartmentalization	This is a naturally occurring process by which chemical and physical barriers are synthesized to prevent the spread of decay and disease in trees.
Irregular Tree Form	Refers to branches and stems that have formed irregularly often, resulting in contorted growth, weak attachments, weakly formed unions and codominant stems. The irregular growth of scaffold (lateral) branches typically leads to damage to other scaffold branches.
Imminently Hazardous Tree	Refers to a destabilized or structurally compromised tree that is in imminent danger of causing damage or injury to life or property.
Injure and Injury	Described as any act that will harm a tree's health, including failure to protect in accordance with standards set by the City’s tree protection / preservation policy.
Root Zone	Refers to the subterranean area around the tree measured from the trunk to up to 2 to 3 m beyond the dripline.
Critical Root Zone	The minimum area of the root system necessary to maintain vitality or stability of the tree. Typically, this area extends to the dripline of the tree. The severing of one root can cause approximately 5-20% loss of the root system. A reduction of this area by greater than 30% can pose stability concerns for the tree.

Table 5.2 – Tree Assessment Criteria

DEFINITION	DESCRIPTION
Trunk Integrity (T.I.)	This is an assessment of the trunk for any defects or weaknesses. It is measured on a scale of poor, fair, good.
Canopy Structure (C.S.)	This is an assessment of the scaffold branches, unions and the canopy of the tree. This is measured on a scale of poor, fair, good.
Canopy Vigour (C.V.)	This is an assessment of the health of the tree and assesses the amount of deadwood and live growth in the crown as compared to a 100% healthy tree. The size, colour and amount of foliage are also considered in this category. This is measured on a scale of poor, fair, good.
Good	Tree displays less than 15% deficiency/defect within the given tree assessment criteria (TI, CS, CV).
Fair	Tree displays 15%-40% deficiency/defect within the given tree assessment criteria (TI, CS, CV).
Poor	Tree displays greater than 40% deficiency/defect within the given tree assessment criteria (TI, CS, CV).

6 DISCUSSION

This section is a discussion of the retention potential, preservation and / or impacts to trees within the limits of the proposed bridge replacement and its approaches. Proposed works, vegetation recommendations, impacts and preservation are detailed in the following sections.

6.1 PROPOSED WORKS

The anticipated proposed works are shown on the Tree Preservation Plans (TP-1 and TP-2). The proposed works include but are not limited to:

- New Bridge – MTO
- Site grading
- Guiderail installation
- Landscaping

6.2 TREE RECOMMENDATIONS / ASSUMPTIONS

The anticipated proposed works have been developed using the detail design drawings prepared by WSP as a base. The new proposed elements are illustrated on the Tree Preservation Plans.

The following recommendations / assumptions apply to trees that are to be removed, preserved, or retained.

6.2.1 TREE REMOVAL

- Tree removal is recommended when the amount of impact is likely to cause a significant and irreversible decline in health of the tree;
- Tree removal is based on the degree of excavation / disturbance within the Tree Protection Zone (TPZ) and considers tree species, size, condition and the number of critical roots that would be impacted that are vital to sustaining the trees overall health and stability;
- This designation may also be applied to trees that are dead; in poor condition or trees that could pose future safety concerns; and trees dying because of a disease or insect infestation.

6.2.2 PARTIAL TREE REMOVAL

- Partial tree removal applies to tree groupings where one or more trees within a grouping are proposed for removal based on the criteria listed in **Section 6.2.1**.
- The number of trees within the grouping that require removal is estimated based on the total area of the tree grouping, number of trees within the grouping, the area that is anticipated to be impacted by construction and grading, site photography and aerial photography.
- This designation is specific to tree groupings only.

6.2.3 TREE INJURY

Tree injury will occur where any action causing harm, damage or impairment to a tree. This includes but is not limited to:

- Causing stress or injury of trees by changing grades or compacting or excavating soils within the dripline of a tree;
- Severing roots;
- The improper application of chemicals, excessive or otherwise;
- Excessive or improper pruning;
- Attachments of any items; and
- Removal or slashing or defacing or girdling or burning of the bark.

6.2.4 TREE PRESERVATION ZONE – ENCROACHMENT / REDUCTION

- Where proposed civil works will encroach into a TPZ, a reduction will be required.
- Where reductions are moderate to significant, mitigative measures may be recommended to minimize damage to roots and canopy. Measures may consist of root-exploratory excavation, root-sensitive excavation and root pruning, stem protection, root zone compaction protection and canopy clearance pruning,

6.2.5 TREE PRESERVATION

- Preservation of trees is considered where an encroachment, excavation or disturbance into the TPZ is expected to be minor or nil and that tree health and stability will not be adversely impacted.
- The implementation of mitigation measures will reduce potential impacts to the tree therefore allowing for the tree to be preserved (e.g. air spade excavation and / or horizontal root protection).
- OPSD 220.010 Barrier for Tree Protection
- Apply at locations where the proposed works will occur within proximity of existing trees, e.g. within 1m of the dripline.

6.2.6 TREE RETENTION

Proposed works will occur beyond the TPZ and the dripline with no impacts to the tree. Trees can be retained and do not require tree protection hoarding.

6.3 TREE REMOVALS - CONSTRUCTION

Impacts to trees will occur where trees are located within the limits of excavation and proposed fill. Excavation, grading and fill will significantly affect the critical root zone of trees. Any tree within this area has been recommended for removal.

Refer to **Table 6.1** which details removals by tree number and quantity.

Table 6.1 – Tree Removal Summary Table

OWNERSHIP	TREE #	QUANTITY
Municipality (10cm DBH or larger)	T1-T9, T13-T19 (2 dead), T21-T22 (1 dead), TG1(3)	21
Total		**21**

- Based on the above criteria, **21** trees will be removed, including 3 dead trees.
- These trees are required to be removed as the encroachments into the TPZs are too severe and mitigation measures would be ineffective.
- Dead trees are indicated and noted on Tree Preservation Plans and Inventory.
- Three trees were felled before the arborist survey and are not included in the above table.
- **Tree impacts are preliminary at this stage. Tree Preservation is to be finalized at the 90% detailed design stage. Additional tree removals may be required when Grading/Servicing and Detailed Site Plans become available.**

6.4 PARTIAL TREE REMOVAL - CONSTRUCTION

- Impacts to trees within tree groupings will occur where trees are located within the limits of excavation and proposed fill. Excavation, grading and fill will significantly affect the critical root zone of trees. Any tree within this area has been recommended for removal.
- Based on the criteria above, partial tree removal-construction is recommended for **0 trees**.

6.5 TREE INJURY

Proposed works may result in tree injury and require a reduction of TPZs. This work will also have the potential to damage roots and/or branches through excavation and mobilization of equipment.

- Trees near the proposed works that may be injured from construction and/or grading operations have been recommended to be preserved with injury.
- Based on the criteria above, root pruning is recommended for **0 trees**.

6.6 TREE PRUNING

To facilitate the proposed works, some selective pruning will be necessary, specifically where work will affect low hanging branches that overhang the work area. Trees identified for pruning may have branches at a height that would interfere with construction equipment and machinery during construction. Much of this work will be determined onsite during work implementation. Pruning is to be undertaken by a Certified Arborist following proper arboricultural techniques and in conjunction with the guidelines in this report prior to the start of construction.

Pruning will be dependant on the location of the existing tree, canopy size and the equipment used during construction. It is to be noted that the Contractor is to adjust the size of the equipment / excavators where feasible to accommodate low hanging trees or congested areas.

- Based on the criteria above, pruning is recommended for **0 trees**:

6.7 TREE PRESERVATION

Trees that are well beyond construction limits with no encroachment into the TPZ can be retained. These trees will not require tree protection hoarding. Trees where construction limits will either encroach into the TPZ or will be within proximity of the TPZ and / or dripline, will require tree protection hoarding.

- The Township of South Glengarry does not currently specify minimum tree protection zone distances; therefore, for the purposes of this report, a minimum TPZ is recommended based on the DBH size of each tree. The minimum protection zone distances are consistent with preservation policies in other municipalities and townships across southeastern Ontario. Refer to **Table 6.2** for the recommended TPZ distance and **Table 6.3** for trees to be preserved.

Table 6.2 – Recommended Tree Protection Zones (TPZ) for Trees Being Preserved

TRUNK DIAMETER	MINIMUM PROTECTION DISTANCES REQUIRED
>=10 cm	None
10-29cm	1.8 m
30-40 cm	2.4 m
41-50 cm	3.0 m
51-60 cm	3.6 m
61-70 cm	4.2 m
71-80 cm	4.8 m
81-90 cm	5.4 m
100 cm +	6.0 m

Table 6.3 – Tree Preservation Table

CATEGORY	OWNERSHIP	TREE NUMBERS	MIN. TPZ	QUANTITY
Preserve	Municipality	T12, T20	1.8	2
			Total	**2**

These trees will be preserved and require tree protection fencing.

6.7.1 HOARDING

Tree protective hoarding is to be installed for **2** trees listed above under “Preserve” as per the minimum TPZ distance. To protect these trees, install the following fence type:

- 1.2 m high plastic snow fence
- Tree protective hoarding is to be:

- Installed prior to construction and remain until construction is completed;
- Installed and protected from construction activity, grade changes, surface treatment or excavations of any kind is permitted within the TPZ;
- Installed per OPSD 220.010 - Barrier for Tree Protection;
- Installed per the minimum TPZ distances detailed in Appendix A and shown on the Tree Preservation Plans; and
- Installed as shown on TP-1 and TP-2 of the Tree Preservation Plans.

7 MITIGATION MEASURES

Mitigation measures are recommended to reduce the amount of impact within the root zone of trees. These measures are as follows:

- Any roots exposed during grading are to be pruned using good arboricultural practices and per the guidelines in this report;
- To minimize damage to roots, it is recommended that excavators scrape soil within the same direction of the roots and not across. Any roots exposed are too be pruned neatly and cleanly.
- In areas where excavation, grading and construction have compacted soil within a reduced TPZ, scarify soil to a depth of 100 mm at the completion of construction. Restore disturbed areas and apply the following methods below:
    - Water trees periodically during construction; and
    - After construction it is recommended that a 150 mm depth layer of mulch be placed in a 2 m radius around the trunks of these trees.

7.1 AIR SPADE / HYDRO VACUUM EXCAVATION

Air-spade / hydro-vacuum excavation is recommended for this project for **0 trees**. The following measures are to be applied:

- At the limit of the excavation, where the tree protection hoarding has been placed, air-spade / hydro-vacuum excavate to a depth of 300 mm and at a width of 0.5 m to expose roots so they can be pruned;
- Air spade / hydro-vacuum excavation on the outside of tree protection hoarding;
- Ensure that the pressure used from the air spade / hydro-vacuum is such that it will not damage roots during excavation;
- Prune any roots in this area using good arboricultural practices per the guidelines in this report or under the supervision of a Certified Arborist;
- Backfill with excavated material or better, immediately after completion of air spade excavation to prevent roots from drying out;
- Water trees periodically during construction;
- Apply a layer of 50 mm depth mulch in a 2 m radius around the trees;
- It is recommended that these measures be applied while a Certified Arborist is present.

7.2 GRADING WITHIN TREE PROTECTION ZONE

Where grading will encroach into a large proportion of a TPZ resulting in cut or fill, or change of grade or slope, the following measures are to be applied.

Currently there are no trees where this measure is recommended.

Trees are to be preserved during this work. The following methods are to be applied:

- Temporary removal of tree protection fencing;

- Wrap trunk up to 1.4m height with tree wrap, or;
- Place 4' length 2"x4"s around the trunk spaced at 2" apart and wrap with rope or tape to prevent movement;

- No grading work within 1m of the trunk of the trees that are <30cm DBH and 2m of trees that are ≥30cm DBH. Create a soil mound / transition at this limit and proposed grading works.
- Add 100mm depth mulch between the trunk and grading limit.
- At the completion of grading works re-install tree protection fencing
- Any grading required within a TPZ is to be conducted by hand using a hard rake or equivalent. Addition or removal of soil to be done by hand where possible. If equipment must be used, after completion of grading works soil is to be scarified to a depth of 5cm to reduce compaction from equipment.
- Reinstate tree protection fencing at the completion of grading works.

8 TREE REMOVAL COMPENSATION

8.1 COMPENSATION NOTES / SUMMARY

- Replacement trees are based on the following criteria outlined in **Table 8.1**
- The ratios and quantities detailed in the table below are recommended based on best management practices. A 1:1 replacement ratio is recommended for any tree removed within the limit of work.
- Compensation for tree injuries is not required.
- The three existing dead/felled trees noted in the tree preservation plans and inventory do not qualify for compensation.

Table 8.1 – Removal Compensation Chart

MTO	TREES TO BE REMOVED DUE TO CONSTRUCTION	DEAD TREES	RECOMMENDED COMPENSATION RATIO	REPLACEMENT TREES REQUIRED
Municipality	21	3	1:1	21

8.2 COMPENSATION NOTES

- Total replacement trees equal 21 trees.
- These replacement trees are recommended to be planted where possible within areas that were disturbed during construction and staging. If adequate space is not available for replacement planting in these areas, then planting can occur within areas adjacent to disturbed limits where vegetation cover is sparse.

9 CONCLUSION

Much of the vegetation found ranges from young to mature and is characterized by a mixture mostly comprising of planted species with some naturally occurring native species.

Impacts to the trees in the study area limit of work will be significant and as follows:

- 2 trees of 26 inventoried are to be preserved.
- 3 trees of 26 inventoried were removed prior to the arborist inventory.
- 21 trees of 26 inventoried are proposed to be removed, including 3 dead trees.
- 21 trees are proposed as compensation.

Given the proposed mitigative measures, significant impacts to trees to be preserved are not anticipated.

The results in this report are preliminary at this stage. Final numbers for trees to be removed, and compensation trees required will be determined when detailed design and grading limits have been finalized.

Vegetation has been recommended to be retained and preserved beyond the construction limits. Proposed mitigation measures will minimize the detrimental effects from construction activities and will help to ensure that the good tree health will continue.

Care should be taken to protect trees to be retained with tree protection fencing as illustrated on the Tree Preservation Plans TP-1 to TP-2. Tree protection fencing shall be erected prior to the start of construction and demolition and maintained for the duration of the work. Priority should be given to protecting vegetation that will not be impacted by grading and construction as this vegetation along property lines provides a visual barrier, shade, noise and wind buffer between properties.

10 PRESERVATION AND PROTECTION RECOMMENDATIONS

The survival rates for trees, which are in proximity to construction, are dependent on the resultant changes to a variety of environmental and anthropogenic factors. These construction activities bring about changes to a variety of environmental features such as the existing microclimate that includes winds, air temperature, soil moisture, amount of available sunlight, soil quality, and the level of the water table. Increased human activities may also damage the structure and/or physiological activities of the trees. The full effects of any damage that occurs may not appear until several years after its occurrence. Thus, it is essential that both vegetative clearing and preservation methods follow the guidelines below and those generally accepted as keeping with good arboricultural and construction practices. The guidelines are subject to adjustments deemed reasonable and appropriate considering the proximity and number of trees involved and the site-specific servicing requirements.

10.1 GENERAL RECOMMENDATIONS

The following is a list of practical considerations for the construction phase of the Project that applies to all trees that may be impacted by the construction:

- The tree protection fencing will be maintained until all construction is completed, soils are stabilized, and all the equipment has been removed from the site.
- Prior to the commencement of tree removals, all limits of the locations of the tree preservation fencing must be clearly staked in the field, installed per approved plans, and approved by the Contract Administrator. All trees within the TPZ must be left standing. The tree removals must be coordinated in accordance and compliance with the Migratory Bird Convention Act (MBCA).
- All removals must be felled into the work area to ensure that damage does not occur to the trees within the TPZ.
- Upon completion of the tree removals, all felled trees are to be removed from the site, and all should be brush chipped. All brush, roots and wood debris must be shredded into pieces that are smaller than 25 mm in size to ensure that any insect pests that could be present within the wood are destroyed.
- The CFIA has issued a prohibition of movement where the EAB has been confirmed. EAB has been found within the southern Ontario and is within the EAB Regulated Area which covers most of Ontario and a portion of western Quebec. This directive pertains to the movement of regulated materials (including but not limited to ash wood or bark and ash wood chips or bark chips) from a regulated area. EAB regulated articles moving out of a regulated area must be accompanied by a Movement Certificate issued by the CFIA. Refer to the EAB Regulated Areas of Canada found on the CFIA website.
- Ash materials may be removed from the site and disposed of within the 'Regulated Area' (see CFIA website for the 'Regulated Area' limits). Should it be necessary to dispose of Ash products outside of the 'Regulated Area' a 'Movement Certificate' will be required from the CFIA prior to transport.
- Tree protection fencing must be constructed and installed as per the details on the approved Tree Preservation Plan. Upon installation of the fencing, the Contractor will contact the Contract Administrator to review and approve the fencing and its location prior to commencement of any grading work.
- Areas within the TPZ are not to be used for any type of storage (e.g. storage of debris, construction material, surplus soils, and construction equipment). No trenching or tunnelling for underground services shall be located within the TPZ or dripline of trees designated for preservation within or adjacent to the construction zone.
- No grade changes shall occur within the TPZ unless approved as part of this report. If any grade changes may occur, either as a cut or fill situation, the consulting arborist must be notified prior to such work occurring to ensure that all precautions to preserve the tree are made.

- Trees shall not have any rigging cables or hardware of any sort attached or wrapped around them, nor shall any contaminants be dumped within the protective areas. Further, no contaminants shall be dumped or flushed where they may come into contact with the feeder roots of the trees.
- If it is necessary to remove additional limbs or portions of trees after construction has commenced to accommodate the construction, the consulting arborist is to be informed and under their direction the removal is to be executed carefully and in full accordance with arboricultural techniques, by a certified arborist.

10.2 ROOT PRUNING PRACTICES

- All approved root pruning is to take place by or under the supervision of an arborist and in accordance good arboricultural practices.
- Pruned root ends shall be neatly and squarely trimmed, and the area shall be backfilled with clean native fill as soon as possible to prevent desiccation and promote root growth.
- The exposed roots shall not be allowed to dry out and an appropriate watering schedule shall be undertaken (e.g. water bi-weekly to field capacity between **June 1st and September 15th**) so that the roots maintain optimum soil moisture during construction and backfilling operations.
- Backfilling shall occur immediately and shall be with clean uncontaminated topsoil from an approved source. It is recommended that texture of backfill be coarser than existing soils, and that backfill comes into clean contact with existing soils, i.e. remove air pockets, sod, etc.

10.3 BRANCH PRUNING PRACTICES

- All limbs damaged or broken during construction shall be pruned cleanly, utilizing by-pass secateurs in accordance with approved arboricultural practices. Should there be a potential risk of transfer of disease from infected to non-infected trees, tools must be disinfected after pruning each tree by dipping in methyl hydrate. This practice is particularly important during periods of tree stress and when pruning many members of the same genera, within which a disease could be spread quickly (i.e., Verticillium Wilt on Maples or Fireblight on genera of the Rosaceae family).
- All pruning cuts should be made to a growing point such as a bud, twig or branch, cut just outside the branch collar (the swollen area at the base of the branch that sometimes has a bark ridge), and perpendicular to the branch being pruned rather than as close to the trunk as possible. This minimizes the site of the wound. No stubs should be left. Poor cut location, poor cut angle and torn cuts are not acceptable.
- Extensive pruning is best completed before plants break dormancy. Pruning should be limited to the removal of no more than 25% of the total bud and leaf bearing branches. Pruning should include the careful removal of:
    - Deadwood,
    - branches that are weak, damaged, diseased and those which will interfere with construction activity,
    - secondary leaders of conifers,
    - trunk and root suckers,
    - trunk waterspouts, and
    - tight V-shaped or weak crotches (included unions).
- Any branches that overhang the work area and require pruning are to be pruned using good arboricultural practices utilizing by-pass secateurs in accordance with American National Standard (ANSI) A300 (Part 1) – 2008 Pruning.
- The Contractor must report immediately any damage to trees such as broken limbs, damage to roots, or wounds to the main trunk or stem systems so that the damage can be assessed immediately.

10.4 CONSTRUCTION IMPLEMENTATION

Pre-Construction:

- A site meeting will be held with Contractor and Contract Administrator to review the clearing limits and confirm the installation location for the temporary tree protection fence.
- Tree removal along the tree retention limit must be carefully felled away from the tree retention limit and into the construction / development area. Stumps adjacent to trees identified for retention are to be flush cut and not chipped or grubbed to avoid impacts to retained trees.

Construction:

- Periodic inspections will be undertaken by the site supervisor to ensure that the mitigation measures are being maintained during construction.
- The temporary protection fence is to be maintained throughout the entire construction period. No equipment storage, flushing of fuel, washing of construction equipment, and storage of spoil or construction debris is to occur behind the temporary protection fence.
- To avoid root zone impacts on trees to be retained, excavated material will not be stored against the tree protection barrier.

Post-Construction:

- The temporary protection fence will be removed last after all the construction has been completed, soils are stabilized and all the equipment has been removed.

10.5 MIGRATORY BIRD PROTECTION

- To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting season of **March 31st to August 31st**. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. If a nest of a migratory bird is found within the construction area outside of this nesting period, it still receives protection.
- If vegetation must be removed during the overall bird nesting season:
    - Nest and nesting activity searches will be conducted in areas defined as simple habitat (i.e., the CUM1-1 community) by a qualified biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (Cadman, 2009).
    - If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following the Environment and Climate Change Canada (ECCC) guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC 2018), which will be confirmed by a qualified Biologist, but will protect a minimum of 10m around the nest or nesting activity.
    - The results of all nest searches will be documented at the end of each survey day in a technical memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites.
    - If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same Best Management Practices (BMPs) such as nest and nesting activity searches described above will be undertaken.

11 LITERATURE CITED

- Ministry of Transportation Ontario. June 2013. Environmental Reference for Highway Design.
- Canadian Food Inspection Agency. January 14, 2021 (5th Revision). D-03-08: Phytosanitary Requirements to Prevent the Introduction Into and Spread Within Canada of the Emerald Ash Borer, Agrilus planipennis (Fairmaire).
- Canadian Food Inspection Agency. Areas Regulated for the Emerald Ash Borer. Mapping. Date Modified: 2021-03-16. https://www.inspection.gc.ca/plant-health/plant-pests-invasive-species/directives/forest-products/d-03-08/areas-regulated/eng/1347625322705/1347625453892
- Environment and Climate Change Canada. Guidelines to Reduce Risk to Migratory Birds. Last modified on October 30, 2018.
- Government of Canada. 1994. Migratory Birds Convention Act, S.C. 1994, c. 22.
- Government of Canada. Migratory Birds Regulations. C.R.C., c. 1035. Last amended on May 30, 2018.
- Government of Ontario. 2007. Endangered Species Act, 2007, S.O. 2007, c. 6.
- Lily, Sharon. J. 2010. Arborists' Certification Study Guide. International Society of Arboriculture.
- Tree Care Industry Association. 2008. ANSI-A300-Part 1. Tree Shrub and Other Woody Plant Management – Standard Practices. Pruning.

12 LIMITATIONS OF ASSESSMENT

- It is our policy to attach the following clause regarding limitations. We do this to ensure that the client is aware of what is technically and professionally realistic in retaining trees.
- The assessment of the trees presented in this report has been made using accepted arboricultural techniques. These include a visual examination of all the above-ground parts of the tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of attack by insects, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the trees and the surrounding site, and the proximity of property and people. Except where specifically noted, the trees were not cored, probed or climbed and there was no detailed inspection of the root crowns involving excavations.
- Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigour constantly change over time. They are not immune to changes in site conditions or seasonal variations in the weather conditions.
- While reasonable efforts have been made to ensure that the subject trees are healthy, no guarantees are offered, or implied, that these trees or any of their parts will remain standing. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree or its component parts under all circumstances. Inevitably, a standing tree will always pose some level of risk. Most trees have the potential for failure under adverse weather conditions, and the risk can only be eliminated if the tree is removed.

APPENDIX

A TREE PRESERVATION TABLES

Tree Preservation Table

Project: MTO-Hwy 401 & Fraser Rd.	**Field Work Completed By: Tiago Medeiros**		
Date of Field Work: October 17, 2024	**Weather: Sunny, Warm**	**Conditions:** G=Good, F=Fair, P=Poor, D=Dead	

Tree Assessment Criteria:

TI - Trunk Integrity: assessment of the trunk for any defects or weaknesses.

CS - Canopy Structure: assessment of scaffold branches, unions and canopy

CV - Canopy vigour: assessment of the health of the tree, based on the % of deadwood & live crown

Tree Condition

Good: tree displays less than 15% deficiency/defect within the given tree assessment criteria (TI,CS,CV)

Fair: tree displays 15-40% deficiency/defect within the given tree assessment criteria (TI,CS,CV)

Poor: tree displays greater than 40% deficiency/defect within the given tree assessment criteria (TI,CS,CV)

Legend:

Trees to be Retained
Trees to be Preserved & Protected
Trees to be Removed - Construction
Trees to be Removed - Health
Trees to be Preserved with Injury
Trees not Existing, Removed prior to arborist inventory

Tree #	*Botanical Name*	Common Name	No.	DBH (cm)	Tree Condition			Dripline Ra	Ownership	Tree Protection Zo	Recommendation	Comments / Health	Comments - Removal / Preservation
					TI	CS	CV						
T1	*Fraxinus pennsylvanica*	Green Ash	1	38	G	F	P	4	Municipality	2.4	Remove	Girdling Roots, Co Dominant, Emerald Ash Borer (EAB)	Remove due to construction
T2	*Fraxinus pennsylvanica*	Green Ash	1	21, 21	P	P	P	3	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB)	Remove due to construction
T3	*Populus tremuloides*	Trembling Aspen	1	12	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T4	*Populus tremuloides*	Trembling Aspen	1	15	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T5	*Populus tremuloides*	Trembling Aspen	1	13	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T6	*Populus tremuloides*	Trembling Aspen	1	15	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T7	*Populus tremuloides*	Trembling Aspen	1	15	P	G	G	2	Municipality	1.8	Remove		Remove due to construction
T8	*Fraxinus pennsylvanica*	Green Ash	1	15	G	P	P	2	Municipality	1.8	Remove	Emerald Ash Borer (EAB)	Remove due to construction
T9	*Ulmus americana*	American Elm	1	12	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T10	*N/A*	N/A	1							N/A	N/A		
T11	*N/A*	N/A	1							N/A	N/A		
T12	*Tilia americana*	Littleleaf Linden	1	20	G	G	G	2	Municipality	1.8	Preserve and Protect		Preserve with tree protecting fencing
T13	*Ulmus americana*	American Elm	1	40	G	G	G	4	Municipality	2.4	Remove		Remove due to construction
T14	*Fraxinus pennsylvanica*	Green Ash	1	30,25	F	P	P	3	Municipality	2.4	Remove	Multi stem, Emerald Ash Borer (EAB)	Remove due to construction
T15	*Fraxinus pennsylvanica*	Green Ash	1	23,23	F	P	P	3	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB), included bark	Remove due to construction
T16	*Fraxinus pennsylvanica*	Green Ash	1	20	F	P	P	2	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB), bark exfoliation, fungi	Remove due to construction
T17	*Fraxinus pennsylvanica*	Green Ash	1	25	F	P	P	3	Municipality	1.8	Remove	EAB	Remove due to construction
T18	*Fraxinus pennsylvanica*	Green Ash	1	25,12	D	D	D	3	Municipality	1.8	Remove	Dead	Remove due to construction
T19	*Fraxinus pennsylvanica*	Green Ash	1	20	D	D	D	2	Municipality	1.8	Remove	Dead	Remove due to construction
T20	Acer saccharum	Sugar Maple	1	20	G	G	G	2	Municipality	1.8	Preserve and Protect		Preserve with tree protecting fencing
T21	*Fraxinus pennsylvanica*	Green Ash	1	14	G	P	P	2	Municipality	1.8	Remove	EAB, suckers	Remove due to construction
T22	*Fraxinus pennsylvanica*	Green Ash	1	12	D	D	D	2	Municipality	1.8	Remove	Dead	Remove due to construction
T23	*N/A*	N/A	1							N/A	N/A		
TG1	*Populus tremuloides*	Trembling Aspen	3	15-20	G	G	G	2	Municipality	1.8	Remove		Remove due to construction

APPENDIX

B SITE PHOTOS



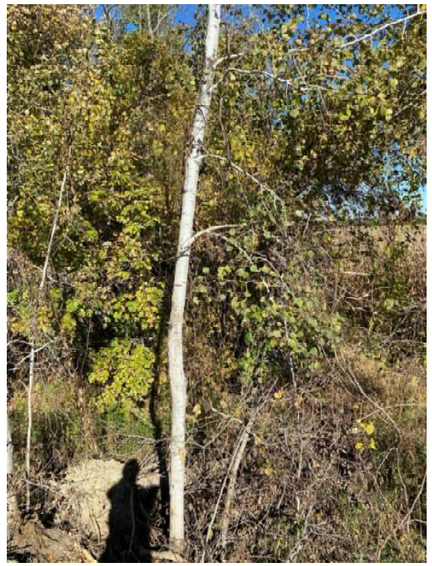
T1 — Green Ash to be removed due to construction.



T2 — Green Ash to be removed due to construction.



T3 — Trembling Aspen to be removed due to construction.



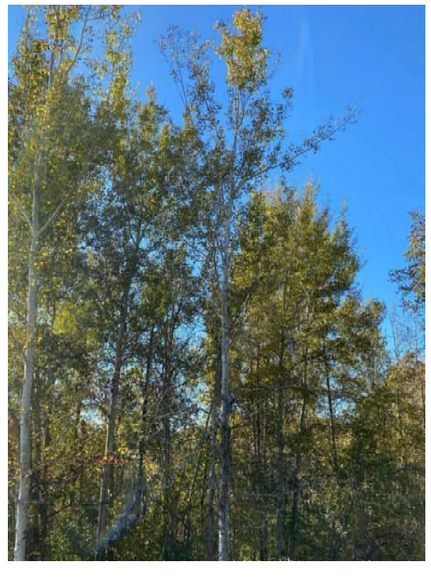
T4 — Trembling Aspen to be removed due to construction.



T5 — Trembling Aspen to be removed due to construction.



T6 — Trembling Aspen to be removed due to construction.



T7 — Trembling Aspen to be removed due to construction.



T8 — Green Ash to be removed due to construction.

wsp	Bridge Clearance—HWY 401 and Fraser Rd SITE PHOTOGRAPHS	Date: December 2024 Project No: 221-07349-00 Appendix B



T9 — American Elm to be removed due to construction.



T10 — Existing tree on site has been felled.



T11 — Existing tree on site has been felled.



T12 — Little Leaf Linden to be preserved with tree protection fencing.



T13 — American Elm to be removed due to construction.



T14 — Green Ash to be removed due to construction.

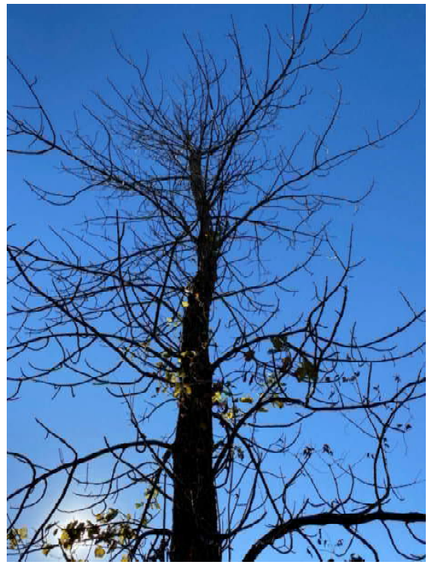


T15 — Green Ash to be removed due to construction.



T16 — Green Ash to be removed due to construction.

wsp	Bridge Clearance—HWY 401 and Fraser Rd SITE PHOTOGRAPHS	Date: December 2024 Project No: 221-07349-00 Appendix B



T17 — Green Ash to be removed due to construction.



T18 — Green Ash to be removed due to construction.



T19 — Green Ash to be removed due to construction.



T20 — Sugar maple to be preserved with tree protection fencing.



T21 — Green Ash to be removed due to construction.



T22 — Green Ash to be removed due to construction.



T23 — Existing tree on site has been felled.

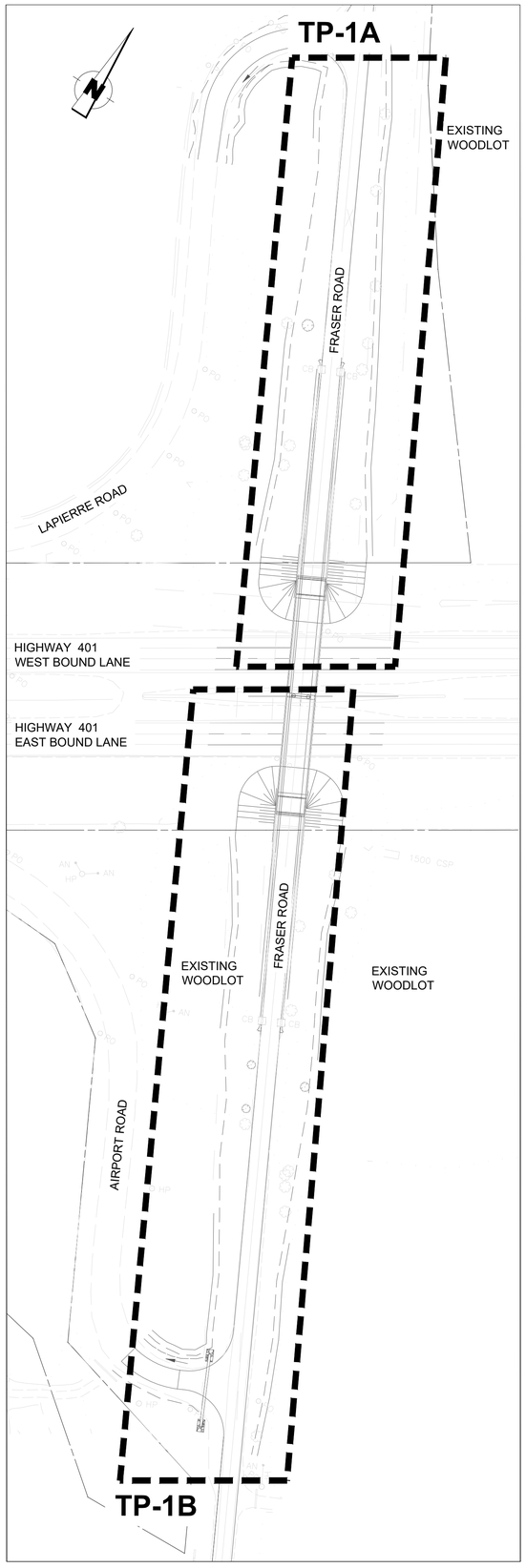


TG1 — Three Trembling Aspen to be removed due to construction.

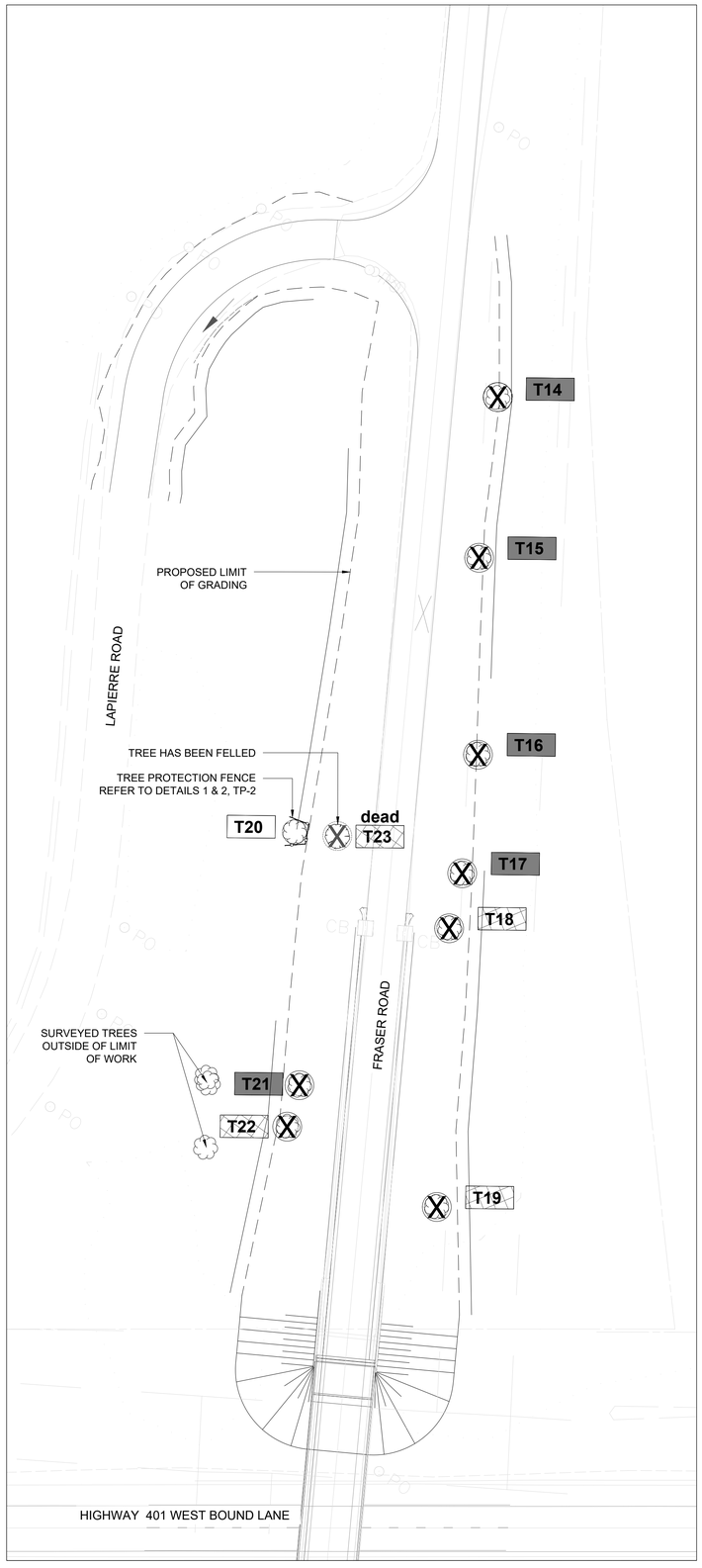
wsp	Bridge Clearance—HWY 401 and Fraser Rd SITE PHOTOGRAPHS	Date: December 2024 Project No: 221-07349-00 Appendix B

APPENDIX

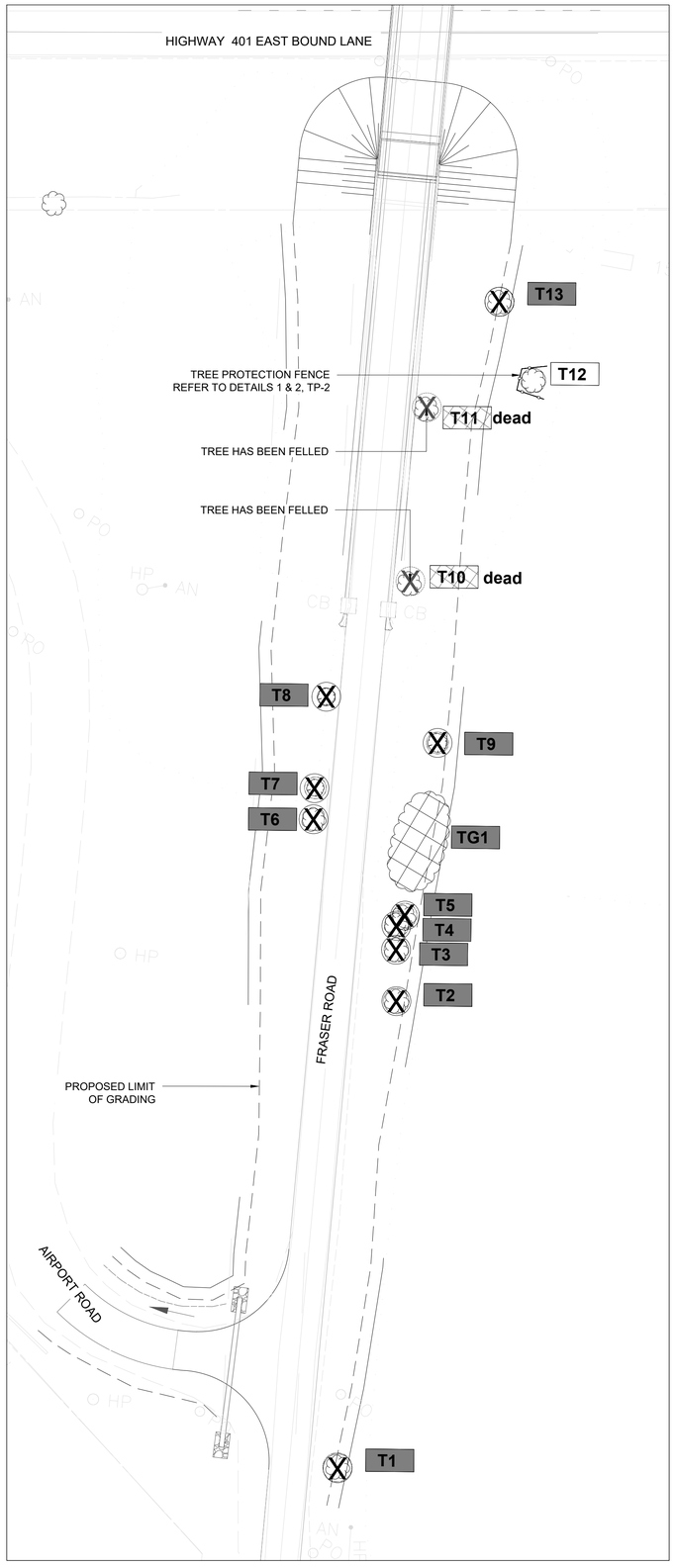
C TREE PRESERVATION PLANS



1 TP-1 TREE PRESERVATION PLAN - LOCATION PLAN
SCALE: 1:1000

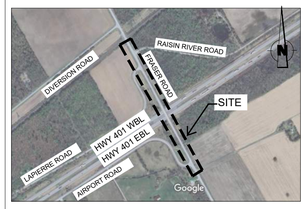


A TP-1 TREE PRESERVATION PLAN - NORTH OF FRASER ROAD U/P
SCALE: 1:500



B TP-1 TREE PRESERVATION PLAN - SOUTH OF FRASER ROAD U/P
SCALE: 1:500

KEY MAP



LEGEND

- PROPERTY LINE
- LIMIT OF PROPOSED GRADING
- EXISTING INDIVIDUAL TREE - SURVEYED LOCATION
- EXISTING INDIVIDUAL TREE - SURVEYED BY ARBORIST
- T000 — TREE INVENTORY NUMBER - TREE TO BE PRESERVED/RETAINED
- T000 — TREE INVENTORY NUMBER - TREE TO BE REMOVED
- T000 — TREE INVENTORY NUMBER - DEAD TREE
- EXISTING INDIVIDUAL TREE TO BE REMOVED DUE TO PROPOSED CONSTRUCTION
- EXISTING INDIVIDUAL TREE REMOVED PRIOR TO SURVEY
- EXISTING TREE GROUPING TO BE REMOVED DUE TO PROPOSED CONSTRUCTION
- TREE PROTECTION FENCE - INSTALL PER DETAILS 1 & 2 ON SHEET TP2
- PRESCRIBED MINIMUM TREE PROTECTION ZONE DISTANCE

NO	DATE	REVISION/ISSUED	BY	APPD
2	28-02-25	ISSUED FOR CLIENT REVIEW	GM	TM
1	02-12-24	ISSUED FOR CLIENT REVIEW	GM	TM

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CLIENT:
MINISTRY OF TRANSPORTATION
(MTO)

PROJECT TITLE:
LVR AGREEMENT 4023-E-003
WIO#3 GWP 4248-15-00 FRASER ROAD UNDERPASS REPLACEMENT

SITE ADDRESS:
FRASER ROAD UNDERPASS 31X-0230/B0

DRAWING TITLE:
TREE PRESERVATION PLAN

STAMP: NOT FOR CONSTRUCTION

STAMP: CERTIFIED ARBORIST ISA Tiago Medeiros ISA ON-3580A

DESIGNED	DRAWN	CHECKED
TM	GM	TM

SCALE: Refer To Drawing
DATE: NOVEMBER 22 2024
PROJECT NUMBER: CA0019704.0000
DWG. NUMBER: TP-1

YYMMDD 25/02/28 3:03 PM
V:\Ottawa Landscape Server\2024\CA0019704.0000 Fraser Rd\Drawings\Hwy 401 Fraser Road Underpass_ Tree Preservation Plans.dwg

TREE PRESERVATION NOTES AND GUIDELINES

ESTABLISHMENT OF TREE PROTECTION ZONE (TPZ):

1. TREE PRESERVATION MEASURES, INCLUDING THE ESTABLISHMENT OF TREE PROTECTION ZONE (TPZ) SHALL APPLY TO THE VEGETATION IDENTIFIED TO BE RETAINED AND PROTECTED. THE TREE PROTECTION ZONE SHALL CONSIST OF TREE PROTECTION FENCING PLACED AT THE DRIPLINE OF VEGETATION TO BE PRESERVED. REFER TO DETAILS ON THIS SHEET.

2. NO GRADE CHANGES SHALL OCCUR WITHIN TREE PROTECTION ZONE. IN THE EVENT THAT GRADE CHANGES OCCUR EITHER AS A CUT OR FILL SITUATION, THE CONSULTING ARBORIST MUST BE NOTIFIED SO THAT PRECAUTIONS TO PRESERVE THE TREE CAN BE DETERMINED PRIOR TO THE PLACEMENT OF FILL OR EXCAVATION ACTIVITIES.

3. EVERY PRECAUTION MUST BE TAKEN TO PREVENT DAMAGE TO TREES AND ROOT SYSTEMS FROM DAMAGE, COMPACTION AND CONTAMINATION RESULTING FROM THE CONSTRUCTION TO THE SATISFACTION OF THE CONSULTING ARBORIST.

4. TREES THAT REQUIRE PRUNING TO PERMIT CONSTRUCTION ACTIVITIES WILL BE DONE SO IN ACCORDANCE WITH GOOD ARBORICULTURAL PRACTICES. IN THE EVENT THAT IT IS NECESSARY TO REMOVE ADDITIONAL LIMBS OR PORTIONS OF TREES, AFTER CONSTRUCTION HAS COMMENCED, TO ACCOMMODATE CONSTRUCTION, THE CONSULTING ARBORIST IS TO BE INFORMED AND UNDER THEIR DIRECTION THE REMOVAL IS TO BE EXECUTED CAREFULLY AND IN FULL ACCORDANCE WITH ARBORICULTURAL TECHNIQUES, BY A CERTIFIED ARBORIST.

5. ANY DAMAGE TO TREES SUCH AS BROKEN LIMBS, DAMAGE TO ROOTS, OR WOUNDS TO THE MAIN TRUNK OR STEM SYSTEMS ARE TO BE REPORTED TO THE CONSULTING ARBORIST SO THAT THE DAMAGE CAN BE ASSESSED IMMEDIATELY AND MITIGATION CAN BE PROMPTLY IMPLEMENTED.

TREE PROTECTION ZONE:

1. APPLIES TO TREES LOCATED THE LIMIT OF GRADING OR NOTED OTHERWISE. THESE TREES ARE TO BE PRESERVED AND WILL HAVE SILT / TREE PROTECTION FENCING INSTALLED AT ALONG THE LIMIT OF GRADING / LIMIT OF WORK TO ESTABLISH THE TREE PROTECTION ZONE. ANY DAMAGE TO TREES SUCH AS BROKEN LIMBS, DAMAGE TO ROOTS, OR WOUNDS TO THE MAIN TRUNK OR STEM SYSTEMS ARE TO BE REPORTED TO THE CONSULTING ARBORIST SO THAT THE DAMAGE CAN BE ASSESSED IMMEDIATELY AND MITIGATION CAN BE PROMPTLY IMPLEMENTED. WITHIN A TREE PROTECTION ZONE.

2. THERE IS TO BE:
   - A. NO CONSTRUCTION
   - B. NO ALTERING OF GRADE BY ADDING FILL, EXCAVATING, TRENCHING, SCRAPING, DUMPING OR DISTURBANCE OF ANY KIND.
   - C. NO STORAGE OF CONSTRUCTION MATERIALS, EQUIPMENT, SOIL, CONSTRUCTION WASTE OR DEBRIS WITHIN THE DRIP LINE
   - D. NO MOVEMENT OF VEHICLES, EQUIPMENT
   - E. NO PARKING OF VEHICLES OR MACHINERY
   - F. NO DIGGING, BORING
   - G. NO RIGGING CABLES SHALL BE WRAPPED AROUND OR INSTALLED IN TREES
   - H. NO CONTAMINANTS WILL BE PLACED OVER ROOT SYSTEM
   - I. NO CONTAMINANTS WILL BE DUMPED OR FLUSHED WHERE FEEDER ROOTS OF TREES EXIST

WORK WITHIN A TREE PROTECTION ZONE:

1. IF WORK MUST BE CONDUCTED WITHIN A TREE PROTECTION ZONE THE CONTRACTOR SHOULD MINIMIZE SOIL COMPACTION AND MECHANICAL ROOT DAMAGE BY UTILIZING ONE OF THE FOLLOWING FOUR METHODS:
   - A. APPLYING 150-300mm OF MULCH TO AREA. UPON COMPLETION REMOVE EXCESS MULCH LEAVING A 100mm DEPTH LAYER OF MULCH.
   - B. LAYING 20mm THICK PLYWOOD OR 100X100mm WOOD BEAMS OVER A 100+MM THICK LAYER OF WOOD CHIP MULCH. UPON COMPLETION REMOVE PLYWOOD AND LEAVE MULCH LAYER IN PLACE.
   - C. APPLYING 100-150mm DEPTH OF GRAVEL OVER A TAUT, STAKED GEOTEXTILE FABRIC. UPON COMPLETION REMOVE GRAVEL AND GEOTEXTILE.
   - D. PLACING COMMERCIAL LOGGING OR ROAD MATS ON TOP OF A MULCH LAYER. UPON COMPLETION REMOVE MATS. STONE, GEOTEXTILE, AND MULCH EXCEEDING 100mm THICK WILL BE REMOVED FROM THE TREE PRESERVATION AREA ONCE THE THREAT OF SOIL OR ROOT DAMAGE HAS PASSED.

TREE PRESERVATION AND PROTECTION RECOMMENDATIONS:

1. THE SURVIVAL RATES FOR TREES, WHICH ARE IN PROXIMITY TO CONSTRUCTION SITES ARE DEPENDENT ON THE RESULTANT CHANGES TO A VARIETY OF ENVIRONMENTAL AND ANTHROPOGENIC FACTORS. THESE CONSTRUCTION ACTIVITIES BRING ABOUT CHANGES TO A VARIETY OF ENVIRONMENTAL FEATURES INCLUDING THE EXISTING MICROCLIMATE INCLUDING WINDS, TEMPERATURE, SOIL MOISTURE, AMOUNT OF AVAILABLE SUNLIGHT, SOIL QUALITY, AND THE LEVEL OF THE WATER TABLE. INCREASED HUMAN ACTIVITIES MAY ALSO DAMAGE THE STRUCTURE AND / OR PHYSIOLOGICAL ACTIVITIES OF THE TREES. THE FULL EFFECTS OF THE DAMAGE MAY NOT APPEAR UNTIL SEVERAL YEARS AFTER ITS OCCURRENCE. THUS, IT IS ESSENTIAL THAT BOTH VEGETATIVE CLEARING AND PRESERVATION METHODS FOLLOW THE GUIDELINES BELOW AND THOSE GENERALLY ACCEPTED AS KEEPING WITH GOOD HORTICULTURAL AND CONSTRUCTION PRACTICES. THE GUIDELINES ARE SUBJECT TO ADJUSTMENTS DEEMED REASONABLE AND APPROPRIATE CONSIDERING THE PROXIMITY AND NUMBER OF TREES INVOLVED AND THE SITE-SPECIFIC SERVICING REQUIREMENT.

GENERAL RECOMMENDATIONS:

1. ALL TREES WITHIN THE TREE PRESERVATION ZONE MUST BE LEFT STANDING. THE TREE REMOVALS MUST BE COORDINATED TO BE COMPLETED OUTSIDE OF THE BIRD NESTING SEASON **(APRIL 1 TO AUGUST 31)** AND ACTIVE PERIOD FOR BATS **(APRIL 1 TO SEPTEMBER 30)**.

2. ALL REMOVALS MUST BE FELLED INTO THE WORK AREA TO ENSURE THAT DAMAGE DOES NOT OCCUR TO THE TREES WITHIN THE TREE PRESERVATION ZONE.

3. UPON COMPLETING OF THE TREE REMOVALS, ALL FELLED TREES ARE TO BE CHIPPED. THIS WORK MUST BE COMPLETED OUTSIDE OF THE BIRD NESTING SEASON AND ACTIVE PERIOD FOR BATS, **APRIL 1 TO SEPTEMBER 30.**

4. TREE PROTECTION FENCING / SILT FENCE MUST BE INSTALLED AS PER THE MUNICIPAL STANDARD SILT FENCE DETAIL AND AS SHOWN ON THE TREE PRESERVATION PLAN. UPON INSTALLATION OF THE FENCING, THE CONTRACTOR WILL CONTACT THE CONSULTING ARBORIST TO REVIEW AN APPROVE THE FENCING AND ITS LOCATION PRIOR TO COMMENCEMENT OF ANY GRADING WORK.

5. AREAS WITHIN THE TREE PRESERVATION ZONE ARE NOT TO BE USED FOR ANY TYPE OF STORAGE (E.G. STORAGE OF DEBRIS, CONSTRUCTION MATERIAL, SURPLUS SOILS, AND CONSTRUCTION EQUIPMENT). NO TRENCHING OR TUNNELLING FOR UNDERGROUND SERVICES SHALL BE LOCATED WITHIN THE TREE PROTECTION ZONE OR DRIPLINE OF TREES DESIGNATED FOR PRESERVATION WITHIN OR ADJACENT TO THE CONSTRUCTION ZONE.

ROOT PRUNING:

1. AT THE COMMENCEMENT OF CONSTRUCTION PRUNE ROOTS CLEANLY USING ACCEPTABLE ARBORICULTURAL PRACTICES AND IMMEDIATELY BACKFILL WITH APPROPRIATE MATERIAL. ROOTS OVER 2.5cm DIAMETER THAT ARE TO BE CUT SHOULD BE PRUNED RATHER THAN LEFT TORN OR CRUSHED.
2. THE FOLLOWING ARE GENERAL METHODS OF ROOT PRUNING:

- SOIL EXCAVATION USING SUPERSONIC AIR TOOLS, PRESSURIZED WATER OR HAND TOOLS, FOLLOWED BY SELECTIVE ROOT CUTTING
- CUTTING THROUGH THE SOIL ALONG A PREDETERMINED LINE ON THE SURFACE USING TOOL SPECIFICALLY DESIGNED TO CUT ROOTS
- MECHANICALLY EXCAVATING (e.g. BACKHOE) THE SOIL AND PRUNING WHAT IS LEFT OF THE EXPOSED ROOTS.
- CUTS TO BE MADE WITH HAND PRUNING SHEARS, BY-PASS BLADE, PRUNING SAW. DO NOT USE ANVIL TYPE PRUNERS.

TREE INJURY:

1. TYPICALLY TREE ROOTS EXTEND 1.5 TO 3 TIMES BEYOND THE DRIPLINE OF THE TREE AND ARE WITHIN THE TOP 150mm OF THE SOIL. TYPES OF DAMAGE FROM CONSTRUCTION INCLUDE:

- PHYSICAL INJURY
- SOIL COMPACTION
- SEVERING OF ROOTS
- SMOTHERING OF ROOTS
- SPLIT OR BROKEN BRANCHES
- EXCESSIVE PRUNING

2. SOIL COMPACTION REDUCES PORE SPACE, OXYGEN AVAILABLE TO ROOTS INCREASES CARBON DIOXIDE ACCUMULATION, RESTRICTS ROOT GROWTH AND THE ABILITY TO ABSORB WATER AND NUTRIENTS, AS WELL AS IMPAIRS DRAINAGE.
SMOTHERING OF ROOTS: 90% OF FINE ABSORBING ROOTS ARE WITHIN THE UPPER 150-300mm OF THE SOIL. SMOTHERING WITH THE ADDITION OF SOIL CAN KILL THE ROOTS AND STRESS THE TREE. PHYSICAL INJURY, SPLIT OR BROKEN BRANCHES HINDER THE TREES ABILITY TO COMPARTMENTALIZE (CLOSE) WOUNDS PROPERLY.

PRUNING PRACTICES:

1. ALL LIMBS DAMAGED OR BROKEN DURING THE COURSE OF CONSTRUCTION SHOULD BE PRUNED CLEANLY, UTILIZING BY-PASS SECATEURS IN ACCORDANCE WITH APPROVED HORTICULTURAL PRACTICES. SHOULD THERE BE A POTENTIAL RISK OF TRANSFER OF DISEASE FROM INFECTED TO NON-INFECTED TREES; TOOLS MUST BE DISINFECTED AFTER PRUNING EACH TREE BY DIPPING IN METHYL HYDRATE. THIS PRACTICE IS PARTICULARLY IMPORTANT DURING PERIODS OF TREE STRESS AND WHEN PRUNING MANY MEMBERS OF THE SAME GENERA, WITHIN WHICH A DISEASE COULD BE SPREAD QUICKLY (I.E.,VERTICILLIUM WILT ON MAPLES OR FIRE BLIGHT ON GENERA OF THE ROSACEA FAMILY).

2. DURING EXCAVATION OPERATIONS IN WHICH THE ROOT AREA IS AFFECTED, THE CONTRACTOR IS TO PRUNE ALL EXPOSED ROOTS CLEANLY. PRUNED ROOT ENDS ARE TO BE NEATLY AND SQUARELY TRIMMED AND THE AREA IS TO BE BACKFILLED WITH CLEAN NATIVE FILL AS SOON AS POSSIBLE TO PREVENT DESICCATION AND PROMOTE ROOT GROWTH. THE EXPOSED ROOTS SHOULD NOT BE ALLOWED TO DRY OUT, AND THE CONTRACTOR SHALL DISCUSS WATERING OF THE ROOTS WITH THE CONSULTING ARBORIST SO THAT THE ROOTS SHALL MAINTAIN OPTIMUM SOIL MOISTURE DURING CONSTRUCTION AND BACKFILLING OPERATIONS, YET SO NOT TO INTERFERE WITH CONSTRUCTION OPERATIONS. BACKFILLING MUST BE WITH CLEAN UNCONTAMINATED TOPSOIL FROM AN APPROVED SOURCE. TEXTURE MUST BE COARSER THAN EXISTING SOILS, AND TO COME INTO CLEAN CONTACT WITH EXISTING SOILS (REMOVE AIR POCKETS, SOD, ETC.)

3. ALL PRUNING CUTS SHOULD BE MADE TO A GROWING POINT SUCH AS A BUD, TWIG OR BRANCH, CUT JUST OUTSIDE THE BRANCH COLLAR (THE SWOLLEN AREA AT THE BASE OF THE BRANCH THAT SOMETIMES HAS A BARK RIDGE), AND PERPENDICULAR TO THE BRANCH BEING PRUNED RATHER THAN AS CLOSE TO THE TRUNK AS POSSIBLE. THIS MINIMIZES THE SITE OF THE WOUND. NO STUBS SHOULD BE LEFT. POOR CUT LOCATION, POOR CUT ANGLE AND TORN CUTS ARE NOT ACCEPTABLE.

4. TREE ROOTS SHOULD NOT BE EXCAVATED WITHIN THE CRITICAL STRUCTURAL ROOTING AREA. THIS IS THE MINIMUM AREA OF THE ROOT SYSTEM NECESSARY TO MAINTAIN VITALITY OR STABILITY OF THE TREE. TYPICALLY THIS AREA EXTENDS TO THE DRIPLINE OF THE TREE. THE SEVERING OF ONE ROOT CAN CAUSE APPROXIMATELY 5-20% LOSS OF THE ROOT SYSTEM. A REDUCTION OF THIS AREA BY GREATER THAN 30% CAN POSE STABILITY CONCERNS FOR THE TREE.

5. A SLOW RELEASE FERTILIZER EG: BONE MEAL OR APPROVED EQUAL TO BE APPLIED TO TREES WHERE ROOT PRUNING OR ROOT DAMAGE HAS OCCURRED. APPLY PER MANUFACTURER'S RECOMMENDATIONS

6. EXTENSIVE PRUNING IS BEST COMPLETED BEFORE PLANTS BREAK DORMANCY. PRUNING SHOULD BE LIMITED TO THE REMOVAL OF NO MORE THAN ONE THIRD (1/3) OF THE TOTAL BUD AND LEAF BEARING BRANCHES.

7. PRUNING SHOULD INCLUDE THE CAREFUL REMOVAL OF:
   - A. DEADWOOD
   - B. BRANCHES THAT ARE WEAK, DAMAGED, DISEASED AND THOSE WHICH WILL INTERFERE WITH CONSTRUCTION ACTIVITY
   - C. SECONDARY LEADERS OF CONIFERS
   - D. TRUNK AND ROOT SUCKERS
   - E. TRUNK WATERSPOUTS
   - F. TIGHT V-SHAPED OR WEAK CROTCHES (INCLUDED UNIONS).

8. THE CONTRACTOR MUST IMMEDIATELY REPORT ANY DAMAGE TO TREES SUCH AS BROKEN LIMBS, DAMAGE TO ROOTS, OR WOUNDS TO THE MAIN TRUNK OR STEM SYSTEMS SO THAT THE DAMAGE CAN BE ASSESSED IMMEDIATELY.

9. THE TREE PROTECTION FENCING WILL BE MAINTAINED UNTIL ALL CONSTRUCTION IS COMPLETED, SOILS ARE STABILIZED AND ALL OF THE EQUIPMENT HAS BEEN REMOVED FROM THE SITE.

MIGRATORY BIRD CONVENTION ACT (1994) GUIDELINES:

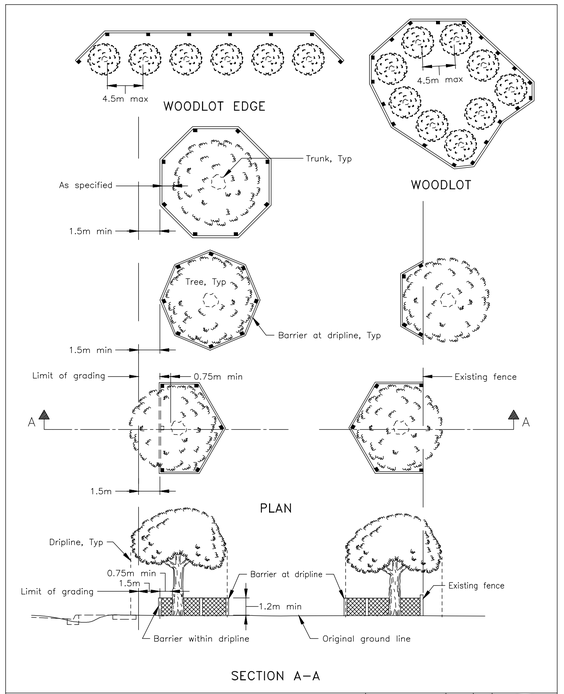
1. IN ACCORDANCE WITH THIS ACT THE REMOVAL OF VEGETATION WHERE THE POTENTIAL FOR NESTING EXISTS, IS RESTRICTED WITHIN CERTAIN TIME PERIODS RELATED TO THE APPLICABLE ZONE.

2. SOUTH GLENGARRY IS WITHIN ZONE C3. CORE NESTING PERIODS RANGE BETWEEN MID APRIL TO LATE AUGUST. TREE REMOVALS SHOULD BE COORDINATED OUTSIDE OF THIS WINDOW.

3. THE PROPONENT / CONTRACTOR IS RESPONSIBLE FOR UNDERTAKING ACTIVITIES IN COMPLIANCE WITH THE MIGRATORY BIRDS CONVENTION ACT (1994).

BAT ROOSTING GUIDELINES:

1. IN ACCORDANCE WITH THE SPECIES AT RISK ACT, THE REMOVAL OF VEGETATION WHERE THE POTENTIAL FOR BAT ROOSTING EXISTS, IS RESTRICTED WITHIN CERTAIN TIME PERIODS. ROOSTING PERIODS RANGE BETWEEN MID APRIL TO LATE SEPTEMBER AND TREE REMOVALS SHOULD BE COORDINATED OUTSIDE OF THIS WINDOW. OVERALL CLEARING OF TREES WOULD BE PERMITTED FROM OCTOBER 1 TO MARCH 31.



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 1
BARRIER FOR TREE PROTECTION		OPSD 220.010

1 TP-2 LAYOUT FOR TREE PROTECTION BARRIER
N.T.S

Tree Preservation Table

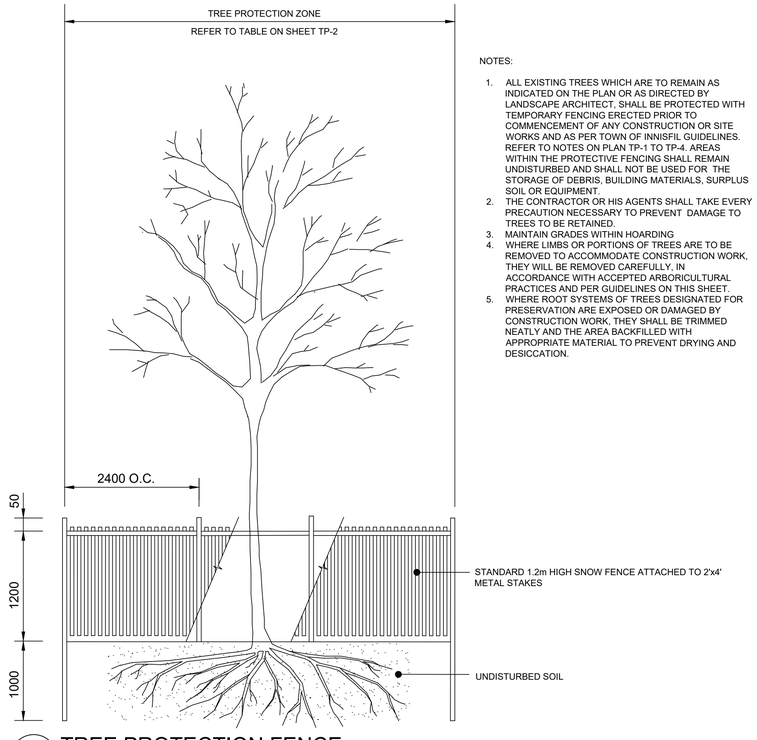
Project: MTO-Hwy 401 & Fraser Rd. | **Field Work Completed By:** Tiago Medeiros
Date of Field Work: October 17, 2024 | **Weather:** Sunny, Warm | **Conditions:** G=Good, F=Fair, P=Poor, D=Dead

Tree Assessment Criteria:
TI - Trunk Integrity: assessment of the trunk for any defects or weaknesses.
CS - Canopy Structure: assessment of scaffold branches, unions and canopy
CV - Canopy vigour: assessment of the health of the tree, based on the % of deadwood & live crown

Tree Condition
Good: tree displays less than 15% deficiency/defect within the given tree assessment criteria (TI,CS,CV)
Fair: tree displays 15-40% deficiency/defect within the given tree assessment criteria (TI,CS,CV)
Poor: tree displays greater than 40% deficiency/defect within the given tree assessment criteria (TI,CS,CV)

Legend:
Trees to be Retained | Trees to be Removed - Construction | Trees to be Preserved with Injury
Trees to be Preserved & Protected | Trees to be Removed - Health | Trees not Existing, Removed prior to arborist inventory

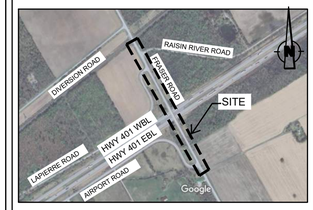
Tree #	Botanical Name	Common Name	No.	DBH (cm)	Tree Condition			Dripline Radius (m)	Ownership	Tree Protection Zone (m)	Recommendation	Comments / Health	Comments - Removal / Preservation
					TI	CS	CV						
T1	*Fraxinus pennsylvanica*	Green Ash	1	38	G	F	P	4	Municipality	2.4	Remove	Girdling Roots, Co Dominant, Emerald Ash Borer (EAB)	Remove due to construction
T2	*Fraxinus pennsylvanica*	Green Ash	1	21, 21	P	P	P	3	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB)	Remove due to construction
T3	*Populus tremuloides*	Trembling Aspen	1	12	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T4	*Populus tremuloides*	Trembling Aspen	1	15	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T5	*Populus tremuloides*	Trembling Aspen	1	13	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T6	*Populus tremuloides*	Trembling Aspen	1	15	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T7	*Populus tremuloides*	Trembling Aspen	1	15	P	G	G	2	Municipality	1.8	Remove		Remove due to construction
T8	*Fraxinus pennsylvanica*	Green Ash	1	15	G	P	P	2	Municipality	1.8	Remove	Emerald Ash Borer (EAB)	Remove due to construction
T9	*Ulmus americana*	American Elm	1	12	G	G	G	2	Municipality	1.8	Remove		Remove due to construction
T10	*N/A*	N/A	1							N/A	N/A		
T11	*N/A*	N/A	1							N/A	N/A		
T12	*Tilia americana*	Littleleaf Linden	1	20	G	G	G	2	Municipality	1.8	Preserve and Protect		Preserve with tree protecting fencing
T13	*Ulmus americana*	American Elm	1	40	G	G	G	4	Municipality	2.4	Remove		Remove due to construction
T14	*Fraxinus pennsylvanica*	Green Ash	1	30,25	F	P	P	3	Municipality	2.4	Remove	Multi stem, Emerald Ash Borer (EAB)	Remove due to construction
T15	*Fraxinus pennsylvanica*	Green Ash	1	23,23	F	P	P	3	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB), included bark	Remove due to construction
T16	*Fraxinus pennsylvanica*	Green Ash	1	20	F	P	P	2	Municipality	1.8	Remove	Multi stem, Emerald Ash Borer (EAB), bark exfoliation, fungi	Remove due to construction
T17	*Fraxinus pennsylvanica*	Green Ash	1	25	F	P	P	3	Municipality	1.8	Remove	EAB	Remove due to construction
T18	*Fraxinus pennsylvanica*	Green Ash	1	25,12	D	D	D	3	Municipality	1.8	Remove	Dead	Remove due to construction
T19	*Fraxinus pennsylvanica*	Green Ash	1	20	D	D	D	2	Municipality	1.8	Remove	Dead	Remove due to construction
T20	*Acer saccharum*	Sugar Maple	1	20	G	G	G	2	Municipality	1.8	Preserve and Protect		Preserve with tree protecting fencing
T21	*Fraxinus pennsylvanica*	Green Ash	1	14	G	P	P	2	Municipality	1.8	Remove	EAB, suckers	Remove due to construction
T22	*Fraxinus pennsylvanica*	Green Ash	1	12	D	D	D	2	Municipality	1.8	Remove	Dead	Remove due to construction
T23	*N/A*	N/A	1							N/A	N/A		
TG1	*Populus tremuloides*	Trembling Aspen	3	15-20	G	G	G	2	Municipality	1.8	Remove		Remove due to construction



NOTES:
1. ALL EXISTING TREES WHICH ARE TO REMAIN AS INDICATED ON THE PLAN OR AS DIRECTED BY LANDSCAPE ARCHITECT, SHALL BE PROTECTED WITH TEMPORARY FENCING ERECTED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION OR SITE WORKS AND AS PER TOWN OF INNISFIL GUIDELINES. REFER TO NOTES ON PLAN TP-1 TO TP-4. AREAS WITHIN THE PROTECTIVE FENCING SHALL REMAIN UNDISTURBED AND SHALL NOT BE USED FOR THE STORAGE OF DEBRIS, BUILDING MATERIALS, SURPLUS SOIL OR EQUIPMENT.
2. THE CONTRACTOR OR HIS AGENTS SHALL TAKE EVERY PRECAUTION NECESSARY TO PREVENT DAMAGE TO TREES TO BE RETAINED.
3. MAINTAIN GRADES WITHIN HOARDING
4. WHERE LIMBS OR PORTIONS OF TREES ARE TO BE REMOVED TO ACCOMMODATE CONSTRUCTION WORK, THEY WILL BE REMOVED CAREFULLY, IN ACCORDANCE WITH ACCEPTED ARBORICULTURAL PRACTICES AND PER GUIDELINES ON THIS SHEET.
5. WHERE ROOT SYSTEMS OF TREES DESIGNATED FOR PRESERVATION ARE EXPOSED OR DAMAGED BY CONSTRUCTION WORK, THEY SHALL BE TRIMMED NEATLY AND THE AREA BACKFILLED WITH APPROPRIATE MATERIAL TO PREVENT DRYING AND DESICCATION.

2 TP-2 TREE PROTECTION FENCE
N.T.S

KEY MAP



NO	DATE	REVISION/ISSUED	BY	APPD
2	28-02-25	ISSUED FOR CLIENT REVIEW	GM	TM
1	02-12-24	ISSUED FOR CLIENT REVIEW	GM	TM

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www.wsp.com

CLIENT:
MINISTRY OF TRANSPORTATION (MTO)

PROJECT TITLE:
LVR AGREEMENT 4023-E-003
WIO#3 GWP 4248-15-00 FRASER ROAD UNDERPASS REPLACEMENT

SITE ADDRESS:
FRASER ROAD UNDERPASS 31X-0230/B0

DRAWING TITLE:
TREE PRESERVATION NOTES AND DETAILS

STAMP: NOT FOR CONSTRUCTION

STAMP: CERTIFIED ARBORIST ISA — Tiago Medeiros ISA# ON-3580A

DESIGNED	DRAWN	CHECKED
TM	GM	TM

SCALE: NTS | DATE: NOVEMBER 22 2024

PROJECT NUMBER: CA0019704.0000 | DWG. NUMBER: TP-2

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APPENDIX D

Assessment of Past Uses Report

REPORT

Assessment of Past Uses

Agreement #4023-E-003 - Work Item #3 - GWP 4248-15-00 - Fraser Road Underpass (Site No. 31X-0230/B0) Replacement, Township of South Glengarry

Submitted to:

Ministry of Transportation Ontario, East Region

1355 John Counter Blvd.
Kingston, Ontario
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Submitted by:

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January 8, 2025

Distribution List

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1 e-copy (PDF): WSP Canada Inc.

Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery
MTO	Lee Collins, Project Engineer	RevA (draft for client review)	December 2, 2024	PDF via email
MTO	Lee Collins, Project Engineer	Rev0 (final report)	January 8, 2025	PDF via email

Executive Summary

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation Ontario (MTO) East Region to conduct an Assessment of Past Uses (APU) to support the management of excess soil that will be generated during the proposed Fraser Road Underpass (Site No. 31X-0230/B0) replacement (the 'Project') in the Township of South Glengarry, Ontario (hereafter referred to as the 'Project Area').

The objectives of the APU were to identify the likelihood of the presence or absence of potentially contaminating activities (PCAs) within the Project Area and lands within 250 m of the Project Area (APU Study Area) that may impact the subsurface soil quality within the Project Area, and to identify the corresponding areas of potential environmental concern (APECs) and contaminants of potential concern (COPCs).

This APU report has been completed in general accordance with Ontario Regulation (O. Reg.) 406/19 (amended April 23, 2024): On-Site and Excess Soil Management and the associated Ontario Ministry of the Environment, Conservation and Parks (MECP) document "Rules for Soil Management and Excess Soil Quality Standards," dated December 23, 2022 (the 'Soil Rules') (revised February 19, 2024). The APU scope of work included a review of available current and historical information, a site reconnaissance, evaluation of readily available information, and reporting, subject to the limitations outlined in Section 10.0 of this report.

At the time of the site reconnaissance, conducted on August 1, 2024, the Project Area consisted of an approximately 1.1 km stretch of Highway 401 from 0.55 km west to 0.55 km east of the Fraser Road highway underpass, and approximately 0.5 km of Fraser Road from 0.3 km north to 0.2 km south of Highway 401. The surrounding properties within the APU Study Area included primarily residential, industrial, and agricultural land uses.

Based on the available information obtained and reviewed as part of the APU, a total of five APECs were identified in association with the Project Area (Section 6.3). Based on the APECs identified during this assessment, associated COPCs in soil include electrical conductivity (EC), sodium adsorption ratio (SAR), metals, hydride-forming metals, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons (PHCs), benzene, toluene, ethylbenzene, and xylene (BTEX), and organochlorine (OC) pesticides. The summary table of the identified APECs is provided in Section 6.3.

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1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation Ontario (MTO) East Region to conduct an Assessment of Past Uses (APU) to support the management of excess soil that will be generated during the proposed Fraser Road Underpass (Site No. 31X-0230/B0) replacement (the 'Project') in the Township of South Glengarry, Ontario (hereafter referred to as the 'Project Area').

This APU report has been completed in general accordance with Ontario Regulation (O. Reg.) 406/19 (amended April 23, 2024): On-Site and Excess Soil Management and the associated Ontario Ministry of the Environment, Conservation and Parks (MECP) document "Rules for Soil Management and Excess Soil Quality Standards," dated December 23, 2022 (the Soil Rules) (revised February 19, 2024). The APU scope of work included a review of available current and historical information, a site reconnaissance, evaluation of readily available information, and reporting, subject to the limitations outlined in Section 10.0 of this report.

The objectives of the APU were to identify the likelihood of the presence or absence of potentially contaminating activities (PCAs) within the Project Area and lands within 250 m of the Project Area (APU Study Area) that may impact the subsurface soil quality within the Project Area, and to identify the areas of potential environmental concern (APECs) and contaminants of potential concern (COPCs).

1.1 Project Area Information

The Project Area consists of an approximately 1.1 km stretch of Highway 401 from 0.55 km west to 0.55 km east of the Fraser Road highway underpass, and approximately 0.5 km of Fraser Road from 0.3 km north to 0.2 km south of Highway 401. The Project Area currently operates as a roadway. The estimated quantity of excess soil to be generated during construction activities is anticipated to be 2,582 m^3 based on current design estimates.

The Project Area location is presented in Figure 1.

1.2 Property Information

Property information for the Project Area is provided in the table below.

Criterion	Project Area Information
Project Leader	Lee Collins, Project Engineer MTO East Region 1355 John Counter Blvd. Kingston, ON, K7L 5A3 Tel: 613-449-7117 Email: Lee.Collins@ontario.ca
Qualified Person (QP)	The QP for this project who supervised this APU is: Sarah Murray, P.Geo., QP_{ESA}, PMP WSP Canada Inc. 4 Hughson Street South Unit 300 Hamilton, ON L8N 3Z1 Tel: 289-835-2563 Email: sarah.murray@wsp.com
Property Owner(s)	The Project Area (bridge and approaches) is owned by MTO.

Criterion	Project Area Information
Municipal Address(es)	The Project Area is comprised of a bridge and roadways and is not associated with a municipal address.

2.0 SCOPE OF ASSESSMENT

An APU is a preliminary qualitative assessment of the likelihood that subsurface soil within a Project Area has been impacted by one or more contaminants, based on a review of current operations and available historical information for the Project Area and APU Study Area. The boundaries of the Project Area and APU Study Area are presented in Figure 1. The objectives of the assessment include the following:

- Identify the presence or absence of PCAs within the Project Area and surrounding APU Study Area that may contribute to adverse soil quality within the Project Area where soil is to be excavated.
- Develop a preliminary determination of the likelihood that one or more contaminants have impacted soil in a location where soil is to be excavated within the Project Area.
- Identify APECs, if applicable, within the Project Area and associated COPCs to assist in the preparation of the Sampling and Analysis Plan (SAP), if any APECs are identified.

To achieve these objectives, WSP completed the following activities, further details of which are provided in subsequent sections of this report:

- Available records review;
- A reconnaissance of the Project Area (site reconnaissance);
- Review and evaluation of the information gathered from the records review and site reconnaissance, including the preparation of a conceptual site model (CSM); and
- The preparation of this APU report.

It is noted that interviews were not conducted as part of the scope of work because the Project Area consists of public roadways. The QP has determined that the interview component is not necessary to meet the general objectives of the APU report.

3.0 RECORDS REVIEW

The available records review provides information regarding the physical setting, history of development, and land use in connection with the Project Area and APU Study Area.

The following information sources were used to obtain these records:

- An Environmental Risk Information Services (ERIS) standard report was obtained for the Project Area and the APU Study Area. A copy of the ERIS report is provided in Appendix A.
- City directories were compiled by ERIS and reviewed for the Project Area and APU Study Area. A copy of the city directories is provided in Appendix A.
- Aerial photographs for the Project Area and APU Study Area were obtained from ERIS and reviewed on Google Earth.

- An information request to the Technical Standards and Safety Authority (TSSA) for particular addresses within the APU Study Area (e.g., properties that were previously identified as gas stations, fuel storage facilities, and/or commercial autobody shops based on records reviewed and the site reconnaissance) was not submitted as these types of property uses were not identified based on records reviewed and the site reconnaissance.
- Historical insurance products (e.g., fire insurance plans) and title searches for the Project Area were not obtained as the Project Area is primarily comprised of roadways which are assumed to be owned by MTO and the Township of South Glengarry, and there are no municipal addresses associated with the Project Area. It is the opinion of the QP that the historical use of the Project Area has been sufficiently established to meet the objectives of the APU through available historical information from other sources.

3.1 General Information

General information sources were reviewed to determine the history of development and land use of the Project Area and within the Study Area. The general information sources review is summarized in the sections below.

3.1.1 Study Area Determination

For the purposes of this APU, the Project as defined in O. Reg. 406/19 includes:

"*Any project that involves the excavation of soil and includes,*

a) any form of development or site alteration;

b) the construction, reconstruction, erecting or placing of a building or structure of any kind;

c) the establishment, replacement, alteration or extension of infrastructure; or

d) any removal of liquid soil or sediment from a surface water body."

Additionally, the Project Area is defined in O. Reg. 406/19 as "*in respect of a project, a single property or adjoining properties on which the project is carried out*;" and for adjoining properties, O. Reg. 406/19 states "*two properties are adjoining if the boundary of one property touches or, were it not for an intervening highway, road allowance, railway line, railway allowance or utility corridor, would touch the boundary of the other property*."

The APU Study Area is the area within a 250 m radius of the boundaries of the Project Area. Based on WSP's review of the historical and current information compiled as part of this APU for the area surrounding the Project Area and observations of neighbouring properties made during the site reconnaissance, it was concluded that an assessment of information pertaining to properties within 250 m of the boundary of the Project Area was sufficient to achieve the objectives of the APU report. Properties wholly beyond 250 m of the Project Area boundaries were not added to the APU Study Area due to low potential impact to the environmental condition of the Project Area. The limits of the APU Study Area are presented in Figure 1.

3.1.2 First Developed Use Determination

The date of first developed use of the Project Area was determined based on review of available aerial photographs. Based on the aerial photographs, the Project Area was a roadway since at least 1963 and has not appeared to change use since. Based on further clarifications from MTO, the Project Area was constructed in 1958. Accordingly, the first developed use of the Project Area was community use (roadway) in 1958.

3.2 Environmental Reports

No previous environmental reports were available for review at the time of this assessment.

3.3 Environmental Source Information

WSP obtained an ERIS report for the Project Area and surrounding APU Study Area. The ERIS report tabulates the results of a search of provincial, federal, and private source databases which are considered relevant in the identification of potential environmental risks associated with the Project Area. Significant records pertaining to the Project Area and APU Study Area are summarized in the table below.

A copy of the ERIS report is provided in Appendix A.

Table 1: Summary of Environmental Records

Address	Location Relative to Project Area	Record Details
Project Area		
Highway 401	100 metres west of Fraser Road Underpass	▪ In April 2022, an unknown amount of coolant leaked from a truck along the westbound lane of Highway 401. Environmental contamination was reported as minor without further details, however the spill was reportedly contained.
Study Area		
Various	APU Study Area	▪ Seven well records were reported in the ERIS report. Based on available information, stratigraphy was generally comprised of silty clay with sand and gravel, then clayey silt to clay. Wells were installed for domestic, public supply, and monitoring purposes to depths ranging from 9.1 to 21.9 meters below ground surface (mbgs), between 1965 to 2021. Static water levels ranged from 0.2 to 1.1 mbgs. ▪ Seven borehole records were reported in the ERIS report. Based on the provided information, boreholes were advanced between 1965 to 2020 to a maximum depth of 15.5 mbgs. Stratigraphy was generally described as silt or silty clay or clayey silt with sand, then bedrock (limestone and shale).
[redacted]	200 m west of project area	▪ [redacted] was listed as an approved hauled sewage waste disposal site based on an Environmental Compliance Approval (ECA) issued on October 29, 2021.

3.4 City Directories

City directories were searched through ERIS to identify points of interest within the APU Study Area, between the years of 2000 and 2021. The following noteworthy records were identified:

- [redacted] (240 m west) – [redacted] Septic Tank Pumping in 2012.

No city directory records were available for the APU Study Area prior to 2000.

3.5 Physical Setting Sources

3.5.1 Aerial Imagery

Aerial imagery for the Project Area and the APU Study Area was reviewed by WSP. Information obtained from the review of the aerial photographs is summarized in the following table.

Year	Project Area	APU Study Area
1963	The Project Area consists of Highway 401 and Fraser Road in similar configuration to present day, with the exception of the portion of Fraser Road south of Highway 401, which is located just west of the present-day configuration.	North: vacant, forested land, agricultural land, a railway running parallel to the north of Highway 401, Lapierre Road in similar configuration to present day. South: vacant, forested land, minor residential developments, agricultural land, Airport Road in similar configuration to present day, a creek runs through the western portion of the APU Study Area and flows towards the southeast portion of the APU Study Area. East: Highway 401, agricultural land. West: Highway 401, agricultural land.
1980	Generally, as per the 1963 aerial photograph, with the southern portion of Fraser Road realigned to present-day configuration.	North: Raisin River Road has been constructed in similar configuration to present day. South: minor residential development. West: minor industrial development.
1994	Generally, as per the 1980 aerial photograph.	Generally, as per the 1980 aerial photograph.
2007	Generally, as per the 1994 aerial photograph.	Generally, as per the 1994 aerial photograph.
2016	Generally, as per the 2007 aerial photograph.	Generally, as per the 2007 aerial photograph.
2023	Generally, as per the 2016 aerial photograph.	Generally, as per the 2016 aerial photograph.

Based on the aerial photographs, the Project Area appears to have been developed as roadway since at least 1963. The surrounding properties primarily included residential and agricultural land use. The aerial photographs obtained from ERIS (1963, 1980, 1994, 2023) are included in Appendix B. Aerial imagery from 2007 and 2016 were reviewed on Google Earth and have not been included in Appendix B.

3.5.2 Topography, Hydrology, and Geology

Based on a review of available documentation, the following is of note relating to the topography, hydrology, and geology in the vicinity of the Project Area. Additional information on Project Area features, as observed at the time of the site reconnaissance, is provided in Section 5.0.

Topic	Conditions	Comment / Source
Topography of Project Area and Study Area	The elevation of the Project Area and Study Area is generally flat ranging between 49 m above sea level (asl) and 51 masl.	The Atlas of Canada – Toporama (Toporama)
Overburden Soils	Sand, gravel, minor silt and clay deltaic deposits.	Ontario Geological Survey – Surficial Geology Map (2011)
Type of Bedrock	Limestone, dolostone, shale, arkose and sandstone.	Ontario Geological Survey - Bedrock Geology of Ontario (2010)
Depth to Bedrock	Bedrock was encountered at depths ranging from 10 to 12.5 mbgs based on available well records.	MECP Well Records, ERIS report
Inferred Near Surface Groundwater Flow	Based on the Project Area and APU Study Area topography, the inferred direction of shallow groundwater is southeast towards the St. Lawrence River, which is 3 km southeast of the Project Area. Buried utilities and other underground structures can affect local (shallow) groundwater flow conditions. Inferred groundwater flow directions are subject to confirmation with field measurements.	Toporama, site reconnaissance
Depth to Groundwater	Depths to groundwater ranged from 0.2 to 1.1 mbgs based on available well records.	ERIS report

3.5.3 Fill Materials

Topic	Conditions	Comment / Source
Fill Materials	Fill materials were not observed on the Project Area during the site reconnaissance. Fill materials may have been used during construction of the roadways within the Project Area.	Site reconnaissance

3.5.4 Water Bodies, Areas of Natural Significance, and Groundwater Information

Topic	Conditions	Comment / Source
Nearest Open Water Body	An unnamed creek runs through the western portion of the Project Area and continues to the southeast where it drains into the St. Lawrence River. The St. Lawrence River is 3 km southeast of the Project Area.	Site reconnaissance, Toporama
Areas of Natural Significance (ANSI)	Not present.	Ministry of Natural Resources and Forestry, Make a Map: Natural Heritage Areas

Topic	Conditions	Comment / Source
Provincial Parks or Conservation Reserves	Not present.	Ministry of Natural Resources and Forestry, Make a Map: Natural Heritage Areas
Provincially Significant Wetlands or Designated Wilderness Areas	Not present. The wetland and woodland areas present in the east and northwest portions of the APU Study Area are unnamed.	Ministry of Natural Resources and Forestry, Make a Map: Natural Heritage Areas
Environmentally Significant Areas per Municipal Official Plan(s)	Not present.	Township of South Glengarry's Zoning Schedule – South Charlotteburgh Township
Areas Designated Under the Niagara Escarpment Plan or the Oak Ridges Moraine Conservation Plan	Not present.	Oak Ridges Moraine Groundwater Program Mapping Portal; MECP Source Protection Information Atlas
Threatened or Endangered Species Habitat	Gray Fox, Little Brown Myotis, Northern Myotis, American Ginseng, Butternut, Eastern Prairie Fringed Orchid were identified as threatened and endangered species and plants within 1 km of the Study Area. Endangered birds including Bank Swallow, Barn Swallow, Black Tern, Bobolink, Warbler, may be within the Study Area.	Terrestrial Ecosystem Existing Conditions and Impact Assessment Report, WSP (2024)
Wellhead Protection Areas	The Project Area and APU Study Area are not located within a well-head protection area or other area identified by a municipality in its official plan for the protection of ground water.	MECP Source Protection Information Atlas
Municipal Drinking Water Distribution Systems	Based on the ERIS report, some wells within the APU Study Area were installed for domestic and public supply purposes. Utility plans were not provided to WSP for review.	ERIS report

3.5.5 Well Records

Topic	Conditions	Comment / Source
Wells (location, stratigraphy of the overburden, from ground surface to bedrock, depth to bedrock, depth to water table)	Seven well records were reported in the ERIS report. Based on available information, stratigraphy was generally comprised of silty clay with sand and gravel, then clayey silt to clay. Wells were installed for domestic, public supply, and monitoring purposes to depths ranging from 9.1 to 21.9 mbgs, between 1965 to 2021. Static water levels ranged from 0.2 to 1.1 mbgs.	ERIS report

4.0 INTERVIEWS

Interviews were not conducted as part of this investigation as the Project Area is comprised of a municipal roadway with no buildings. Therefore, it is the QP's opinion that it is not necessary to complete the interview component to meet the objectives of the APU.

5.0 SITE RECONNAISSANCE

5.1 Description of the Assessment

The description of the assessment and reconnaissance are documented throughout this Section 5.0 with identified APECs further discussed in Section 6.0. Photographs of relevant features noted during the site reconnaissance are provided in Appendix C.

Criterion	Information
Date and Time of Assessment	August 1, 2024, from 12:15 to 1:30 pm
Weather Conditions	Sunny, 27°C
Whether the facility was operating at the time of the investigation, where the project area is an enhanced investigation property that is currently being used for a use specified in clause 32 (1) (b) of O. Reg. 153/04	The Project Area operates as a municipal roadway. Based on the use of the Project Area, it is not considered an enhanced investigation property. Residential and agricultural properties were primarily situated on surrounding properties. One industrial property (waste disposal site) is located in the southwestern portion of the APU Study Area.
Access Limitations	N/A
Name and Qualifications of Assessor	The site reconnaissance was conducted by Sam Olthof and Catherine Knoll under the general supervision of the QP. Qualifications are outlined in Section 8.0.

5.2 Specific Observations at the Project Area

The specific observations made during the Site reconnaissance are presented in the following sections.

Topic	Observations
Structures	
Number and Age of Buildings on the Site	None observed.
General Descriptions of Each Building (including improvements)	N/A
Building Areas	N/A
Number of Floors (include all levels, whether above or below ground)	N/A
Number, Age, and Depth of Levels Below Ground Level	N/A

Topic	Observations
Number and Details of all ASTs	None observed on Project Area or within the Study Area
Number and Details of all USTs	None observed on Project Area or within the Study Area
Utilities	
Potable and Non-Potable Water Sources	None observed on Project Area. Evidence of connections to the municipal water system were not observed in the Study Area.
Utility Lines Present (i.e., Electrical, Natural Gas, other)	Buried utilities are likely present under the Project Area. Overhead lines were not observed along the Project Area, however, were observed throughout the APU Study Area.
Sanitary/Process Wastewater Receptor	No process wastewater is anticipated to be generated at the Project Area.
Sanitary Sewer Connection	None observed.
Septic Systems	None observed.
Storm Water Flow	Drainage ditches are present throughout the Study Area on the north and south of Lapierre Road, and along Fraser Road.
Storm Sewer Connection	Ditches were observed alongside the roadways in the Project Area and APU Study Area.
Interior of Structures	
Entry and Exit Points for Site Buildings	N/A
Existing and Former Heating System(s) (include fuel type / source)	N/A
Existing and Former Cooling System(s) (include fuel type / source)	N/A
Drains, Pits, and Sumps (include current use, if any, and former use)	N/A
Unidentified Substances	N/A
Floor Stains or Corrosion Located near a Potential Discharge Location	N/A
Miscellaneous	
Location of any Current and Former Wells	None observed on Project Area or within the APU Study Area.
Ground Cover (i.e., grass, gravel, soil, or pavement, etc.)	The Project Area is comprised of paved asphalt road and paved shoulders along Highway 401 and paved asphalt roads along Fraser Road

Topic	Observations
Current or Former Railway Lines or Spurs	None observed on Project Area however a railway line was observed running parallel to Highway 401, approximately 50 m north of the Project Area.
Presence of Stained Soil, Vegetation, or Pavement	None observed in the Project Area or Study Area.
Presence of Stressed Vegetation	None observed in the Project Area or Study Area.
Areas Where Fill and/or Debris Materials Appear to Have Been Placed	Given the age of the municipal roadways present in the Project Area (i.e., since at least 1963), it is inferred that the fill material of unknown quality was imported to construct the roadways. No fill piles or debris were observed on the Project Area during the site reconnaissance.
Potentially Contaminating Activity	No fill piles or debris was observed on the Project Area during the site reconnaissance; however, it is inferred that fill material of unknown quality was imported to construct the roadways. The Project Area contains municipal roadways. Though not observed during the site reconnaissance, it is inferred that de-icing substances are likely applied in the winter months to the roadways to limit snow and ice formation on surfaces that are used for vehicular and pedestrian traffic.
Unidentified Substances	No unidentified substances were observed.

5.3 Observations Within APU Study Area

During the site reconnaissance, a visual reconnaissance of the outdoor operations in the APU Study Area was carried out from the Project Area and publicly accessible areas.

The surrounding properties include residential, industrial, and agricultural, as presented in Figure 1.

North (cross to upgradient): Fraser Road, Raisin River Road, residential properties, agricultural land uses, railway track. The rail line was observed running parallel to Highway 401, approximately 50 m north of the Project Area, with a trackside transformer present. No staining and other evidence of leaks were observed near the transformer. Ditches were observed north of Highway 401. A creek was observed running along Lapierre Road.

East (cross to downgradient): Residential properties and agricultural land uses.

West (up to cross-gradient): Residential properties, industrial land use (waste disposal site), and agricultural land uses.

South (down to cross-gradient): Residential properties and agricultural land uses. Ditches were observed south of Highway 401 and along Fraser Road.

6.0 REVIEW AND EVALUATION OF INFORMATION

6.1 Current and Past Uses of the Project Area

The following summarizes the current and past uses of the Project Area:

Year	Name of Owner	Description of Property Use	Property Use	Other Observations from Aerial Photographs, Fire Insurance Plans, etc.
Pre-1958	Unknown	Vacant and/or agricultural	Agricultural and/or other use	It is assumed the land was vacant or used for agricultural purposes prior to 1958.
1958 - Present	MTO	Roadway	Community use	Based on further clarifications from MTO, the Project Area was constructed in 1958. Based on the 1963 aerial photograph, the Project Area was observed as a roadway. Since 1963, the Project Area has continuously been used as a roadway and has not appeared to change use since.

6.2 Potentially Contaminating Activity

Any PCA in the Project Area or Study Area may contribute to an APEC and may require further investigation through a soil sampling and characterization program. The following PCAs were identified in the Project Area or in the Study Area:

Location	Potentially Contaminating Activity	Figure ID	Information Source	Rationale for Potential Contribution of the PCA to an APEC
Project Area	30. Importation of Fill Material of Unknown Quality. It is inferred that fill material was used during the construction of the roadways in the Project Area.	1	Aerial photographs	The PCA is located in the Project Area and must be identified as an APEC (**APEC 1**).
	N/A. Seasonal De-icing Activities. It is assumed de-icing substances are applied on surfaces in the Project Area and surrounding area during winter months for the safety of vehicular or pedestrian traffic under conditions of snow or ice or both.	2	Site reconnaissance	The PCA is located on the Project Area and must be identified as an APEC (**APEC 2**).
	N/A. Spills. In April 2022, a motor vehicle was reported to spill an unknown amount of coolant along the westbound Highway 401 lane, about 100 m west of Fraser Road causing minor environmental impacts.	3	ERIS report	The PCA is located on the Project Area and must be identified as an APEC (**APEC 3**).

Location	Potentially Contaminating Activity	Figure ID	Information Source	Rationale for Potential Contribution of the PCA to an APEC
	40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications. WSP was informed by the Area Maintenance Contractor for MTO that weed spraying was occurring within the Project limits on July 31 and August 1, 2024.	4	Site reconnaissance	The PCA is located on the Project Area and must be identified as an APEC (**APEC 4**).
APU Study Area	58. Waste Disposal and Waste Management, including thermal treatment, landfilling and transfer of waste, other than use of biosoils as soil conditioners. A waste disposal site for hauled sewage was reported for [redacted] approximately 200 m southwest of the Project Area. An ECA was dated October 2021.	5	ERIS report	Due to the distance and location cross-gradient of the Project Area, it is not considered to contribute to an APEC.
	46. Rail Yards, Tracks and Spurs. Railway tracks were observed in the northern portion of the Study Area, 50 m north of the Project Area.	6	Site reconnaissance, aerial photographs	Due to the proximity and upgradient location to the Project Area, it is considered to contribute to an APEC (**APEC 5**).
	55. Transformer Manufacturing, Processing and Use. A railway trackside transformer was observed approximately 45 m north of the Project Area.	7	Site reconnaissance	Based on observations during the site reconnaissance (no staining) and contaminants associated with this PCA do not usually migrate through groundwater, it is not considered to contribute to an APEC.

6.3 Areas of Potential Environmental Concern

A summary of the APECs identified at the Project Area is provided in the following table. The APEC locations are presented in Figure 2.

Area of Potential Environmental Concern[1]	Location of APEC on Project Area	Potentially Contaminating Activity[2]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted
APEC 1 – It is inferred that fill material of unknown quality was used during the construction of the roadways in the Project Area.	Entirety of Project Area	30. Importation of Fill Material of Unknown Quality.	On-Site	Metals, hydride forming metals, PHCs, BTEX, PAHs	Soil
APEC 2 – It is assumed de-icing substances are applied on surfaces in the Project Area and surrounding area during winter months for the safety of vehicular or pedestrian traffic under conditions of snow and/or ice.	Entirety of Project Area	N/A. Seasonal De-icing Activities.	On-Site	EC and SAR	Soil
APEC 3 - In April 2022, a motor vehicle was reported to spill an unknown amount of coolant along the westbound Highway 401 lane, about 100 m west of Fraser Road causing minor environmental impacts.	West-central portion of Project Area	N/A. Spills	On-Site	PHCs and BTEX	Soil
APEC 4 – WSP was informed by the Area Maintenance Contractor for MTO that weed spraying was occurring within the Project limits on July 31 and August 1, 2024.	Eastern to western portions of Project Area along Highway 401	40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications.	On-Site	OC pesticides	Soil
APEC 5 – Railway tracks were observed in the northern portion of the	Northern portion of Project Area	46. Rail Yards, Tracks and Spurs	Off-Site	Metals, hydride forming metals, PAHs	Soil

Area of Potential Environmental Concern[1]	Location of APEC on Project Area	Potentially Contaminating Activity[2]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted
Study Area, 50 m north of the Project Area.	along Fraser Road				

Notes

1 Area of potential environmental concern means the area on, in or under a property where one or more contaminants are potentially present, as determined through the APU, including through, •(a) identification of past or present uses on, in or under the Project Area, and •(b) identification of PCA.
2 Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a study area.
3 Contaminants of potential concern specified using the method groups as identified in the "Protocol for analytical methods used in the assessment of properties under Part XV.1 of the Environmental Protection Act and excess soil quality, March 9, 2004, amended as of July 1, 2011, and February 19, 2021.

BTEX – Benzene, toluene, ethylbenzene, xylenes
EC – Electrical conductivity
Metals and hydride forming metals - antimony, arsenic, barium, beryllium, boron total, cadmium, chromium total, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc
OC – organochlorine
PAH – Polycyclic aromatic hydrocarbons
PHC – Petroleum hydrocarbon fractions F1 to F4
SAR – Soil absorption ratio

6.4 Conceptual Site Model

The following key features are presented in Figure 1:

- Existing buildings and structures;
- Water bodies located in the APU Study Area;
- Drinking water wells in the Project Area;
- Roads (including names) within the Study Area;
- Uses of properties adjacent to the Project Area; and
- Location of identified PCAs in the APU Study Area (including any storage tanks).

The following describes the CSM for the Site based on the information obtained and reviewed as part of this APU:

- The Project Area consists of an approximately 1.1 km stretch of Highway 401 from 0.55 km west to 0.55 km east of the Fraser Road highway underpass, and approximately 0.5 km of Fraser Road from 0.3 km north to 0.2 km south of Highway 401. No buildings or structures were noted in the Project Area.
- Based on the aerial photographs, the Project Area was a roadway since at least 1963 and has not appeared to change use since. Based on further clarifications from MTO, the Project Area was constructed in 1958. Accordingly, the first developed use of the Project Area was community use (roadway) in 1958. There are no indications that the Project Area was used for an industrial use or any of the following commercial uses: vehicle garage, bulk liquid dispensing facility, or dry-cleaning facility.
- The surrounding properties include residential, industrial, and agricultural uses.

- Depth to groundwater within the APU Study Area was approximately 0.2 to 1.1 mbgs based on the ERIS report.
- Soil within the Project Area and APU Study Area is primarily sand, gravel, minor silt and clay deltaic deposits. Bedrock is described as limestone, dolostone, shale, arkose and sandstone. Bedrock was encountered at depths ranging from 10 to 12.5 mbgs based on available well records.
- Based on the Project Area and APU Study Area topography, the inferred direction of shallow groundwater is southeast towards the St. Lawrence River, which is south of the Project Area. Buried utilities and other underground structures can affect local (shallow) groundwater flow conditions. Inferred groundwater flow directions are subject to confirmation with subsurface field investigations.
- The following relevant PCAs contributing to APECs and the associated COPCs were identified on the Project Area or in the Study Area:

Area of Potential Environmental Concern[1]	Location of APEC on Project Area	Potentially Contaminating Activity[2]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted
APEC 1 – It is inferred that fill material of unknown quality was used during the construction of the roadways in the Project Area.	Entirety of Project Area	30. Importation of Fill Material of Unknown Quality.	On-Site	Metals, hydride forming metals, PHCs, BTEX, PAHs	Soil
APEC 2 – It is assumed de-icing substances are applied on surfaces in the Project Area and surrounding area during winter months for the safety of vehicular or pedestrian traffic under conditions of snow and/or ice.	Entirety of Project Area	N/A. Seasonal De-icing Activities.	On-Site	EC and SAR	Soil
APEC 3 - In April 2022, a motor vehicle was reported to spill an unknown amount of coolant along the westbound Highway 401 lane, about 100 m west of Fraser Road causing minor environmental impacts.	West-central portion of Project Area	N/A. Spills	On-Site	PHCs and BTEX	Soil
APEC 4 – WSP was informed by the Area Maintenance Contractor for MTO that weed	Eastern to western portions of Project Area	40. Pesticides (including Herbicides, Fungicides and	On-Site	OC pesticides	Soil

Area of Potential Environmental Concern[1]	Location of APEC on Project Area	Potentially Contaminating Activity[2]	Location of PCA (on-Site or off-Site)	Contaminants of Potential Concern[3]	Media Potentially Impacted
spraying was occurring within the Project limits on July 31 and August 1, 2024.	along Highway 401	Anti-Fouling Agents) Manufacturing, Processing, Bulk Storage and Large-Scale Applications.			
APEC 5 – Railway tracks were observed in the northern portion of the Study Area, 50 m north of the Project Area.	Northern portion of Project Area along Fraser Road	46. Rail Yards, Tracks and Spurs	Off-Site	Metals, hydride forming metals, PAHs	Soil

Notes

1 Area of potential environmental concern means the area on, in or under a property where one or more contaminants are potentially present, as determined through the APU, including through, •(a) identification of past or present uses on, in or under the Project Area, and •(b) identification of PCA.
2 Potentially contaminating activity means a use or activity set out in Column A of Table 2 of Schedule D that is occurring or has occurred in a study area.
3 Contaminants of potential concern specified using the method groups as identified in the "Protocol for analytical methods used in the assessment of properties under Part XV.1 of the Environmental Protection Act and excess soil quality, March 9, 2004, amended as of July 1, 2011, and February 19, 2021.

BTEX – Benzene, toluene, ethylbenzene, xylenes
EC – Electrical conductivity
Metals and hydride forming metals - antimony, arsenic, barium, beryllium, boron total, cadmium, chromium total, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc
OC – organochlorine
PAH – Polycyclic aromatic hydrocarbons
PHC – Petroleum hydrocarbon fractions F1 to F4
SAR – Soil absorption ratio

6.4.1 Uncertainty and Absence of Information

Interviews were not conducted as part of this investigation as the Project Area is comprised of municipal roadways with no buildings. Therefore, it is the QP's opinion that it is not necessary to complete the interview component to meet the objectives of the APU.

There were no other material deviations to the APU requirements that would cause uncertainty or absence of information that would affect the validity of the APU CSM or the findings of this APU.

7.0 CONCLUSIONS

The objectives of the APU were to assess for the presence or absence of PCAs within the Project Area or within the surrounding APU Study Area and identify the APECs and COPCs resulting from the identified PCAs. The estimated quantity of excess soil to be generated during construction activities is anticipated to be 2,582 m^3 based on current design estimates.

Based on the available information obtained and reviewed as part of the APU, a total of five APECs were identified in association with the Project Area (Section 6.3). Based on the APECs identified during this

assessment, associated COPCs in soil include concentrations of EC, SAR, metals, hydride-forming metals, PAHs, PHCs, BTEX, and OC pesticides. Where PCBs were identified, it was not carried as a COPC at the contaminant does not usually migrate through groundwater. The summary table of the identified APECs is provided in Section 6.3. Other COPCs may be identified during subsequent subsurface investigations.

Accordingly, the preparation and implementation of an SAP followed by a soil quality assessment program are recommended to meet the general requirements of O. Reg. 406/19 regulatory requirements for excess soil management. It should be noted that many reuse sites in Ontario have established their own procedures and documentation requirements that Project Areas (source sites) must provide prior to the movement/management of excess soils from the source sites into the potential receiving sites. Reuse sites may also have existing instruments that will mandate specific or additional requirements.

8.0 QUALIFICATIONS OF THE ASSESSOR

The site reconnaissance was completed by **Catherine Knoll, E.I.T. and Sam Olthof, BASc, P.Eng.** Catherine is an Environmental Consultant at WSP Canada Inc. and is competent in the execution and supervision of field programs including site remediation, borehole drilling, monitoring well installation, test pitting, and the collection of environmental samples for groundwater, surface water, soil, and sediment, as well as preparing reports for environmental and geo-environmental projects under municipal, provincial and federal jurisdiction. Sam is an Environmental Engineer at WSP Canada Inc. and conducts Environmental Site Assessments and excess soil management projects in accordance with O. Reg. 153/04 and O.Reg. 406/19, respectively, for various private clients, municipalities, and governing bodies including Defense Construction Canada, the Department of National Defense, the City of Ottawa, and Public Services and Procurement Canada.

This report was prepared by **Matthew Hamming**, **B.Tech.**, an Environmental Technician who carries out fieldwork involving groundwater monitoring and sampling, environmental drilling investigations including soil sampling, and geotechnical investigations including rock coring, vein and shelby tube to support infrastructure design. He supports Assessment of Past Uses and Soil Characterization Reports and Phase I/One and II/Two Environmental Site Assessments in accordance with O. Reg. 406/19 and O. Reg.153/04, respectively. Matthew has conducted this work for various private clients, municipalities, and governing bodies including Metrolinx and the Ministry of Transportation Ontario.

The report was reviewed by **Querine Alavata, EPt**, an Environmental Scientist at WSP Canada Inc. Querine conducts Assessment of Past Uses and Soil Characterization Reports and Phase I/One and II/Two Environmental Site Assessments in accordance with O. Reg. 406/19 and O. Reg.153/04, respectively. Her tasks include document research, site visits, interviews, data analysis, report and proposal preparation, as well as coordinating field investigations. Querine has conducted this work for various private clients, municipalities, and governing bodies including the Ministry of Transportation Ontario.

The report was reviewed by **Sarah Murray, P.Geo., QP_{ESA}, PMP**. Sarah Murray is a Project Manager with 16 years' experience working in the Environmental Management Department. Sarah's experience includes completing Phase One and Two Environmental Site Assessments (ESAs) in support of public transportation and infrastructure projects and private developments requiring Record of Site Conditions. Additionally, Sarah has gained extensive experience managing excess soil projects in the role of the Qualified Person for both the Project Leader or reuse site owner. Sarah works with our WSP team to ensure that the excess soil planning documents are completed in full compliance with the excess soil regulation and guidance documents. Sarah is a Qualified Person as per O.Reg. 406/19 and O.Reg.153/04.

9.0 REFERENCES

The following documents and/or data were cited in this report:

Source	Date Accessed or Date of Document
Bedrock Geology of Ontario, Ontario Geological Survey 2011	2011
Natural Resources Canada – Surficial Geology Index Map.	March 11, 2024
Environmental Risk Information Services Report	July 23, 2024
MECP Source Protection Information Atlas (online)	Accessed July 2024
The Atlas of Canada – Toporama	Accessed July 2024
Ministry of the Environment, Conservation and Parks – Map: Well records	Accessed July 2024
Ministry of Natural Resources and Forestry, Make a Map: Natural Heritage Areas on-line database	Accessed July 2024
Terrestrial Ecosystem Existing Conditions and Impact Assessment Report, WSP (2024)	Draft report – November 2024
Aerial Photographs – ERIS and Google Earth	1963, 1980, 1994, 2007, 2016, 2023

10.0 LIMITATIONS AND USE OF REPORT

This report (the Report) was prepared for the exclusive use of MTO for the express purpose of providing advice with respect to the environmental condition of the Project Area. In evaluating the Project Area, WSP has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this Report as a result of omissions, misinterpretations, or fraudulent acts of persons interviewed or contacted, or incomplete or inaccurate historical information from the various agencies. Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, is the sole responsibility of such third party. If a third party requires reliance on this Report, prior written authorization from WSP is required. WSP disclaims any responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The scope and the period of WSP's assessment are described in this Report, and are subject to restrictions, assumptions, and limitations. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within WSP's proposal. Distances noted in this report were determined using mapping data of variable accuracy and should therefore be considered approximate. WSP did not perform a complete assessment of all possible conditions or circumstances that may exist at the Project Area referenced in the Report. Conditions may therefore exist which were not detected given the limited nature of the assessment WSP was retained to undertake with respect to the Project Area and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. WSP's opinions are based upon information available to WSP as of the date of the site reconnaissance. It is understood that the services provided for in the scope of work allowed WSP to form no more than an opinion of the actual conditions at the Project Area at the time of the site reconnaissance and cannot be used to assess the

effect of any subsequent changes in any laws or regulations and the environmental quality of the Project Area or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Project Area is free from any and all contamination from past or current practices.

11.0 CLOSURE

The Qualified Person confirms that the APU was conducted and/or supervised by the Qualified Person and that the findings and conclusions of the APU are included in the report.

In accordance with O. Reg. 406/19 and the Soil Rules, the Qualified Person declares:

1) *That the project leader or operator of the project area have provided the qualified person or an individual supervised by the qualified person with all necessary information and access to the project area and authorized the qualified person or an individual supervised by the qualified person to make any inquiries of the project leader and operator's employees and agents, for the purpose of assisting the qualified person in preparing or overseeing the preparation of the documents.*

2) *That the qualified person has prepared or overseen the preparation of the documents.*

3) *That the documents are complete and accurate and meet the requirements of the regulation and these Soil Rules to the best of the qualified person's knowledge.*

We trust that the information presented in this report meets your current requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Signature Page

WSP Canada Inc.



Matthew Hamming, B.Tech.
Environmental Technician



Querine Alavata, EPt
Environmental Scientist

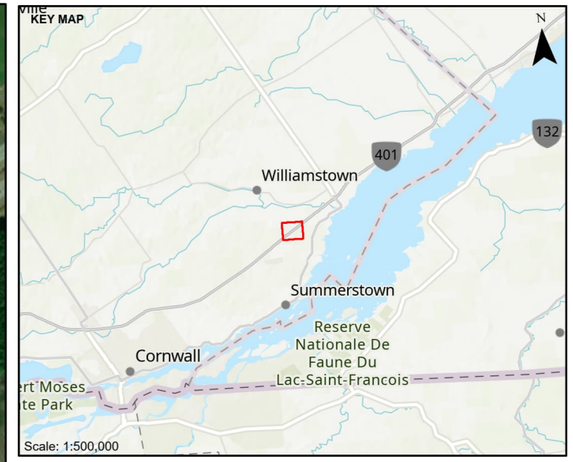


Sarah Murray, P.Geo., QPESA, PMP
Environmental Project Manager

FIGURES



KEY MAP



LEGEND

- WELL RECORD
- INFERRED GROUNDWATER FLOW DIRECTION
- 250 m STUDY AREA
- SITE BOUNDARY

LABEL	PCA	DESCRIPTION
1	30 - IMPORTATION OF FILL MATERIAL OF UNKNOWN QUALITY	IT IS INFERRED THAT FILL MATERIAL WAS USED DURING THE CONSTRUCTION OF THE ROADWAYS IN THE PROJECT AREA.
2	N/A - DEICING MATERIALS	IT IS ASSUMED DE-ICING SUBSTANCES ARE APPLIED ON SURFACES IN THE PROJECT AREA AND SURROUNDING AREA DURING WINTER MONTHS FOR THE SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFIC UNDER CONDITIONS OF SNOW OR ICE OR BOTH.
3	N/A - SPILLS	IN APRIL 2022, A MOTOR VEHICLE WAS REPORTED TO SPILL AN UNKNOWN AMOUNT OF COOLANT ALONG THE WESTBOUND HIGHWAY 401 LANE, ABOUT 100 M WEST OF FRASER ROAD CAUSING MINOR ENVIRONMENTAL IMPACTS.
4	40 - PESTICIDES (INCLUDING HERBICIDES, FUNGICIDES AND ANTI-FOULING AGENTS) MANUFACTURING, PROCESSING, BULK STORAGE AND LARGE-SCALE APPLICATIONS	WSP WAS INFORMED BY MTO THAT WEED SPRAYING WAS OCCURRING WITHIN THE PROJECT LIMITS ON JULY 31 AND AUGUST 1, 2024.
5	58 - WASTE DISPOSAL AND WASTE MANAGEMENT, INCLUDING THERMAL TREATMENT, LANDFILLING AND TRANSFER OF WASTE, OTHER THAN USE OF BIOSOILS AS SOIL CONDITIONERS	A WASTE DISPOSAL SITE FOR HAULED SEWAGE WAS REPORTED FOR [redacted] APPROXIMATELY 200 M SOUTHWEST OF THE PROJECT AREA. AN ECA WAS DATED OCTOBER 2021.
6	46 - RAIL YARDS, TRACKS AND SPURS	RAILWAY TRACKS WERE OBSERVED IN THE NORTHERN PORTION OF THE STUDY AREA, 50 M NORTH OF THE PROJECT AREA.
7	55 - TRANSFORMER MANUFACTURING, PROCESSING AND USE	A RAILWAY TRACKSIDE TRANSFORMER WAS OBSERVED AT THE SOUTHWEST CORNER OF THE INTERSECTING RAILWAY ALONG FRASER ROAD, APPROXIMATELY 45 M NORTH OF THE PROJECT AREA.

DRAFT

0 100 200

1:5,500 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: ESRI, CGIAR, USGS, PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR
3. PROJECTION: NAD 1983 UTM ZONE 18N, TRANSVERSE MERCATOR

CLIENT
MINISTRY OF TRANSPORTATION ONTARIO

PROJECT
ASSESSMENT OF PAST USES, HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

TITLE
CONCEPTUAL SITE MODEL

CONSULTANT

wsp

YYYY-MM-DD	2025-01-22
DESIGNED	MH
PREPARED	LS
REVIEWED	QA
APPROVED	RT

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019704.4282	0001	A	1

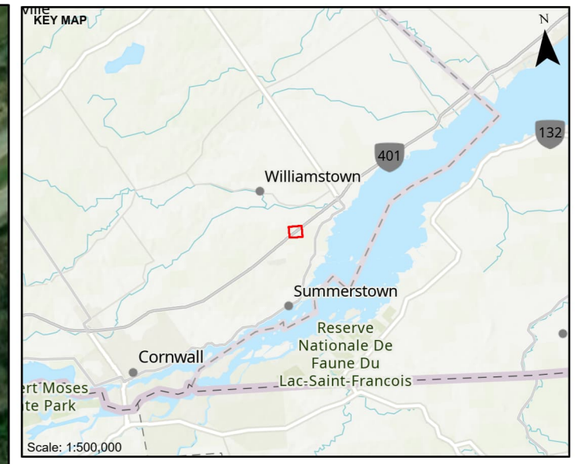
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LEGEND

- APEC 1, 2
- APEC 3
- APEC 4
- APEC 5
- SITE BOUNDARY

APEC	DESCRIPTION
1	IT IS INFERRED THAT FILL MATERIAL OF UNKNOWN QUALITY WAS USED DURING THE CONSTRUCTION OF THE ROADWAYS IN THE PROJECT AREA.
2	IT IS ASSUMED DE-ICING SUBSTANCES ARE APPLIED ON SURFACES IN THE PROJECT AREA AND SURROUNDING AREA DURING WINTER MONTHS FOR THE SAFETY OF VEHICULAR OR PEDESTRIAN TRAFFIC UNDER CONDITIONS OF SNOW AND/OR ICE.
3	IN APRIL 2022, A MOTOR VEHICLE WAS REPORTED TO SPILL A LARGE AMOUNT OF NOS COOLANT TO THE DRY DITCH ALONG THE WESTBOUND HIGHWAY 401 ABOUT 100 METRES WEST OF FRASER ROAD CAUSING MINOR ENVIRONMENTAL IMPACTS.
4	WSP WAS INFORMED BY MTO THAT WEED SPRAYING WAS OCCURRING WITHIN THE PROJECT LIMITS ON JULY 31 AND AUGUST 1, 2024.
5	RAILWAY TRACKS WERE OBSERVED IN THE NORTHERN PORTION OF THE STUDY AREA, 50 M NORTH OF THE PROJECT AREA.

DRAFT

0 100 200

1:3,500 METRES

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: ESRI, NASA, NGA, USGS, PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR, MICROSOFT
3. PROJECTION: NAD 1983 UTM ZONE 18N, TRANSVERSE MERCATOR

CLIENT
MINISTRY OF TRANSPORTATION ONTARIO

PROJECT
ASSESSMENT OF PAST USES, HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

TITLE
AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

CONSULTANT

wsp

YYYY-MM-DD	2025-01-23
DESIGNED	MH
PREPARED	LS
REVIEWED	QA
APPROVED	RT

PROJECT NO.	CONTROL	REV.	FIGURE
CA0019704.4282	0001	A	2

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APPENDIX B

Aerial Photographs

HISTORICAL AERIALS

Project Property: Fraser Road and Highway 401
Fraser Road Structure and Highway 401
South Glengarry ON

Project No: CA0019704.4282, Task 400.404

Requested By: WSP Canada Inc.

Order No: 24073000699

Date Completed: August 02,2024

Aerial Maps included in this report are produced by the sources listed above and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property. ERIS provides no warranty of accuracy or liability. The information contained in this report has been produced using aerial photos listed in above sources by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS'. The maps contained in this report do not purport to be and do not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

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Date	Source	Scale	Comments
2023	Maxar Technologies	10,000	
1994	National Air Photo Library	10,000	
1980	National Air Photo Library	10,000	
1963	National Air Photo Library	10,000	
1940	Decade Coverage Unavailable	10,000	



Year: 2023
Source: MAXAR
Scale: 10,000
Comment:

Address: Fraser Road Structure and Highway 401, South Glengarry, ON
Approx Center: -74.54493321,45.11417717

Order No: 24073000699



Year: 1994
Source: NAPL
Scale: 10,000
Comment:

Address: Fraser Road Structure and Highway 401, South Glengarry, ON
Approx Center: -74.54493321,45.11417717

Order No: 24073000699

ERIS



Year: 1980
Source: NAPL
Scale: 10,000
Comment:

Address: Fraser Road Structure and Highway 401, South Glengarry, ON
Approx Center: -74.54493321,45.11417717

Order No: 24073000699

ERIS



Year: 1963
Source: NAPL
Scale: 10,000
Comment:

Address: Fraser Road Structure and Highway 401, South Glengarry, ON
Approx Center: -74.54493321,45.11417717

Order No: 24073000699

ERIS

APPENDIX C

Site Photographs



Photo 1: Highway 401 from Fraser Road overpass, facing east.



Photo 2: Highway 401 eastbound lane, facing east. Fraser Road overpass in background.



Photo 3: Fraser Road and Airport Road intersection, facing north towards Project Area. Agricultural land use in background.



Photo 4: Railway track and railway trackside transformer in northern Study Area, facing west.



Photo 5: Northern Project Area along Fraser Road, facing south. Lapierre Road intersection and agricultural land use observed in the background.



Photo 6: Railway tracks observed intersecting east to west across Fraser Road in northern Study Area.



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APPENDIX E

Hydrogeological Study in Support of a Groundwater Taking

REPORT

Hydrogeological Study in Support of a Groundwater Taking

Agreement #4023-E-003 - Work Item #3 - GWP 4248-15-00 - Fraser Road Underpass (Site MTO GEOCRES No. 31G02-001) Replacement, Township of South Glengarry

Submitted to:

Ministry of Transportation Ontario

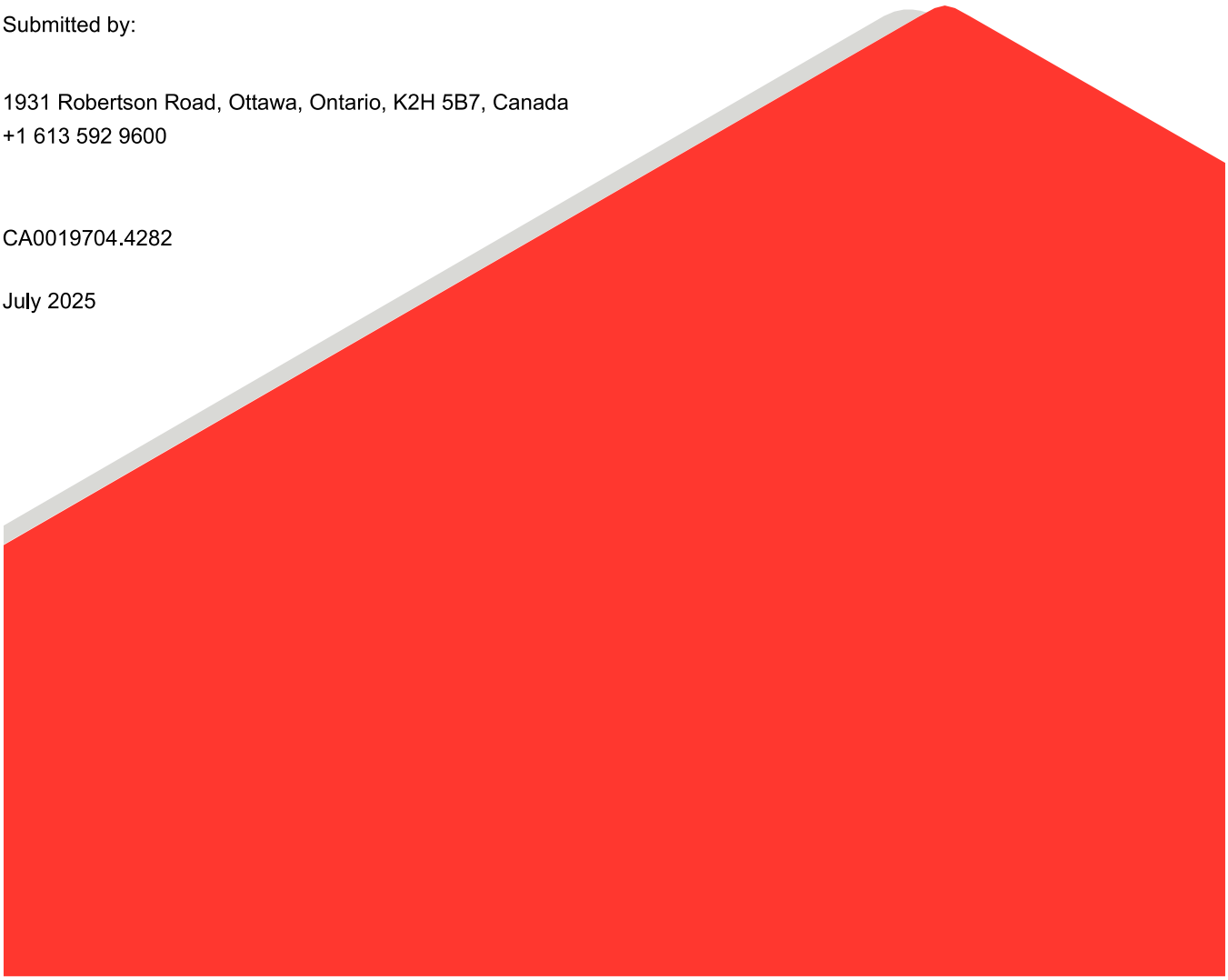
1355 John Counter Boulevard, Kingston, Ontario K7K 0E5

Submitted by:

1931 Robertson Road, Ottawa, Ontario, K2H 5B7, Canada
+1 613 592 9600

CA0019704.4282

July 2025



Distribution List

1 E-Copy - Ministry of Transportation Ontario

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Figure 4 – Bedrock Geology

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APPENDIX D
Groundwater Inflow Analyses

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Water Supply Wells Information

1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation Ontario (MTO) to prepare a hydrogeological assessment to support a registration on the Environmental Activity Sector Registry (EASR) associated with the Municipal Class EA for the Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) located within Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Raisins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario.

The purpose of this assessment is to summarize the hydrogeological information relevant to the proposed temporary dewatering. Temporary construction water taking greater than 50,000 L/day is not expected and therefore the water taking is not required to be registered on the Ministry of the Environment, Conservation, and Parks (MECP) EASR.

1.1 Description of Site and Project

The project limit is presented on Figure 1 and is summarized as follows:

- Highway 401 and Fraser Road Underpass, from Raisin River Road to Airport Road (660 metres).

The proposed work consists of the replacement of the existing pier, and existing abutments. Potentially, excavation below the current groundwater elevation for the construction of the new structures will be required, resulting in a requirement for groundwater control measures (i.e., temporary dewatering).

2.0 INVESTIGATION OF SUBSURFACE CONDITIONS

2.1 Site Stratigraphy Overview

Published geological maps of surficial geology, drift thickness and bedrock geology within the vicinity of the project limits were reviewed and are presented on Figures 2, 3, and 4, respectively. Published surficial geology mapping (Figure 2) indicates the surficial geology within the project limits is predominately composed of coarse textured glaciomarine deltaic deposits of sand, gravel with silt and clay. Published drift thickness mapping (Figure 3) indicates the depth from ground surface to the bedrock surface increases towards the east. The reported depth to bedrock at this site is between 10.8 and 15.3 metres (WSP 2024 - Report Number 22513877A). Bedrock within the project limits consists of limestone with minor shales in the upper part of the Bobcaygeon Formation (Figure 4).

In 2018, Golder Associates Ltd. (Golder; now WSP Canada Inc.) carried out a preliminary foundation investigation for the proposed replacement of the Highway 401/Fraser Road underpass. The field investigation included the advancement of five (5) boreholes (including 18-1101, 18-1102, 18-1103, 18-1103A, and 18-1103B), and a monitoring well was installed at borehole 18-1103A.

In 2023, a detailed design subsurface investigation was carried out by WSP Canada Inc. (WSP), and the field investigation included the advancement of eight (8) boreholes (including 22-01A/B, 22-02A/B, 22-03A/B and 22-04A/B), and a monitoring well was installed in boreholes 22-01B, 22-03A and 22-03B.

The borehole logs mentioned above were reviewed for the current assessment (WSP, 2024) and the logs are included in Appendix A.

The subsurface conditions within the project limits within the depth of the investigation were found to consist of asphaltic concrete and pavement structure, or topsoil surface cover, over granular embankment fill underlain by a native soil stratum comprised of silt and sand over a weathered clay crust, over grey silty clay to clay, over granular glacial till, all underlain by limestone bedrock (WSP, 2024).

Soil stratigraphic cross-sections of the Site are presented on drawings 1 to 4 (Appendix A), extracted from the Foundation Investigation and Design Report completed on April 19, 2024 (WSP, 2024 – report number 22513877A).

In general, the results of the field investigations show good agreement with the published data.

Topographic contours in the vicinity of the Site range from approximately 48 to 54 m above sea level (masl). Topographic contours are shown on attached Figure 5. A review of the topography of the subject Site shows that the vicinity of the area is relatively flat and the highest elevation of 56 masl reflects the embankment fill material (Fraser Road surface) of the existing underpass.

2.2 Groundwater Elevations

During the abovementioned field investigations completed by Golder in 2018 and WSP in 2023, several monitoring wells were sealed into boreholes, including 18-1103A, 22-01B, 22-03A and 22-03B. Groundwater levels were measured in the monitoring wells on September 18, 2018, on February 2 and March 7, 2023, and on January 28, 2025. The groundwater levels, measurement dates and selected monitoring well details are presented in the Table 1 below.

Table 1: Summary of Groundwater Elevations

Well ID	Screened Interval	Ground Surface Elevation (masl)	Groundwater Depth (mbgs)	Screen Interval (masl)	Groundwater Elevation (masl)	Date of Measurement
22-01B	Weathered crust / clay	52.9	3.6 3.9	45.5 – 47.0	49.3 49.0	March 7, 2023 January 28, 2025
22-03A	Glacial till / bedrock	52.7	3.7 4.0	39.6 – 41.1	49.0 48.7	March 7, 2023 January 28, 2025
22-03B	Inferred topsoil / inferred silt / weathered crust	52.7	3.3 3.6	47.2 – 48.7	49.4 49.1	March 7, 2023 January 28, 2025
18-1103A	Glacial till (silty sand)	53.1	6.1 4.1 4.0 4.3	42.4 – 43.9	47.0 49.0 49.1 48.8	Sep. 18, 2018 Feb. 2, 2023 March 7, 2023 January 28, 2025

The groundwater level measurements collected during the field investigations indicated that the depth to the water table ranged from 3.3 to 6.1 metres below ground surface. Groundwater levels are expected to fluctuate seasonally. Higher groundwater levels are expected during wet periods of the year, such as spring.

2.3 Single Well Hydraulic Conductivity Testing

During the 2018 field investigation, a single well response test (i.e., slug tests) was carried out at the monitoring well 18-1103A (Golder, 2019). The results of the slug test were analyzed using the Hvorslev (1951) method to estimate the hydraulic conductivity of the glacial till (WSP, 2024). Based on the single well hydraulic conductivity

test conducted, the estimated hydraulic conductivity of the gravelly silty sand till is 7 x 10^{-5} metres per second (m/s).

A hydraulic conductivity value (K) was estimated from particle size analyses using the Hazen method, which is an empirical relationship where:

$$K = C\ x\ d_{10}^2$$

Where:

C = constant, average value of 1.0, when D is in mm and K is in cm/s;

d_{10} = diameter of the 10th percentile grain size (mm).

The Hazen analysis shows that the hydraulic conductivity value of the silt with some sand and gravel is 9 x 10^{-8} m/sec. The resulting hydraulic conductivity estimates for the tests performed are summarized in the following Table 2.

Table 2: Summary of Hydraulic Conductivity Values

Well ID	Screened Geological Unit(s)	Top of Test Interval (mbgs)	Bottom of Test Interval (mbgs)	Hydraulic Conductivity (m/s)
BH18-1103A	Gravelly silty sand (till)	9.2	10.7	Hvorslev: 7 x 10^{-5}
BH22-03A	Silt with some sand and gravel	4.5	4.8	Hazen: 9 x 10^{-8}

A review of available geotechnical data found that boreholes within the Site encountered a gravelly silty sand till deposit (0.9 metres thick) underlying thick deposits of cohesive weathered clay/unweathered grey clay with thickness varying from 2.7 to 7.7 metres (WSP 2024). The gravelly silty sand till deposit was hydraulically tested at BH18-1103A in September 2018, showing a higher permeability than the silt to silty sand deposits that overlies the clay deposits. Based on the available preliminary design plan (WSP 2024), the gravelly silty sand till deposit will not be reached during the construction of the new structures, and for this reason the hydraulic conductivity of the gravelly silty sand till deposit was not used for the construction dewatering estimates.

For purposes of the construction dewatering assessment, the hydraulic conductivity value of 9 x 10^{-8} m/s was increased by one order of magnitude and 9 x 10^{-7} m/s was assigned for the overburden as a conservative estimate.

2.4 Source Protection Areas

The MECP Source Protection Information Atlas (SPIA) indicates that the site is not within a wellhead protection area (WHPA) with the site within Raisin Region Conservation Authority. The site is also not within a surface water intake protection zone (IPZ), and not within an area identified as significant groundwater recharge area (SGRA), and but it is identified as a highly vulnerable aquifer (HVA) score 6.

A HVA has a relatively fast path for water to travel from the ground surface down to the aquifer. Generally, the faster the water flows through the ground to an aquifer, the more vulnerable the area is to impact or contamination. These aquifers typically occur in areas of coarse or sandy soils with a high groundwater table. The HVA analysis assumes that the vulnerability of an aquifer usually increases as the protection provided by the overlying geological materials decreases. Each vulnerable area is assigned a vulnerability score from 1 to 10, with

a higher score indicating a higher vulnerability. The type and thickness of the material overlying an aquifer is therefore important to a HVA analysis. Since the area studied does not lie within a WHPA, it is unlikely that a hydrological connection exists to an aquifer that is a source of drinking water across the area studied.

The locations of the construction site dewatering fall outside of WHPA-E indicating that groundwater at the site is not contributing source water to a municipal water supply well.

The following Table 3 provides a summary of source water protection areas.

Table 3: Source Water Protection Areas

Source Protection Area:	Raisin Region	**Wellhead Protection Area:**	No	**Wellhead Protection Area E (GUDI):**	No
Intake Protection Zone (IPZ):	No	**Issue Contributing Area:**	No	**Significant Groundwater Recharge Area (SGRA):**	No
Highly Vulnerable Aquifer (HVA):	Yes, score 6	**Event Based Area:**	No	**Intake Protection Zone Q (IPZ-Q):**	No
Wellhead Protection Area Q1 (WHPA-Q1):	No	**Wellhead Protection Area Q2 (WHPA-Q2):**	No		

Based on the Source Water Protection Threats (SWPT, 2021), there are chemical threats with moderate and low risk for HVA score 6, and there are no threats for pathogens HVA score 6. The moderate risks include Landfilling (Hazardous Waste or LIW), Landfilling (Municipal Waste), LIW Injection into a well, Transfer/Processing Site – Hazardous Waste or LIW, and Transfer/Processing Site – Municipal Waste (SWPT, 2021).

There are 44 low risk threats listed in attached Appendix B. Most of these are not considered applicable given the nature of the area / project and the small area of the WHPA-D score 6 and HVA score 6. However, the following two may be appliable depending on construction activities and ongoing road maintenance; Fuel – Handling and Storage and Road Salt – Application. If fuel is to be stored in these areas, the threat must be reviewed, and applicable requirements adhered to. If salt is to be applied to the roads in this area, the threat must be reviewed, and applicable environmental protection requirements adhered to.

2.5 Groundwater Quality

To assess the suitability for discharge of pumped groundwater during construction activities to the local sanitary or storm sewer during dewatering activities, one (1) groundwater sample was collected from well 18-1103A on January 28, 2025. Prior to collection of the samples, approximately three (3) standing well volumes of groundwater were purged from the well. The samples were collected unfiltered and placed into laboratory-supplied vials and/or bottles containing analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling.

The groundwater samples were submitted to an independent laboratory, Eurofins Environmental Testing (Eurofins), in Ottawa, Ontario, for analysis of parameters listed in the City of Cornwall by-law 103-2003 and in the Provincial Water Quality Objectives (PWQO). Eurofins is a laboratory certified by the Canadian Association for Laboratory Accreditation Inc. The dissolved metals for the PWQO package were field-filtered.

For the assessment purposes, the analytical results were compared to Table 1 – Limits for Sanitary and Combined Sewers and Table 2 – Limits for Storm Sewer Discharge, and to the PQWO guidelines. A summary of the analytical results and the laboratory Certificate of Analysis (CofA) are enclosed in Appendix C.

The collected groundwater samples from the available well had no exceedances to Table 1 – Limits for Sanitary and Combined Sewers and Table 2 – Limits for Storm Sewer Discharge. When compared against the PWQO criteria the groundwater samples presented exceedances for dissolved cobalt and dissolved iron.

Even though no exceedances were detected for the sewer by-law criteria, sediment control tanks and a physical filtration system are recommended during construction to decrease fines and a subsequent control in total suspended solids (TSS) levels. Groundwater collected during construction can be discharged to the natural environment, however, the discharge will need to be monitored and pre-treated to ensure that it meets the PWQO criteria.

WSP recommends that groundwater is tested by the Contractor for parameters listed in the City of Cornwall sanitary/combined and storm sewer use bylaw and in the PWQO guideline prior to construction.

2.6 Existing Permit to Take Water (PTTW) and Environmental Activity and Sector Registry (EASR) Search

The MECP maintains a database of all active PTTW and EASR items, related to construction dewatering. A review of the MECP PTTW database indicated that there were no active PTTW registrations (issued and revoked/replaced) found within 1 km of the site.

Access environment records were also reviewed for any active construction dewatering EASRs. No records were found for active construction dewatering for properties within 1 km of the site.

3.0 PROPOSED WATER TAKING

Based on the Foundation Investigation and Design Report (WSP, 2024) and given that the adopted groundwater level was of 49.9 masl (refer to Section 3.1), some dewatering for construction of the proposed new abutments is anticipated to be required. The new abutments will be constructed on top of the existing front slope toe berms with the underside of pile cap at about 53.0 masl and the base of the corrugates steel pipes (CSPs) surrounding the integral abutment piles extending to between approximately 49.5 to 50.0 masl (WSP, 2024).

Also indicated by WSP (2024), a new pier (48.3 masl), consisting of a series of caissons, is proposed to be advanced from within the median of Highway 401. Given that the ground surface within the median area of Highway 401 appears to be at approximately 50.5 masl and the top of the proposed caissons at approximately 49.0 masl, it was recommended to have the top of caissons built to a higher elevation closer to the existing ground surface to reduce dewatering needs within the pier area. However, even adopting the recommended design, temporary measures will likely be necessary to reduce groundwater inflows during construction of the caissons (WSP, 2024). Therefore, excavations will likely extend below the water table, and groundwater management will be required for the construction of the new pier. The excavations will be kept dry during

construction by a method to be selected by the contractor. It is anticipated that the required groundwater management will be accomplished by means of submersible pumps within an open excavation.

The groundwater taking rate will depend on many factors including the contractor's schedule and rate of excavation, the size of the excavations, the number of working areas being excavated at one time and the time of year at which the excavations are made. Also, there may be instances where significant volumes of precipitation collect in an open excavation and must be pumped out.

3.1 Groundwater Inflow Estimate

It is anticipated that the groundwater taking rate required to dewater open excavations for the proposed new central pier and new abutments will not vary significantly along the proposed trenches. Groundwater inflow into excavations made within the proposed locations is expected to occur from the silt and sand deposits overlying the clay deposits, which are expected to behave as an aquitard.

For dewatering assessment purposes, it is understood that replacement of the proposed new central pier and new abutments is to be completed using an open cut excavation.

To estimate the highest groundwater taking rate required to complete the proposed work, the equation for groundwater inflow to a linear excavation in an unconfined aquifer (Equation 6.10b in Powers, 2007) was used to estimate the potential rate of groundwater inflow into excavations made at the median area of Highway 401 under the Fraser Road Underpass (i.e., in the vicinity of borehole 18-1102) and at the locations of the new proposed abutments (i.e., in the vicinity of boreholes 22-04A and 18-1103).

For purposes of construction dewatering estimates the following assumptions were made:

- The initial groundwater elevation within the excavated trenches as of 49.9 metres above sea level (masl), which is 0.5 metres higher than the highest groundwater level observed during the field investigation at the monitoring well installed in borehole 22-03B, to account for groundwater fluctuations.
- The groundwater elevation within the excavated trenches will be lowered to 48 masl, which is 0.5 metre lower than the top of the proposed caissons for the new pier and lowered to 49 masl, which is 0.5 metre lower than the bottom of the proposed abutments.
- Groundwater will flow into the excavated trench through the silt to sandy silt and silt and sand deposits which has a hydraulic conductivity of 9×10^{-8} m/s, as estimated from particle size analyses using the Hazen method from borehole 22-03 soil sample. For construction dewatering purposes, the estimated hydraulic conductivity of 9×10^{-8} m/s has been increased by one order of magnitude and 9×10^{-7} m/s was assigned as representative for the silt and sand deposits.
- Excavated trenches will have lengths varying from 12.3 to 16.1 metres and width of 2 metres, for the centre pier, and width of approximately 7 metres, for the north and south abutments (refer to Appendix D for dewatering estimates details).

The assumptions provide a conservative estimate for the groundwater inflow into the proposed excavation areas at Highway 401 and at the new proposed abutments. The results of the analytical model indicate the steady-state rate of groundwater inflow into a single trench for the new pier, new north and south abutments are estimated to be 5,400 litres per day (L/day), 6,100 L/day and 6,500 L/day, respectively, but a factor of safety of 2.5 was applied to the steady state groundwater flow estimates and values of 13,500 L/day, 15,200 L/day and 16,300 L/day, respectively, are recommended. The steady-state flow rates represent the water taking rates required to maintain dry conditions within the open trenches once the trenches and the surrounding subsurface are fully dewatered. Initial rates of

groundwater inflow to the trenches are expected to exceed the steady-state rate. Groundwater inflow calculations are provided in Appendix D.

The amount of precipitation that would fall on the abovementioned open trenches (i.e., new pier, new north and south abutments) over 24 hours during a 10-year-return precipitation event (72 mm, as observed by Environment Canada at the Ottawa International Airport) was calculated to be approximately 1,770 litres, 6,450 litres and 8,110 litres, respectively. Therefore, the proposed water taking volumes of 13,500 L/day, 15,200 L/day and 16,300 L/day are considered sufficient to accommodate precipitation falling within an open excavation.

Considering the proposed temporary dewatering will be completed through the overburden using open cut methods to the proposed depths, the estimated dewatering rate will be under 50,000 L/day (refer to Appendix D). Therefore, under the Ontario Water Resource Act, water taking at the Site will not require a registration under the MECP EASR system.

Efforts should also be implemented to divert surface water, including rainwater, from entering open excavations as these storm water pumping volumes from the excavation are to be included in the daily excavation dewatering rates.

4.0 ASSESSMENT OF POTENTIAL IMPACTS OF PROPOSED WATER TAKINGS

4.1 Radius of Influence of Proposed Groundwater Takings

The radius of influence for the proposed water taking was estimated using the Sichardt and Kyrieleis method as described by Powers (Powers et al., 2007), which estimates radius of influence using the following empirical equation:

$$R_0 = 3000(H - h)\sqrt{K}$$

where R_o is the equivalent radius of influence (metres), H is the initial water level (metres), h is the required drawdown (metres), and K is hydraulic conductivity (metres/second).

For proposed groundwater takings for the replacement of the existing underpass structures (new pier and new abutments), radius of influence of approximately 6.4 metres, 6.1 metres and 6.1 metres, respectively, have been estimated assuming a change in head of 1.9 metres, 0.9 metres and 0.9 metres, respectively, and a hydraulic conductivity of 9.0 x 10^{-7} m/s (as described in Section 2.3).

4.2 Receptor Identification and Potential Impacts

The area surrounding the source of the proposed groundwater taking was assessed for the following potential receptors:

- Surface water and impacts to natural heritage systems;
- Impacts to nearby structures; and
- Water supply wells.

The receptors identified and any potential impacts are described in the sections below.

4.2.1 Impacts to Surface Water and Natural Heritage Systems

Unevaluated wetlands are located adjacent to the Site to the east (Figure 6), and at approximately 200 m west of the Site. Considering the calculated radius of influence of 6.4 metres and 3.6 metres, impacts to the unevaluated wetlands are not expected to be significant. However, it is recommended to assess any impacts to the unevaluated wetlands prior to any dewatering activities.

The nearest Provincially Significant Wetlands (PSW) is located at approximately 1550 m southeast of the Site. No creeks or rivers were identified within the vicinity of the proposed groundwater taking. The closest pond is located at approximately 350 m northeast of the Site.

The estimated radius of influence will have to be refined and impacts to surface water features and natural heritage systems re-evaluated if the design plan changes.

4.2.2 Impacts to Nearby Structures

During the course of dewatering and some time after, settlement can occur in saturated unconsolidated soils within a radius of influence due to dewatering. As a result, neighbouring buildings, utilities and underground structures/infrastructure may be at risk when lowering water levels or depressurizing an aquifer.

Based on the site information gathered during this preliminary hydrogeology assessment, the maximum construction dewatering radius of influence is anticipated to be about 6.5 metres and 3.6 metres from the excavation boundary for the new pier and the new abutments, respectively, considering no cut-off system is in place. Other than the existing underpass structures and potential underground infrastructures, there are no buildings within the estimated radius of influence. A geotechnical engineer should be consulted to determine potential settlement impacts to underground structures and infrastructures from dewatering activities.

4.2.3 Water Supply Wells

The MECP Water Well Information System (WWIS) database was reviewed to identify water wells in the vicinity of the proposed groundwater takings. The water wells reported in the WWIS within 500 metres of the project alignment are displayed on Figure 7. The MECP water well database indicated a total of eleven (11) wells completed within approximately 500 metres of the site. Of the eleven (11) wells identified, six (6) are water supply wells, five (5) are monitoring wells. Well construction details are summarized in Appendix E.

None of the identified water supply wells are located within the estimated radius of influence of the proposed water taking. Based on this assessment, no impacts to groundwater users are expected as a result of the proposed groundwater taking.

5.0 DISCHARGE PLAN

This section provides an overview of the proposed discharge plan for the water pumped from the proposed excavation areas:

- An assessment of the quality and quantity of the water that is expected to be discharged;
- The location of the discharge, if applicable;
- A recommendation of one or more of the methods of transfer or discharge;
- If the recommended method of discharge is to a surface land or to a storm sewer, a statement that the discharge will not cause an adverse effect to the environment;

- If the recommended method of discharge is to a surface land or to a storm sewer, identification of any treatment or control measures required to minimize erosion, flooding, scouring and sedimentation and a statement that addresses the quality of the discharge to ensure that it will not cause an adverse effect on the environment;
- An analysis to determine whether a monitoring plan would be needed to monitor the potential impacts of the discharge and, if needed, a description of the plan and the circumstances in which it would be needed;
- A summary of the qualifications and experience of the person who prepared the discharge report;
- A contingency plan that includes measures to address: potential impacts related to the quality and quantity of the discharge, any failures of recommended treatment or control measures and other site-specific impacts such as flooding. A description of a shutdown protocol should be included if a qualified person assesses that such a protocol is required; and
- All calculations and assumptions used in the preparation of the discharge report must be included in the report.

The groundwater that is pumped during the proposed water taking must be handled appropriately. The contractor will be responsible for discharging the water taken in a manner that does not result in erosion, flooding or siltation. Given that the groundwater samples collected from the available monitoring well satisfied the sanitary/combined and storm sewer use discharge criteria, the pumped groundwater could be discharged to a local sewer. An appropriate discharge agreement with the municipality must be obtained prior to discharging to any sewer system. Even though no exceedances were detected for the sewer by-law criteria, sediment control tanks and a physical filtration system are recommended during construction to decrease fines and a subsequent control in total suspended solids (TSS) levels.

Groundwater collected during construction can be discharged to the natural environment, however, the discharge will need to be monitored and pre-treated to ensure that it meets the PWQO criteria.

It is expected that under the discharge agreement with the municipality, the contractor will be required to implement a groundwater quality sampling program and properly dispose of the pumped water.

6.0 PROPOSED MONITORING AND CONTINGENCY PLAN

Based on the potential impacts to receptors due to the proposed water taking (Section 4.2), monitoring and contingency plans are limited to the unevaluated wetlands, substructures (i.e., infrastructures) and structures of the existing underpass.

6.1 Surface Water Monitoring

Unevaluated wetlands are located adjacent to the Site to the east. Considering the radius of influence of 6.4 meters and 3.6 metres, impacts to the unevaluated wetlands are not expected to be significant.

The estimated radius of influence will have to be refined and impacts to surface water features and natural heritage systems re-evaluated if the design plan changes.

6.2 Discharge Water Monitoring

The rate and daily volume of water pumped from the proposed excavation areas will be measured using a flow meter and controlled using valves as appropriate. The location of discharge, the discharge effluent and a point downstream of the point of discharge (if applicable) should be visually inspected at least once daily to ensure that there are no visible signs of erosion or petroleum hydrocarbon films or sheens present. An inspection log should be kept with daily observations. Field analyses for pH, temperature, conductivity, and turbidity should be conducted periodically (minimum daily). In addition, water quality samples should be collected and analyzed (at an analytical laboratory) to determine water quality changes over the course of the construction dewatering.

6.3 Contingency Plan

Discharge activities will be suspended if:

- Impacts to nearby surface water features are detected;
- Impacts to nearby structures are detected;
- Visible oil or sheen is observed in the discharge water;
- Significant erosion or significant increase in turbidity is observed at the discharge point and cannot be mitigated in a short period of time; or,
- Should a complaint arise in regard to water quality or quantity that can be directly attributed to the water taking or discharge.

Until normal conditions are restored, discharge activities will be postponed. Discharge will only commence (or recommence) once normal conditions are restored, and/or erosion has been mitigated (if applicable).

7.0 SUMMARY AND RECOMMENDATIONS

The following summary and recommendations are provided based on the information reviewed in this report.

- An EASR application for the proposed temporary construction dewatering for an underpass replacement will not be required. The maximum daily water taking volumes at the proposed locations are not anticipated to exceed 50,000 L/day (50 m^3).
- The radius of influence (1.9 m and 0.9 m drawdown) to keep excavations dry is estimated to be 6.4 metres and 6.1 metres for the new pier and new abutments, respectively. Unevaluated wetlands are located adjacent to the Site to the east. Considering the calculated radius of influence, impacts to the unevaluated wetlands and the existing underpass are not expected to be significant; however, it is recommended to assess any potential impacts prior to any dewatering activities.
- The contractor will be responsible for discharging the water taken in a manner that does not result in erosion, flooding or siltation.
- None of the identified water supply wells are located within the estimated radius of influence of the proposed water takings, and based on this assessment, no impacts to groundwater users are expected as a result of the proposed groundwater taking.
- Given that the groundwater samples collected from the available monitoring well satisfied the Sanitary and Combined Sewer and Storm Sewer Discharge Criteria, the pumped groundwater could be discharged to a

sanitary or storm sewer, and an appropriate discharge agreement with the municipality must be obtained prior to discharging to any sewer system.

- When compared against the PWQO criteria the groundwater samples presented exceedances for dissolved cobalt and dissolved iron. Groundwater collected during construction can be discharged to the natural environment, however, the discharge will need to be monitored and pre-treated to ensure that it meets the PWQO criteria.
- It is expected that under the discharge agreement with the municipality, the contractor will be required to implement a groundwater quality sampling program and properly dispose of the pumped water.

8.0 LIMITATIONS

WSP Canada Inc. (“WSP”) prepared this report solely for the use of the intended recipient, Ministry of Transportation Ontario, in accordance with the professional services agreement between the parties. In the event a contract has not been executed, the parties agree that the WSP General Terms for Consultant shall govern their business relationship which was provided to you prior to the preparation of this report.

The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

WSP disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP makes no other representations whatsoever concerning the legal significance of its findings.

The intended recipient is solely responsible for the disclosure of any information contained in this report. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report.

WSP has provided services to the intended recipient in accordance with the professional services agreement between the parties and in a manner consistent with that degree of care, skill and diligence normally provided by members of the same profession performing the same or comparable services in respect of projects of a similar nature in similar circumstances. It is understood and agreed by WSP and the recipient of this report that WSP provides no warranty, express or implied, of any kind. Without limiting the generality of the foregoing, it is agreed and understood by WSP and the recipient of this report that WSP makes no representation or warranty whatsoever as to the sufficiency of its scope of work for the purpose sought by the recipient of this report.

In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

Benchmark and elevations used in this report are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Design recommendations given in this report are applicable only to the project and areas as described in the text and then only if constructed in accordance with the details stated in this report. The comments made in this report on potential construction issues and possible methods are intended only for the guidance of the designer. The

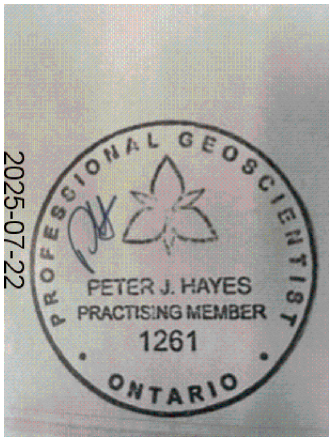
number of testing and/or sampling locations may not be sufficient to determine all the factors that may affect construction methods and costs. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

Overall conditions can only be extrapolated to an undefined limited area around these testing and sampling locations. The conditions that WSP interprets to exist between testing and sampling points may differ from those that actually exist. The accuracy of any extrapolation and interpretation beyond the sampling locations will depend on natural conditions, the history of Site development and changes through construction and other activities. In addition, analysis has been carried out for the identified chemical and physical parameters only, and it should not be inferred that other chemical species or physical conditions are not present. WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site.

The original of this digital file will be kept by WSP for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP, its integrity cannot be assured. As such, WSP does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

This limitations statement is considered an integral part of this report.

Signature Page



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Senior Hydrogeologist

NU/PH/rk

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REFERENCES

Golder Associates Ltd (Golder), 2019, Foundation Investigation and Design, Preliminary Design of Replacement of Fraser Road Underpass, Highway 401, Site No. 31-230, United Counties of Stormont, Dundas and Glengarry, Ontario, GWP 4248-15-00, WP 4290-15-01, (Report No. 22513877A-Fraser).

Powers, J.P. et al, 2007. Construction Dewatering and Groundwater Control: New Methods and Applications. John Wiley & Sons, Inc., 2007.

WSP Canada Inc. (WSP), 2024, Foundation Investigation and Design Report, Replacement of the Highway 401 Underpass at Fraser Road, Site No. 31-230 United Counties of Stormont, Dundas and Glengarry, Ontario, MTO WP 4290-15-01, Agreement No. 4021-E-0021 – Final Report (Report No. 22513877A-Fraser).

Figures



KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- PROPERTY BOUNDARY
- WATERCOURSE
- WATERBODY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR
3. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

CLIENT
MTO

PROJECT
HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
SITE LOCATION

CONSULTANT
wsp

YYYY-MM-DD	2025-07-22
DESIGNED	NU
PREPARED	BR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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FRASER RD

HWY 401

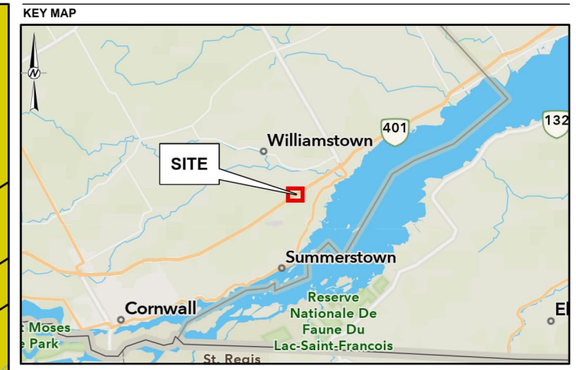
HWY 401

LAPIERRE RD

AIRPORT RD

11a

KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- WATERCOURSE
- WATERBODY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

OGS SURFICIAL GEOLOGY

- 11a. **COARSE-TEXTURED GLACIOMARINE DEPOSITS:** SAND, GRAVEL, MINOR SILT AND CLAY; DELTAIC DEPOSITS

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. ONTARIO GEOLOGICAL SURVEY 2010. SURFICIAL GEOLOGY OF SOUTHERN ONTARIO; ONTARIO GEOLOGICAL SURVEY, MISCELLANEOUS RELEASE--DATA 128-REV
2. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
3. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA
4. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

CLIENT
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HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
SURFICIAL GEOLOGY

CONSULTANT
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APPROVED	----

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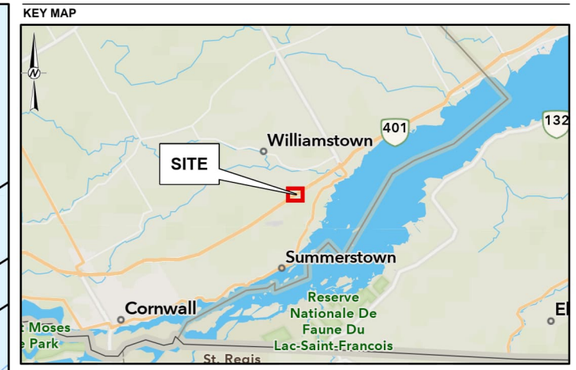
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DIVERSION RD
FRASER RD
HWY 401
HWY 401
LAPIERRE RD
AIRPORT RD

KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- WATERCOURSE

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND
- WATERBODY

OGS TREND IN DEPTH TO BEDROCK

- 5 - 10
- 10 - 15

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. BEDROCK TOPOGRAPHY AND OVERBURDEN THICKNESS MAPPING, SOUTHERN ONTARIO, ONTARIO GEOLOGICAL SURVEY, MISCELLANEOUS RELEASE - DATA 207
2. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
3. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA
4. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

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TITLE
DRIFT THICKNESS

CONSULTANT

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KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- WATERCOURSE

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND
- WATERBODY

OGS BEDROCK GEOLOGY

- 9: BOBCAYGEON FORMATION - LIMESTONE, WITH MINOR SHALES IN UPPER PART

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. ARMSTRONG, D.K. AND DODGE, J.E.P. 2007. PALEOZOIC GEOLOGY OF SOUTHERN ONTARIO; ONTARIO GEOLOGICAL SURVEY, MISCELLANEOUS RELEASE--DATA 219
2. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
3. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA
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HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
BEDROCK GEOLOGY

CONSULTANT
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APPROVED	----

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DIVERSION RD
HWY 401
HWY 401
LAPIERRE RD
AIRPORT RD
FRASER RD

KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- TOPOGRAPHIC CONTOUR, METRES
- PROPERTY BOUNDARY
- WATERCOURSE
- WATERBODY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR
3. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

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PROJECT
HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
TOPOGRAPHY

CONSULTANT

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DIVERSION RD

FRASER RD

HWY 401

HWY 401

LAPIERRE RD

AIRPORT RD

KEY MAP



SCALE: 1:500,000

LEGEND

- STUDY AREA
- BUILDING POINT
- ROADWAY
- RAILWAY
- UTILITY LINE
- PROPERTY BOUNDARY
- WOODED AREA
- WATERCOURSE
- WATERBODY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

0 50 100 200

1:4,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA
3. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

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PROJECT
HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
NATURAL FEATURES

CONSULTANT

wsp

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APPROVED	----

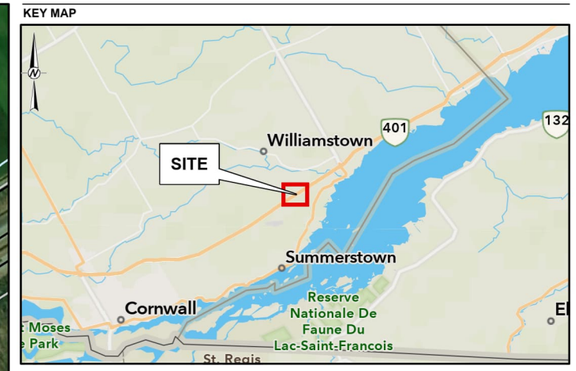
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KEY MAP



SCALE: 1:500,000

LEGEND

- MECP WWIS WATER WELL LOCATION
- 500 METRE BUFFER
- STUDY AREA
- ROADWAY
- RAILWAY
- UTILITY LINE
- PROPERTY BOUNDARY
- WATERCOURSE
- WATERBODY

WETLAND SIGNIFICANCE

- UNEVALUATED WETLAND

0 50 100 200

1:6,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, NRCAN, PARKS CANADA, SDG COUNTIES, MAXAR
3. COORDINATE SYSTEM: NAD 1983 CSRS MTM 8

CLIENT
MTO

PROJECT
HYDROGEOLOGICAL STUDY IN SUPPORT OF A REGISTRATION ON THE ENVIRONMENTAL ACTIVITY SECTOR REGISTRY (EASR) INTERSECTION OF HIGHWAY 401 AND FRASER ROAD, SOUTH GLENGARRY

TITLE
MECP WATER WELL RECORDS (WITHIN 500 METRES)

CONSULTANT

wsp

YYYY-MM-DD	2025-07-22
DESIGNED	NU
PREPARED	BR
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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APPENDIX A

Borehole Logs

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS
MINISTRY OF TRANSPORTATION, ONTARIO

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>200	>8
COBBLES	Not Applicable	75 to 200	3 to 8
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
FINES	Classified by plasticity	<0.075	< (200)

MODIFIERS FOR SECONDARY COMPONENTS[1,2]

Percentage by Mass	Modifier
> 35	Use 'and' to combine primary and secondary component (*i.e.,* SAND and gravel)
> 20 to 35	Primary soil name prefixed with "gravelly, sandy" as applicable
> 10 to 20	some (*i.e.,* some sand)
≤ 10	trace (*i.e.,* trace fines)

1. Only applicable to components not described by Primary Group Name.
2. Classification of Primary Group Name based on Unified Soil Classification System (ASTM D2487) for coarse-grained soils; fine-grained soils described per current MTO Soil Classification System.

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)
An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve friction (f_s) are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); N_d:
The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven or pushed tube sampler – note size
DS	Denison type sample
GS	Grab Sample
MC	Modified California Samples
MS	Modified Shelby (for frozen soil)
RC / SC	Rock core / Soil core
SS	Split spoon sampler – note size
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample
OD / ID	Outer Diameter / Inner Diameter
HSA / SSA	Hollow-Stem Augers / Solid-Stem Augers

SOIL TESTS

w	water content
PL , w_p	plastic limit
LL , w_L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test[1]
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D_R	relative density (specific gravity, Gs)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO_4	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

COARSE-GRAINED SOILS

Compactness[1]

Term	SPT 'N' (blows/0.3m)[2]
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	> 50

3. Definition of compactness terms are based on SPT 'N' ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT 'N' value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT 'N' value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.
4. SPT 'N' in accordance with ASTM D1586, uncorrected for the effects of overburden pressure.

FINE-GRAINED SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N'[1,2] (blows/0.3m)
Very Soft	< 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	> 200	> 30

1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
2. SPT 'N' values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

Unless otherwise stated, the symbols employed in the report are as follows:

I. GENERAL

π	3.1416
ln x	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time
FoS	factor of safety

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta\sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
υ	Poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress = $(\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
U	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
E	void ratio
N	porosity
S	degree of saturation

* Density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

(a) Index Properties (continued)

w	water content
w_l or LL	liquid limit
w_p or PL	plastic limit
I_p or PI	plasticity index = $(w_l - w_p)$
NP	non-plastic
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
c_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c′	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$
2 shear strength = (compressive strength)/2

WEATHERINGS STATE

Fresh: no visible sign of weathering

Faintly weathered: weathering limited to the surface of major discontinuities.

Slightly weathered: penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.

Moderately weathered: weathering extends throughout the rock mass but the rock material is not friable.

Highly weathered: weathering extends throughout rock mass and the rock material is partly friable.

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BEDDING THICKNESS

Description	Bedding Plane Spacing
Very thickly bedded	Greater than 2 m
Thickly bedded	0.6 m to 2 m
Medium bedded	0.2 m to 0.6 m
Thinly bedded	60 mm to 0.2 m
Very thinly bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly laminated	Less than 6 mm

JOINT OR FOLIATION SPACING

Description	Spacing
Very wide	Greater than 3 m
Wide	1 m to 3 m
Moderately close	0.3 m to 1 m
Close	50 mm to 300 mm
Very close	Less than 50 mm

GRAIN SIZE

Term	Size*
Very Coarse Grained	Greater than 60 mm
Coarse Grained	2 mm to 60 mm
Medium Grained	60 microns to 2 mm
Fine Grained	2 microns to 60 microns
Very Fine Grained	Less than 2 microns

Note: * Grains greater than 60 microns diameter are visible to the naked eye.

CORE CONDITION

Total Core Recovery (TCR)

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD)

The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varied from 0% for completely broken core to 100% for core in solid sticks.

DISCONTINUITY DATA

Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

Dip with Respect to Core Axis

The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole a discontinuity with a 90° angle is horizontal.

Description and Notes

An abbreviation description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature of fracture surfaces and infillings are also noted.

Abbreviations

JN	Joint	PL	Planar
FLT	Fault	CU	Curved
SH	Shear	UN	Undulating
VN	Vein	IR	Irregular
FR	Fracture	K	Slickensided
SY	Stylolite	PO	Polished
BD	Bedding	SM	Smooth
FO	Foliation	SR	Slightly Rough
CO	Contact	RO	Rough
AXJ	Axial Joint	VR	Very Rough
KV	Karstic Void		
MB	Mechanical Break		

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS
MINISTRY OF TRANSPORTATION, ONTARIO

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>200	>8
COBBLES	Not Applicable	75 to 200	3 to 8
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
FINES	Classified by plasticity	<0.075	< (200)

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Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N'[1,2] (blows/0.3m)
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Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	> 200	> 30

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σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress = $(\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
U	porewater pressure
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III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
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$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
E	void ratio
N	porosity
S	degree of saturation

* Density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

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I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
c_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c′	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$
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BEDDING THICKNESS

Description	Bedding Plane Spacing
Very thickly bedded	Greater than 2 m
Thickly bedded	0.6 m to 2 m
Medium bedded	0.2 m to 0.6 m
Thinly bedded	60 mm to 0.2 m
Very thinly bedded	20 mm to 60 mm
Laminated	6 mm to 20 mm
Thinly laminated	Less than 6 mm

JOINT OR FOLIATION SPACING

Description	Spacing
Very wide	Greater than 3 m
Wide	1 m to 3 m
Moderately close	0.3 m to 1 m
Close	50 mm to 300 mm
Very close	Less than 50 mm

GRAIN SIZE

Term	Size*
Very Coarse Grained	Greater than 60 mm
Coarse Grained	2 mm to 60 mm
Medium Grained	60 microns to 2 mm
Fine Grained	2 microns to 60 microns
Very Fine Grained	Less than 2 microns

Note: * Grains greater than 60 microns diameter are visible to the naked eye.

CORE CONDITION

Total Core Recovery (TCR)

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

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The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varied from 0% for completely broken core to 100% for core in solid sticks.

DISCONTINUITY DATA

Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

Dip with Respect to Core Axis

The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole a discontinuity with a 90° angle is horizontal.

Description and Notes

An abbreviation description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature of fracture surfaces and infillings are also noted.

Abbreviations

JN	Joint	PL	Planar
FLT	Fault	CU	Curved
SH	Shear	UN	Undulating
VN	Vein	IR	Irregular
FR	Fracture	K	Slickensided
SY	Stylolite	PO	Polished
BD	Bedding	SM	Smooth
FO	Foliation	SR	Slightly Rough
CO	Contact	RO	Rough
AXJ	Axial Joint	VR	Very Rough
KV	Karstic Void		
MB	Mechanical Break		

RECORD OF BOREHOLE No 22-01A

SHEET 1 OF 4 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997614.3; E 222585.9 MTM NAD 83 ZONE 9 (LAT. 45.113720; LONG. -74.544880)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core
DATE February 8, 2023

ORIGINATED BY BW
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
52.9	GROUND SURFACE							
0.0	TOPSOIL							
52.7	Dark brown to black							
0.2	Moist		1	SS	15			
	Gravelly SILTY SAND (SM), with fines of slight plasticity, contains cobbles and boulders (FILL)							
	Brown to Grey							
	Loose to compact		2	SS	7			
	Moist							
			3	SS	23			
			4	SS	21			24 35 (41)
			5	SS	28			22 39 28 11
48.8			6	SS	13			
	TOPSOIL							
4.3	Dark brown to black							
48.3	Moist							0 36 (64)
4.6	SILT (ML) and sand, some plastic fines							
	Moist to wet		7	SS	5			
	SILTY CLAY to CLAY (CI/CH), trace sand, highly fissured, contains thin to thick laminations of silty sand (WEATHERED CRUST)							
	Grey-brown							
	Stiff		8	SS	2			
	W>PL							
46.8								
6.1	CLAY (CH)							
	Grey		9	SS	WH			
	Firm							
	W>PL							
			10	SS	WH			
44.7								
8.2	Gravelly SILTY SAND (SM) (TILL)							
	Loose to compact		11	SS	11			21 43 (36)
	Wet							
			12	SS	10			

ELEVATION SCALE: 52, 51, 50, 49, 48, 47, 46, 45, 44, 43

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × REMOULDED
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
25 50 75

+5.4
+4.0

Continued Next Page

+3, ×3: Numbers refer to Sensitivity
○3% STRAIN AT FAILURE

GTA-MTO 001 S:\CLIENTS\MTO\FRASERROAD\02_DATA\GINT\FRASERROAD.GPJ GAL-GTA.GDT 4/1/24 ZS gtalib.glb

PROJECT 22513877A

RECORD OF BOREHOLE No 22-01A

SHEET 2 OF 4

METRIC

G.W.P. 4290-15-01 LOCATION N 4997614.3; E 222585.9 MTM NAD 83 ZONE 9 (LAT. 45.113720; LONG. -74.544880) ORIGINATED BY BW

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core COMPILED BY NV

DATUM Geodetic DATE February 8, 2023 CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
	Gravelly SILTY SAND (SM) (TILL) Loose to compact Wet		13	SS	5						
42.2											
10.7	SAND (SP) Grey Compact Wet		14	SS	19		42				
41.9											
11.0	Gravelly SILTY SAND (SM), contains cobbles and boulders (TILL) Compact Wet						41				
			15	SS	12				○		
							40				
			16	SS	24		39				
	- Cobbles and boulders from 14.4 m to 15.3 m		17	RC	DD						
							38				
37.6			18	SS	100/0.13						
15.3	LIMESTONE (BEDROCK) Bedrock cored from 15.3 m to 18.9 m For rock coring details see Record of Drillhole 22-01A		1	RC	REC 100%		37				RQD = 99%
			2	RC	REC 99%		36				RQD = 96%
							35				
34.1			3	RC	REC 100%						RQD = 99%
18.9	END OF BOREHOLE										

$+^3$, $\times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

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PROJECT: 22513877A

RECORD OF DRILLHOLE: 22-01A

SHEET 4 OF 4

LOCATION: N 4997614.30 ;E 222585.94

DRILLING DATE: February 8, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME -CC-55 Trackmount

DRILLING CONTRACTOR: Downing

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jcon	WEATHERING INDEX	Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER
		Continued from Record of Borehole 22-01A		37.64															
16	Rotary Drill NQ Core	Fresh thickly laminated, medium bedded, medium grey, fine grained, non-porous, excellent quality, medium strong, nodular LIMESTONE with fresh, thinly laminated to thinly bedded, black, fine grained, non-porous, weak shale		15.27	1														BC
17					2														UCS = 58.7 MPa
18					3														BC BC/LC
				34.06															
19		END OF DRILLHOLE		18.85															
20																			
21																			
22																			
23																			
24																			
25																			

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED:

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RECORD OF BOREHOLE No 22-01B

SHEET 1 OF 1 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997616.0; E 222584.5 MTM NAD 83 ZONE 9 (LAT. 45.113740; LONG. -74.544900)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)
DATE February 9, 2023

ORIGINATED BY RI
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
52.9	GROUND SURFACE							20 40 60 80 100	25 50 75		
0.0	For soil stratigraphy from 0 m to 4.6 m refer to Record of Borehole 22-01A						52				
48.3							51				
4.6	SILTY CLAY to CLAY (CI/CH), trace sand, contains silty sand laminations (WEATHERED CRUST) Grey-brown w>PL		1	TO	PH		50				
			2	TO	PH		49			17.8	CIU
			3	TP	PH		48			15.5	OED
46.5							47			16.1	OED
6.4	CLAY (CH) Grey w>PL		4	TP	PH		46			15.2	CID
			5	TP	PH		45			15.7 15.3	OED OED-LT
45.0			6	TP	PH						
8.1	Gravelly SILTY SAND (SM) (TILL) Grey Wet										
	END OF BOREHOLE										

NOTES:

1. Water level measured in screen at a depth of 3.6 m (Elev. 49.3 m) on March 7, 2023

$+^3$, $\times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-02A

SHEET 1 OF 3 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997592.7; E 222607.2 MTM NAD 83 ZONE 9 (LAT. 45.113530; LONG. -74.544610)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core
DATE January 30, 2023

ORIGINATED BY BW
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
56.0	GROUND SURFACE										
0.0	ASPHALTIC CONCRETE										
55.7											
0.3	SILTY SAND (SM) and gravel (PAVEMENT STRUCTURE) (FILL) Very dense Grey brown Moist		1	SS	71				○		36 51 (13)
55.0							55				
1.0	Gravelly SILTY SAND (SM), with fines of slight plasticity, contains cobbles and boulders (FILL) Very dense to compact Brown Moist		2	SS	30						
			3	SS	67		54				
			4	SS	40				○ H		33 36 21 10
			5	SS	31		53				
			6	SS	39		52				
			7	SS	27		51		○		
			8	SS	29		50				
			9	SS	27				○		26 39 (35)
			10	SS	27	▽	49				
	- cobbles and boulders from 7.6 m to 8.4 m		11	SS	56/0.08						
47.6							48				
8.4	CLAY (CH), trace sand, highly fissured, contains thin laminations of silt and sand (WEATHERED CRUST) Stiff Grey brown w>PL		12	SS	3						0 1 31 68
			13	SS	1		47				
46.2											
9.8							46				

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$+^3$, $\times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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PROJECT 22513877A

RECORD OF BOREHOLE No 22-02A SHEET 2 OF 3 METRIC

G.W.P. 4290-15-01 LOCATION N 4997592.7; E 222607.2 MTM NAD 83 ZONE 9 (LAT. 45.113530; LONG. -74.544610) ORIGINATED BY BW

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core COMPILED BY NV

DATUM Geodetic DATE January 30, 2023 CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
	CLAY (CH) Firm Grey brown w>PL							5.2			
			14	SS	WH		45				0 2 14 84
								4.2			
							44	4.0			
	- Trace sand trace gravel from 12.5 m to 13 m		15	SS	WH						
43.0							43				
13.0	Gravelly SILTY SAND (SM), possible cobble and boulders (TILL) Loose to compact Grey Wet		16	SS	-				○		23 44 (33)
			17	SS	9		42				
			18	SS	18				○		
			19	SS	20		41				
40.0											
16.0	SILTY SAND (SM), some gravel, with fines of slight plasticity, (TILL) Compact to very dense Grey Wet		20	SS	78		40		○		18 37 35 10
			21	SS	25		39		○		
			22	SS	34		38				
	- sand layer from 18.3 m to 18.5 m		23	SS	44				○		19 67 (14)
							37				
			24	SS	19						
36.0							36				

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$+^3$, $\times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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PROJECT 22513877A

RECORD OF BOREHOLE No 22-02A

SHEET 3 OF 3

METRIC

G.W.P. 4290-15-01 LOCATION N 4997592.7; E 222607.2 MTM NAD 83 ZONE 9 (LAT. 45.113530; LONG. -74.544610) ORIGINATED BY BW

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core COMPILED BY NV

DATUM Geodetic DATE January 30, 2023 CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
20.0	SILTY SAND (SM/GM) and GRAVEL, contains cobbles and boulders (TILL) Very Dense Grey wet		25	SS	66				○		38 43 (19)
34.9							35				
21.1	END OF BOREHOLE AUGER REFUSAL ON INFERRED BEDROCK NOTES: 1. Water level measured in open hole at a depth of 7.0 m (Elev. 49.0 m) upon completion of drilling.										

+^{3}, ×^{3}: Numbers refer to Sensitivity ○$^{3\%}$ STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-02B

SHEET 1 OF 2 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997591.9; E 222603.3 MTM NAD 83 ZONE 9 (LAT. 45.113520; LONG. -74.544660)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)
DATE February 1, 2023

ORIGINATED BY RI
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED) 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 25 50 75	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
56.0	GROUND SURFACE										
0.0	For soil stratigraphy from 0 m to 7.3 m refer to Record of Borehole 22-02A										
48.7											
7.3	SILTY SAND (SM) Grey-brown Moist		1	TO	PH						
48.1											
7.9	SILTY CLAY (CI) , trace to some sand, highly fissured (WEATHERED CRUST) Grey-brown w>PL		2	TO	PH					19.0	OED
			3	TP	PH						
46.9											
9.2	CLAY (CH), contains thin laminations of silty sand Grey w>PL		4	TP	PH						

ELEVATION SCALE: 55, 54, 53, 52, 51, 50, 49, 48, 47

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$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-02B

SHEET 2 OF 2 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997591.9; E 222603.3 MTM NAD 83 ZONE 9 (LAT. 45.113520; LONG. -74.544660)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)
DATE February 1, 2023

ORIGINATED BY RI
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---							20 40 60 80 100	25 50 75		
	CLAY (CH), contains thin laminations of silty sand Grey w>PL		5	TP	PH						
			6	TP	PH		45			16.1	OED
			7	TP	PH						
43.8			8	TP	PH		44				
12.3	Gravelly SILTY SAND (SM) (TILL) Grey Wet										
	END OF BOREHOLE										

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-03A

SHEET 1 OF 4

METRIC

PROJECT 22513877A

G.W.P. 4290-15-01

LOCATION N 4997676.2; E 222569.8 MTM NAD 83 ZONE 9 (LAT. 45.114280; LONG. -74.545090)

ORIGINATED BY BW

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core

COMPILED BY NV

DATUM Geodetic

DATE February 10, 2023

CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES
52.7	GROUND SURFACE			
0.0	TOPSOIL			
0.2	Dark brown to black Moist to wet	1	SS	10
	Gravelly SILTY SAND (SM), contains cobbles and boulders (FILL) Very loose to dense Brown to grey Moist	2	SS	1
		3	SS	41
		4	SS	23
		5	SS	46
48.9				
3.8	TOPSOIL Dark brown to black Moist	6	SS	7
48.4				
4.3	SILT (ML), some sand, trace gravel Loose Grey-brown Moist to wet	7	SS	7
47.8				
4.9	CLAY (CH), trace sand, highly fissured (WEATHERED CRUST) Stiff Grey-brown W>PL	8	SS	4
46.6				
6.1	CLAY (CH), trace sand Firm Grey w>PL	9	SS	WH
		10	SS	1
		11	SS	1

GROUND WATER CONDITIONS

ELEVATION SCALE: 52, 51, 50, 49, 48, 47, 46, 45, 44, 43

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH kPa (20 40 60 80 100)

○ UNCONFINED + FIELD VANE

● QUICK TRIAXIAL × REMOULDED

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%) (25 50 75)

+6.1, +5.4, +4.0, +5.4

UNIT WEIGHT γ kN/m³

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
22	39		(39)
1	17	72	10
0	0	26	74

Continued Next Page

+3, ×3: Numbers refer to Sensitivity

○3% STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-03A

SHEET 2 OF 4 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997676.2; E 222569.8 MTM NAD 83 ZONE 9 (LAT. 45.114280; LONG. -74.545090)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core
DATE February 10, 2023

ORIGINATED BY BW
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---				
42.0	CLAY (CH), trace sand Firm Grey w>PL				
10.7 41.4	SILTY CLAY (CI) Firm Grey w>PL	12	SS	1	
11.3 39.9	Gravelly SILTY SAND (SM), contains cobbles and boulders (TILL) Loose to dense Grey Wet	13	SS	7	31 39 (30)
		14	SS	30	
12.8 34.5	LIMESTONE (BEDROCK) Bedrock cored from 12.8 m to 18.2 m For rock coring details see Record of Drillhole 22-03A	1	RC	REC 78%	RQD = 41%
		2	RC	REC 77%	RQD = 56%
		3	RC	REC 100%	RQD = 99%
		4	RC	REC 100%	RQD = 99%
18.2	END OF BOREHOLE				

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH kPa (20 40 60 80 100)
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × REMOULDED
8.1
6.0

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (25 50 75)

UNIT WEIGHT γ kN/m^3

ELEVATION SCALE: 42 41 40 39 38 37 36 35

GROUND WATER CONDITIONS

$+^3$, $\times^3$: Numbers refer to Sensitivity
$\circ^{3\%}$ STRAIN AT FAILURE

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PROJECT: 22513877A

RECORD OF DRILLHOLE: 22-03A

SHEET 4 OF 4

LOCATION: N 4997676.18 ;E 222569.81

DRILLING DATE: February 10, 2023

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME -CC-55 Trackmount

DRILLING CONTRACTOR: Downing

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jcon	WEATHERING INDEX W1	W2	W3	W4	W5	W6	Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER
		Continued from Record of Borehole 22-03A		39.93																				
13	Rotary Drill NQ Core	Slightly weathered, thickly laminated to medium bedded, medium grey, fine grained, non-porous, poor to fair quality, medium strong nodular LIMESTONE with slightly weathered, thinly laminated to thinly bedded, black, fine grained, non-porous, weak shale		12.80	1																			BC/LC
14					2																			BC
15		- Becomes fresh, excellent quality below 14.71 m depth.			3																			BC/LC
16																								BC
17					4																			UCS = 52.6 MPa
18				34.52																				UCS = 59.0 MPa
		END OF DRILLHOLE		18.21																				
19																								
20																								
21																								
22																								

DEPTH SCALE
1 : 50

LOGGED: BW
CHECKED:

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RECORD OF BOREHOLE No 22-03B

SHEET 1 OF 2

METRIC

PROJECT 22513877A

G.W.P. 4290-15-01

DIST Eastern HWY 401

DATUM Geodetic

LOCATION N 4997676.6; E 222571.1 MTM NAD 83 ZONE 9 (LAT. 45.114280; LONG. -74.545080)

BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)

DATE February 12, 2023

ORIGINATED BY RI

COMPILED BY NV

CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
52.7	GROUND SURFACE						
0.0	For soil stratigraphy from 0 m to 4.9 m refer to Record of Borehole 22-03A						
47.8							
4.9	SILTY CLAY to CLAY (CI/CH), trace sand, contains sand to silty sand laminations (Weathered Crust) Grey-brown w>PL		1	TO	PH	16.0	CID
			2	TO	PH	15.4	CID
46.6							
6.1	CLAY (CH), trace to some sand, trace gravel Grey w>PL		3	TP	PH	15.0	OED
			4	TP	PH	15.1	CIU
			5	TP	PH	15.0	OED
			6	TP	PH		
			7	TP	PH	15.1	OED-LT
			8	TP	PH	15.2	OED

GROUND WATER CONDITIONS

ELEVATION SCALE: 52, 51, 50, 49, 48, 47, 46, 45, 44, 43

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: 20 40 60 80 100

○ UNCONFINED + FIELD VANE

● QUICK TRIAXIAL × REMOULDED

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

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$+^3$, $\times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-03B

SHEET 2 OF 2 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997676.6; E 222571.1 MTM NAD 83 ZONE 9 (LAT. 45.114280; LONG. -74.545080)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)
DATE February 12, 2023

ORIGINATED BY RI
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × REMOULDED)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---							20 40 60 80 100	25 50 75		
	CLAY (CH), trace to some sand, trace gravel Grey w>PL		9	TP	PH						
			10	TP	PH		42				
41.7											
11.0	Gravelly SILTY SAND (SM) (TILL) Grey Wet		11	TP	PH						
41.1											
11.6	END OF BOREHOLE										

NOTES:

1. Water level measured in screen at a depth of 3.3 m (Elev. 49.4 m) on March 7, 2023

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-04A

SHEET 1 OF 4

METRIC

PROJECT 22513877A

G.W.P. 4290-15-01 LOCATION N 4997698.0; E 222548.7 MTM NAD 83 ZONE 9 (LAT. 45.114470; LONG. -74.545370) ORIGINATED BY BW

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core COMPILED BY NV

DATUM Geodetic DATE February 3, 2023 CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
55.9	GROUND SURFACE										
0.0	ASPHALTIC CONCRETE										
55.7											
55.5	Gravelly SAND (SP) (Pavement Structure) (FILL) Grey Moist		1	GS							
0.4	Gravelly SILTY SAND (SM), contains cobbles, possible boulders (FILL) Compact to dense Brown to grey brown Moist		2	SS	40		55				
			3	SS	11		54				
			4	SS	27		53				25 44 (31)
			5	SS	40		52				
			6	SS	24					NP	21 34 36 9
			7	SS	35		51				
			8	SS	38		50				21 44 (35)
			9	SS	32		49				
			10	SS	10						
48.3											
7.6	TOPSOIL Dark brown to black Wet		11	SS	12	▽	48				
48.0											
7.9	SILTY SAND (SM) Compact Grey brown Wet										
47.5			12	SS	3		47				
8.4	CLAY (CH), highly weathered fissured (WEATHERED CRUST) Stiff Grey-brown w>PL										
			13	SS	WH						
46.1							46				
9.8											

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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RECORD OF BOREHOLE No 22-04A

SHEET 2 OF 4 **METRIC**

PROJECT 22513877A
G.W.P. 4290-15-01
DIST Eastern HWY 401
DATUM Geodetic

LOCATION N 4997698.0; E 222548.7 MTM NAD 83 ZONE 9 (LAT. 45.114470; LONG. -74.545370)
BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem), NQ Core
DATE February 3, 2023

ORIGINATED BY BW
COMPILED BY NV
CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---				
	CLAY (CH), contains thin laminations of silty sand Stiff to firm Grey with red brown banding w>PL				
		14	SS	PM	0 2 19 79
		15	SS	PM	
42.2					
13.7	CLAY to SILTY CLAY (CH/CI), contains thin laminations of silty sand Firm Grey w>PL	16	SS	PM	0 7 31 62
41.6					
14.3	Gravelly SILTY SAND (SM), with fines of slight plasticity (TILL) Compact to very loose Grey Wet	17	SS	12	
		18	SS	3	23 46 22 9
39.4					
16.5	SAND (SP), fine to medium, trace silt Loose Grey Wet	19	SS	8	
38.8					
17.1	Sandy GRAVEL (GW), trace silt (TILL) Grey Wet				
38.2					
17.7	END OF BOREHOLE	20	SS	100/0.03	

NOTES:

1. Water level measured in open hole at a depth of 7.7 m (Elev. 48.2 m) upon completion of drilling.

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH kPa (20 40 60 80 100)
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × REMOULDED

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (25 50 75)

UNIT WEIGHT γ kN/m^3

ELEVATION SCALE: 45, 44, 43, 42, 41, 40, 39

+^{3}, ×^{3}: Numbers refer to Sensitivity
○$^{3\%}$ STRAIN AT FAILURE

RECORD OF BOREHOLE No 22-04B

SHEET 1 OF 2

METRIC

PROJECT 22513877A

G.W.P. 4290-15-01

LOCATION N 4997699.3; E 222547.9 MTM NAD 83 ZONE 9 (LAT. 45.114480; LONG. -74.545380)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem)

COMPILED BY

DATUM Geodetic

DATE February 7, 2023

CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
55.9	GROUND SURFACE							
0.0	For soil stratigraphy from 0 m to 8.4 m refer to Record of Borehole 22-04A							
47.5								
8.4	CLAY (CH) (WEATHERED CRUST)		1	TO	PH		15.7	OED
			2	TP	PH			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

ELEVATION SCALE: 55 54 53 52 51 50 49 48 47 46

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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PROJECT 22513877A

RECORD OF BOREHOLE No 22-04B

SHEET 2 OF 2

METRIC

G.W.P. 4290-15-01 LOCATION N 4997699.3; E 222547.9 MTM NAD 83 ZONE 9 (LAT. 45.114480; LONG. -74.545380) ORIGINATED BY RI

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Dia. (Hollow Stem) COMPILED BY

DATUM Geodetic DATE February 7, 2023 CHECKED BY KCP

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---							20 40 60 80 100	25 50 75		
	CLAY (CH) (WEATHERED CRUST)		3	TP	PH						
			4	TP	PH		45				
			5	TP	PH						
			6	TP	PH		44			16.0	OED
			7	TP	PH						
	- Coarse sand seams from a depth of 12.8 m to 14.3 m.		8	TP	PH		43				
			9	TP	PH						
41.6							42				
14.3 41.3	SILTY CLAY (CI), some sand, some gravel (TILL)		10	TP	PH						
14.6	END OF BOREHOLE										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

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GOLDER

RECORD OF BOREHOLE No 18-1101

SHEET 1 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997670.5; E 222557.1 NAD MTM ZONE 8 (LAT. 45.114230; LONG. -74.545260)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 4-5, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE
52.8	GROUND SURFACE						
0.0	(SM) Silty sand, contains organic matter (rootlets) (TOPSOIL/FILL) Dark brown Moist		1	SS	48		
0.1	(SM/GM) Silty sand and gravel, contains cobbles and organic matter (FILL) Dense to compact Brown Moist		2	SS	22		52
			3	SS	29		51
			4	SS	16		50
			5	SS	26		
49.0							49
3.8	(ML) Sandy silt, contains organic matter and silty sand seams (wood/rootlets) (TOPSOIL) Dark brown to black Moist		6	SS	19		
48.5							
4.3	(SM) Silty SAND, fine, contains organic matter (rootlets/wood) Compact to loose Grey Moist		7	SS	5	▽	48
48.1							
4.7	(CH) CLAY, trace sand, highly fissured, contains silt and sand seams (WEATHERED CRUST) Very stiff to stiff Grey-brown Moist		8	SS	WH		47
46.7							
6.1	(CH) CLAY Firm Grey Moist		9	TP	PH		46
			10	TP	PH		45
			11	SS	WH		44
43.0							43
9.8							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

UNIT WEIGHT γ kN/m³

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
32	36	26	6

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

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RECORD OF BOREHOLE No 18-1101

SHEET 2 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997670.5; E 222557.1 NAD MTM ZONE 8 (LAT. 45.114230; LONG. -74.545260)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 4-5, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (20 40 60 80 100): ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × REMOULDED	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- *CONTINUED FROM PREVIOUS PAGE* ---										
	(SM) Gravelly Silty SAND (TILL) Loose to compact Grey Wet		12	SS	10						
42.1							42				
10.7	(SP/GP) SAND and GRAVEL, some silt, contains cobbles and boulders (TILL) Compact to very dense Grey to dark grey Wet		13	SS	11				○		33 43 19 5
			14	SS	40		41				
			15	SS	45				○		
			16	SS	118		40				
39.1											
13.7	Limestone (BEDROCK) Bedrock cored from depths 13.7 m to 20.9 m For bedrock coring detail refer to Record of Drillhole 18-1101		1	RC	REC 79%		39				RQD = 78%
			2	RC	REC 81%						RQD = 36%
			3	RC	REC 100%		38			UCS = 32.9 MPa	RQD = 88%
			4	RC	REC 98%		37				RQD = 76%
			5	RC	REC 51%		36				RQD = 10%
			6	RC	REC 90%		35				RQD = 62%
			7	RC	REC 100%		34				RQD = 100%
							33				

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

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GOLDER

RECORD OF BOREHOLE No 18-1101

SHEET 3 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997670.5; E 222557.1 NAD MTM ZONE 8 (LAT. 45.114230; LONG. -74.545260)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 4-5, 2018

CHECKED BY CK

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
31.9	Limestone (BEDROCK) Bedrock cored from depths 13.7 m to 20.9 m For bedrock coring detail refer to Record of Drillhole 18-1101		7	RC	REC 100%		32				RQD = 100%
20.9	END OF BOREHOLE NOTES: 1. Water level in open borehole at a depth of 5.0 m below ground surface (Elev. 47.8), measured during drilling. 2. PVC pipe for VSP installed within borehole following drilling.										

+ ³, × ³: Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

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PROJECT: 1899802-1100

RECORD OF DRILLHOLE: 18-1101

SHEET 4 OF 4

LOCATION: N 4997670.5 ;E 222557.1

DRILLING DATE: September 4-5, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	Jr	Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	WEATHERING INDEX	FEATURES	
		BEDROCK SURFACE		39.10														
		Nodular Limestone (BEDROCK), with fresh, thinly bedded, dark grey to black, fine grained, non-porous, weak shale Fresh Thinly bedded Medium grey Fine grained Non-porous Medium strong - Broken/lost core from 14.27 m to 14.45 m - Vertical joint from 14.61 m to 14.77 m - Broken core from 14.85 m to 14.92 m (with 40 mm clay seam) - Broken core from 15.68 m to 15.72 m (with 25 mm clay seam) - Broken core from 16.25 m to 16.26 m - Broken/lost core from 16.59 m to 16.74 m - Broken core from 17.35 m to 17.36 m - Vertical joint from 17.77 m to 17.92 m - Broken core from 18.14 m to 18.16 m - Broken/lost core from 18.24 m to 18.90 m - Broken/lost core from 18.90 m to 18.95 m (with 10 mm clay seam) - Broken core from 19.02 m to 19.06 m - Vertical joint from 19.06 m to 19.19 m - Broken core from 19.19 m to 19.21 m		13.73	1	100											UCS = 32.9 MPa
					2	0												
					3	0												
					4	0												
					5	0												
					6	0												
					7	0												
	Rotary Drill HQ3 Core			31.95														
		END OF DRILLHOLE		20.88														

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: CK

GTA-RCK 031 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-MISS.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1102

SHEET 1 OF 3

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997639.0; E 222573.6 NAD MTM ZONE 8 (LAT. 45.113940; LONG. -74.545040)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, NQ Core

COMPILED BY ZS

DATUM Geodetic

DATE September 18-19, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
50.6	GROUND SURFACE						
0.0 / 50.4	(SW/GW) Gravelly sand to sandy gravel, angular (FILL)	1	SS	15			25 30 (45)
0.2 / 50.0	Compact, Grey, Moist						
0.6	(ML) Gravelly sandy silt (FILL) Compact, Brown, Moist	2	SS	6			
49.2	(ML) sandy SILT, fine, contains organic matter and silty sand layers (rootlets/wood) (TOPSOIL)						
1.4	Dark brown, Moist	3	SS	9			2 26 (72)
48.3	(ML) Sandy SILT, contains organic matter (rootlets/wood) Loose, Green-grey, Wet						
2.3	(CH) CLAY, trace sand, highly fissured, contains thin to thick laminations of silty sand (WEATHERED CRUST) Stiff, Grey-brown, Moist	4	SS	2	▽		
47.3		5	SS	WH			
3.4	(CH) CLAY, trace sand, trace gravel Firm to soft, Grey, Moist	6	SS	WH			
43.6		7	SS	WH			
7.0 / 43.3	(ML/SM) SILT and SAND, some clay, trace gravel (TILL) Compact, Grey, Wet	8	SS	13			6 48 32 14
7.3	(SM) Gravelly Silty SAND (TILL) Compact, Grey, Wet	9	SS	16			
42.2							
8.4 / 41.6	(SP/GP) SAND and GRAVEL Dense, Grey, Wet	10	SS	47			49 40 (11)
9.0	(SM) Gravelly Silty SAND, contains cobbles and boudlers (TILL) Very dense to loose, Grey, Wet	11	SS	70			

ELEVATION SCALE: 50, 49, 48, 47, 46, 45, 44, 43, 42, 41

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

>96+

Continued Next Page

+ ³, × ³: Numbers refer to Sensitivity

○ 3% STRAIN AT FAILURE

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GOLDER

RECORD OF BOREHOLE No 18-1102 SHEET 2 OF 3 METRIC

PROJECT 1899802-1100
G.W.P. 4248-15-00
DIST Eastern HWY 401
DATUM Geodetic
LOCATION N 4997639.0; E 222573.6 NAD MTM ZONE 8 (LAT. 45.113940; LONG. -74.545040)
BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, NQ Core
DATE September 18-19, 2018
ORIGINATED BY RI
COMPILED BY ZS
CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 25 50 75	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
	(SM) Gravelly Silty SAND, contains cobbles and boudlers (TILL) Very dense to loose Grey Wet		12	SS	32		40	○			
			13	SS	5						
39.2											
11.4	(SP/GP) SAND and GRAVEL, some silt (TILL) Compact to very dense Grey Wet		14	SS	33		39				40 40 15 5
			15	SS	24		38	○			
37.5			~~16~~	~~SS~~	~~50/0.00~~						
13.1	Limestone (BEDROCK)		1	RC	REC 100%						RQD = 60%
	Bedrock cored from depths 13.1 m to 17.8 m For bedrock coring detail refer to Record of Drillhole 18-1102		2	RC	REC 87%		37				RQD = 64%
			3	RC	REC 56%		35				RQD = 25%
			4	RC	REC 81%		34			UCS = 37.0 MPa	RQD = 64%
32.8							33				
17.8	END OF BOREHOLE NOTES: 1. Water level in open borehole at a depth of 2.7 m below ground surface (Elev. 47.9), measured during drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

PROJECT: 1899802-1100

RECORD OF DRILLHOLE: 18-1102

SHEET 3 OF 3

LOCATION: N 4997639.0 ;E 222573.6

DRILLING DATE: September 18-19, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55

DRILLING CONTRACTOR: Downing Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	WEATHERING INDEX	FEATURES	
		BEDROCK SURFACE		37.50														
	ROtary Drill / NQ Core	Limestone (BEDROCK), with slightly weathered to fresh, thinly bedded, dark grey to black, fine grained, non-porous to slightly porous shale Slightly weathered to fresh Thinly bedded Medium grey Fine grained Non-porous to slightly porous - Broken/lost core from 13.26 m to 13.31 m - Broken core from 13.36 m to 13.37 m - Broken core from 13.42 m to 13.43 m - Broken/lost core from 13.53 m to 13.75 m - Broken core from 14.90 m to 14.98 m - Broken/lost core from 15.08 m to 15.20 m - Broken core from 15.27 m to 15.30 m - Broken/lost core from 15.56 m to 16.73 m		13.07	1	100											
14					2	100												
15					3	100-0												
16																		
17					4	0												UCS = 37.0 MPa
				32.80														
		END OF DRILLHOLE		17.77														
18																		
19																		
20																		
21																		
22																		
23																		

GTA-RCK 031 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-MISS.GDT 19-5-23 ZS

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: CK

GOLDER

RECORD OF BOREHOLE No 18-1103

SHEET 1 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997614.4; E 222587.4 NAD MTM ZONE 8 (LAT. 45.113730; LONG. -74.544860)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 10-11, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS
53.0	GROUND SURFACE					
0.0	(SM) Silty sand, trace gravel, contains organic matter (rootlets) (TOPSOIL/FILL) Dark brown Moist		1	SS	12	
0.2	(SM) Gravelly silty sand, contains cobbles and boulders (FILL) Very dense to compact Grey-brown Moist		2	SS	53	
			3	SS	28	
			4	SS	28	
			5	SS	43	
			6	SS	26	
48.7						
4.3	(SM) Silty sand, some gravel, contains organic matter (rootlets) (FILL) Compact Brown to grey Moist		7	SS	6	
48.4						
4.6	(CH) CLAY, trace sand, highly fissured (WEATHERED CRUST) Very stiff to stiff Grey-brown Moist		8	TP	PH	▽
46.9						
6.1	(CH) CLAY, trace sand, trace gravel, contains thin laminations of sand Firm to stiff Grey Wet		9	TP	PH	
			10	SS	2	
			11	SS	2	
44.6						
8.4	(SM) Gravelly Silty SAND (TILL) Loose to very loose Grey Wet		12	SS	4	
			13	SS	7	

ELEVATION SCALE: 52, 51, 50, 49, 48, 47, 46, 45, 44

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

UNIT WEIGHT γ kN/m^3

REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1103

SHEET 2 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997614.4; E 222587.4 NAD MTM ZONE 8 (LAT. 45.113730; LONG. -74.544860)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 10-11, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 25 50 75	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
	(SM) Gravelly Silty SAND (TILL) Loose to very loose Grey Wet		14	SS	3						
42.3											
10.7	(SP/GP) SAND and GRAVEL Compact Grey Wet		15	SS	13		42	○	○		40 50 (10)
41.7											
11.3	(GP) Sandy GRAVEL, some silt (TILL) Compact to dense Grey Wet		16	SS	28						
			17	SS	26		41		○		
			18	SS	15		40				55 28 12 5
			19	SS	29		39		○		
			20	SS	42		38				
37.7			21	SS	50/0.10						
15.3	Limestone (BEDROCK) Bedrock cored from depths 15.3 m to 21.0 m For bedrock coring detail refer to Record of Drillhole 18-1103		1	RC	REC 75%		37			UCS = 21.5 MPa	RQD = 53%
			2	RC	REC 100%		36				RQD = 90%
			3	RC	REC 100%		35				RQD = 99%
			4	RC	REC 100%		34				RQD = 92%

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IM\MTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1103

SHEET 3 OF 4

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997614.4; E 222587.4 NAD MTM ZONE 8 (LAT. 45.113730; LONG. -74.544860)

ORIGINATED BY RI

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)/Rotary Drill, HQ3 Core

COMPILED BY ZS

DATUM Geodetic

DATE September 10-11, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
32.1	Limestone (BEDROCK) Bedrock cored from depths 15.3 m to 21.0 m For bedrock coring detail refer to Record of Drillhole 18-1103		4	RC	REC 100%						RQD = 92%
21.0	END OF BOREHOLE NOTES: 1. Water level in open borehole at a depth of 5.7 m below ground surface (Elev. 47.3), measured during drilling. 2. Packer testing was carried out in bedrock. 3. PVC pipe for VSP installed within borehole following drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IM\MTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

PROJECT: 1899802-1100

RECORD OF DRILLHOLE: 18-1103

SHEET 4 OF 4

LOCATION: N 4997614.4 ;E 222587.4

DRILLING DATE: September 10-11, 2018

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: Downing Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	DISCONTINUITY DATA: Jr	DISCONTINUITY DATA: Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	WEATHERING INDEX	FEATURES	
		BEDROCK SURFACE		37.65														
16	Rotary Drill / HQ3 Core	Nodular Limestone (BEDROCK), with fresh, thinly laminated to thinly bedded, dark grey to black, fine grained, non-porous, weak shale Fresh Thinly bedded Medium grey Fine grained Non-porous Medium strong - Broken/lost core from 15.34 m to 15.65 m - Broken core from 15.78 m to 15.82 m - Broken core from 15.90 m to 15.94 m - 15 mm clay seam at 16.38 m - Broken core from 16.44 m to 16.48 m - Vertical joint from 16.61 m to 16.73 m		15.34	1	100											UCS = 21.5 MPa
17					2	100												
18		- 60 mm clay seam at 17.91 m			3	100-0												
19																		
20		- Broken core from 19.38 m to 19.51 m - Broken core from 20.03 m to 20.04 m			4	0												
				32.04														
21		END OF DRILLHOLE		20.95														
22																		
23																		
24																		
25																		

DEPTH SCALE
1 : 50

GOLDER

LOGGED: RI
CHECKED: CK

GTA-RCK 031 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-MISS.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1103A

SHEET 1 OF 2

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997612.2; E 222588.7 NAD MTM ZONE 8 (LAT. 45.113710; LONG. -74.544840)

ORIGINATED BY PAH

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)

COMPILED BY ZS

DATUM Geodetic

DATE September 13, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
53.1	GROUND SURFACE				
0.0	(SM) Silty sand, trace gravel, contains organic matter (rootlets) (TOPSOIL/FILL) Dark brown Moist				
0.2	(SM) Gravelly silty sand, contains cobbles and boulders (FILL) Very dense to compact Grey-brown Moist				
48.8					
4.3	(SM) Silty sand, some gravel, contains organic matter (rootlets) (FILL) Compact Brown to grey Moist				
48.5					
4.6	(CH) CLAY, trace sand, highly fissured (WEATHERED CRUST) Very stiff to stiff Grey-brown Moist				
47.0					
6.1	(CH) CLAY, contains sand layers and gravel Firm Grey Moist to wet		1	SS	3
			2	TP	PH
44.9					
8.2	(SM) Gravelly SILTY SAND, contains cobbles and boulders (TILL) Loose to compact Grey Wet		3	SS	7

GROUND WATER CONDITIONS

ELEVATION SCALE: 53, 52, 51, 50, 49, 48, 47, 46, 45, 44

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × REMOULDED
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%)
25 50 75

UNIT WEIGHT γ kN/m^3

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1103A

SHEET 2 OF 2 **METRIC**

PROJECT 1899802-1100

G.W.P. 4248-15-00 LOCATION N 4997612.2; E 222588.7 NAD MTM ZONE 8 (LAT. 45.113710; LONG. -74.544840) ORIGINATED BY PAH

DIST Eastern HWY 401 BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem) COMPILED BY ZS

DATUM Geodetic DATE September 13, 2018 CHECKED BY CK

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (25 50 75)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	--- CONTINUED FROM PREVIOUS PAGE ---										
	(SM) Gravelly SILTY SAND, contains cobbles and boulders (TILL) Loose to compact Grey Wet						43				
			4	SS	16		42				
41.8											
11.3	END OF BOREHOLE										
	NOTES: 1. Soil stratigraphy from 0.0 to 6.1 m inferred from 18-1103. 2. Vane refusal was encountered at 6.3 m due possibly to presence of gravel. 3. Water level in monitoring well at a depth of 6.1 m below ground surface (Elev. 47.0 m), measured on Sept. 18, 2018.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IM\MTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

GOLDER

RECORD OF BOREHOLE No 18-1103B

SHEET 1 OF 1

METRIC

PROJECT 1899802-1100

G.W.P. 4248-15-00

LOCATION N 4997611.2; E 222587.4 NAD MTM ZONE 8 (LAT. 45.113700; LONG. -74.544860)

ORIGINATED BY PAH

DIST Eastern HWY 401

BOREHOLE TYPE Power Auger, 200 mm Diam. (Hollow Stem)

COMPILED BY ZS

DATUM Geodetic

DATE September 13, 2018

CHECKED BY CK

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS
52.9	GROUND SURFACE					
0.0	(SM) Silty sand, trace gravel, contains organic matter (rootlets) (TOPSOIL/FILL) Dark brown Moist					
0.2	(SM) Gravelly silty sand, contains cobbles and boulders (FILL) Very dense to compact Grey-brown Moist					
48.6						
4.3	(SM) Silty sand, some gravel, contains organic matter (rootlets) (FILL) Compact Brown to grey Moist					
48.3						
4.6	(CH) CLAY, trace sand, highly fissured (WEATHERED CRUST) Very stiff to stiff Grey-brown Moist					
46.8						
6.1	(CH) CLAY, contains silt layers and gravel Firm Grey Moist to wet		1	TP	PH	
45.1			2	SS	50/0.15	
7.8	END OF BOREHOLE AUGER REFUSAL					

NOTES:

1. Soil stratigraphy from 0.0 to 6.1 m inferred from 18-1103.

2. Vane refusal was encountered at 6.7 m due possibly to presence of gravel.

ELEVATION SCALE: 52, 51, 50, 49, 48, 47, 46

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × REMOULDED; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 25 50 75

UNIT WEIGHT γ kN/m^3

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

$+^3, \times^3$: Numbers refer to Sensitivity

$\circ^{3\%}$ STRAIN AT FAILURE

GTA-MTO 001 N:\ACTIVE\SPATIAL_IMMTO\HWY401\FRASERROAD\02_DATA\GINT\1899802.GPJ GAL-GTA.GDT 19-5-23 ZS

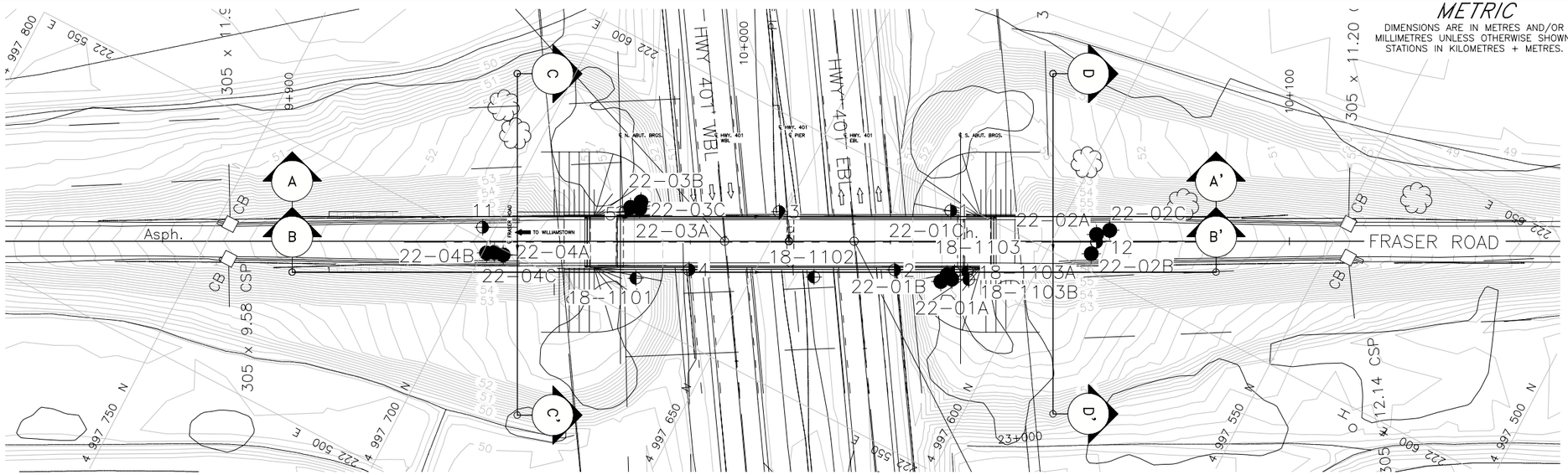
MINISTRY OF TRANSPORTATION, ONTARIO

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.

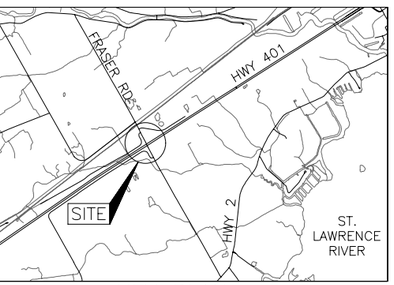
CONT No.
WP No. 4290-15-01

SHEET

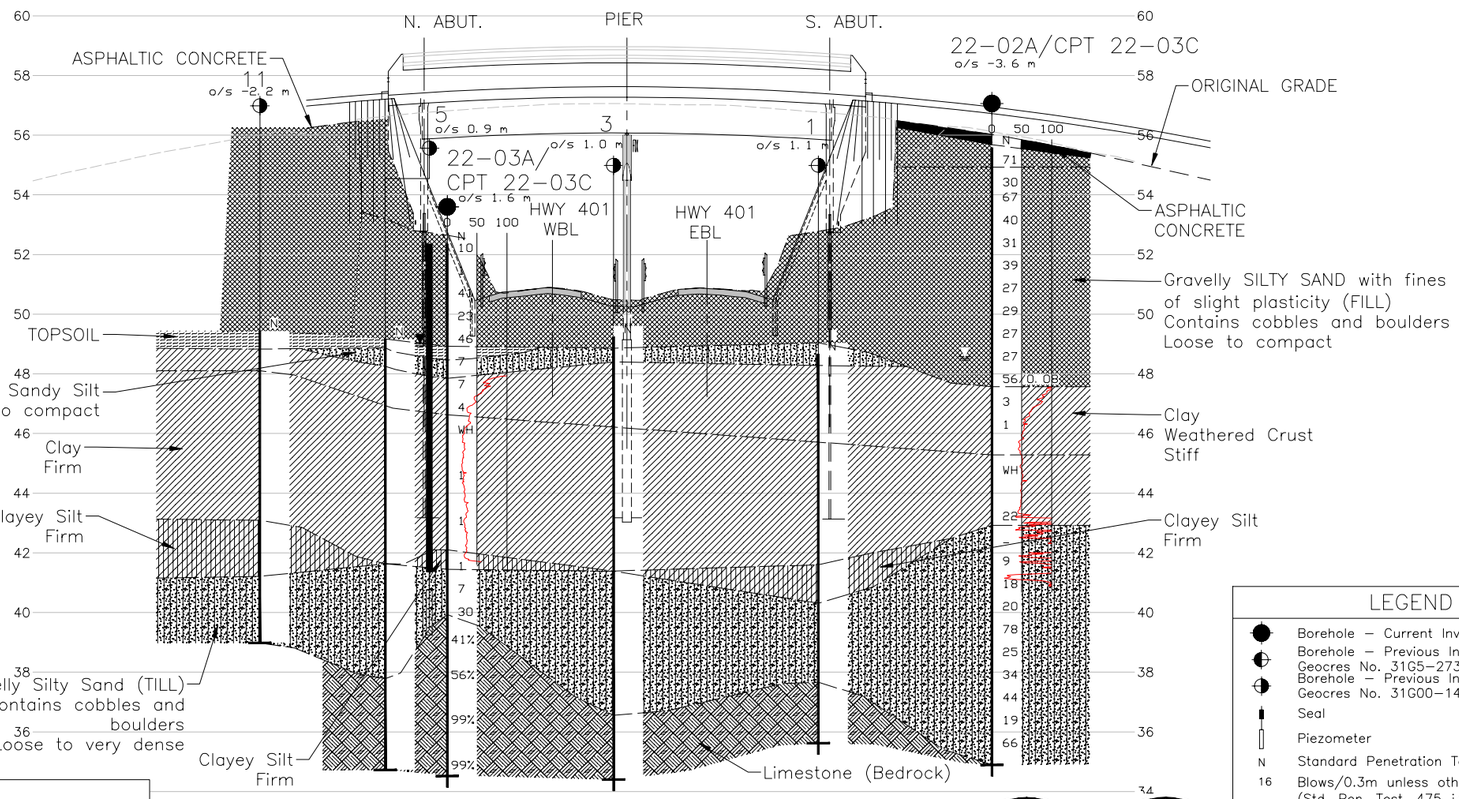
REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD
BOREHOLE LOCATIONS AND SOIL STRATA



PLAN
SCALE
10 0 10 20 m



KEY PLAN
SCALE
1 0 1 2 km



CROSS-SECTIONS A-A'
HORIZONTAL SCALE
10 0 10 20 m
2.5 0 2.5 5
VERTICAL SCALE
2 0 2 4 m

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01B	52.9	4997616.0	222584.5
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02B	56.0	4997591.9	222603.3
22-02C	55.8	4997590.7	222609.1
22-03A	52.7	4997676.2	222569.8
22-03B	52.7	4997676.6	222571.1
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04B	55.9	4997699.3	222547.9
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
18-1102	50.6	4997639.0	222573.6
18-1103	53.0	4997614.4	222587.4
18-1103A	53.1	4997612.2	222588.7
18-1103B	52.9	4997611.2	222587.4
1	49.0	4997620.7	222598.0
2	50.6	4997625.3	222582.3
3	49.6	4997651.1	222582.1
4	50.6	4997661.8	222563.5
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0
12	49.1	4997592.0	222605.8

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

LEGEND
- Borehole - Current Investigation
- Borehole - Previous Investigation Geocres No. 31G5-273
- Borehole - Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

NOTES
This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

REFERENCE
Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 - Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA - Fraser Rd, received January 23, 2023.

LICENSED PROFESSIONAL ENGINEER K.T.C. POWER 100130652 Apr. 19, 2024 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.P. DITTRICH Apr.19, 2024 PROVINCE OF ONTARIO

NO.	DATE	BY	REVISION

Geocres No. 31G-291

HWY. 401	PROJECT NO. 22513877A		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 1

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\FraserRoad\99_PROJ\225138777\05_PROD\0001_Foundations\225138777-0001-BD-0001.dwg

MINISTRY OF TRANSPORTATION, ONTARIO

CONT No.
WP No. 4290-15-01

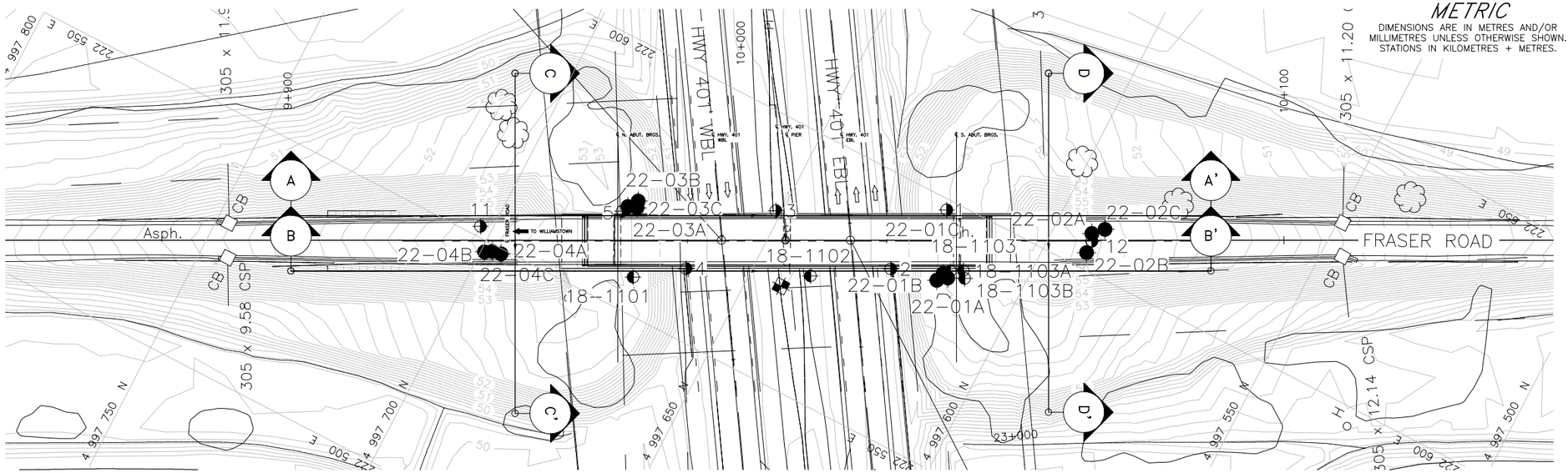
SHEET

REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD

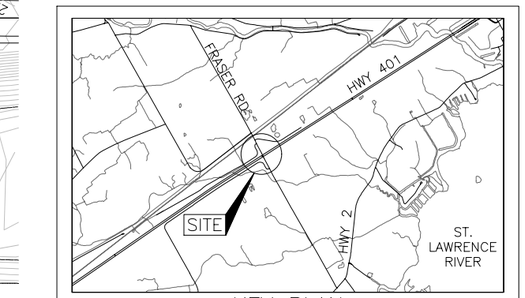
BOREHOLE LOCATIONS AND SOIL STRATA

wsp

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.



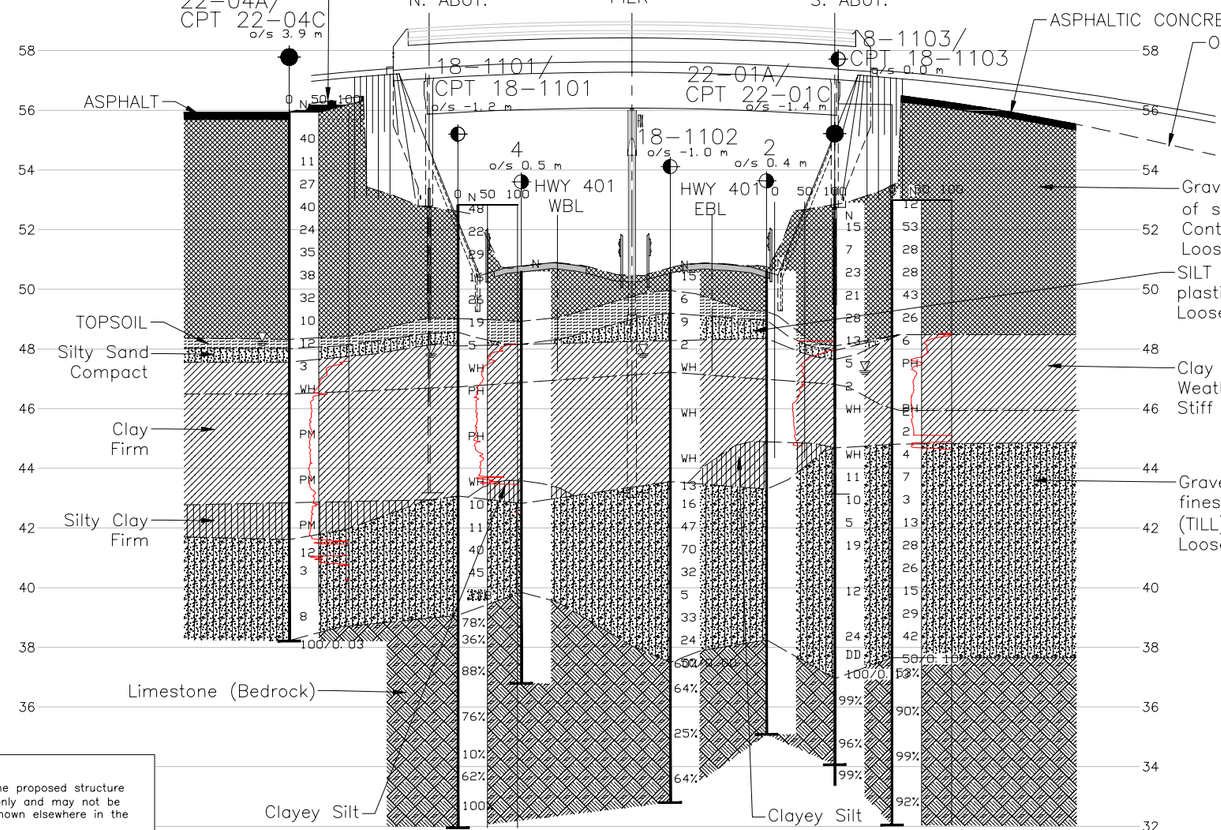
PLAN
SCALE
10 0 10 20 m



KEY PLAN
SCALE
1 0 1 2 km

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01B	52.9	4997616.0	222584.5
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02B	56.0	4997591.9	222603.3
22-02C	55.8	4997590.7	222609.1
22-03A	52.7	4997676.2	222569.8
22-03B	52.7	4997676.6	222571.1
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04B	55.9	4997699.3	222547.9
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
18-1102	50.6	4997639.0	222573.6
18-1103	53.0	4997614.4	222587.4
18-1103A	53.1	4997612.2	222588.7
18-1103B	52.9	4997611.2	222587.4
1	49.0	4997620.7	222598.0
2	50.6	4997625.3	222582.3
3	49.6	4997651.1	222582.1
4	50.6	4997661.8	222563.5
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0
12	49.1	4997592.0	222605.8

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989



HORIZONTAL SCALE
10 0 10 20 m
2.5 0 2.5

VERTICAL SCALE
2 0 2 4 m

CROSS-SECTIONS B-B'

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

NOTES

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The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

NO.	DATE	BY	REVISION

Geocres No. 31G-291

HWY. 401	PROJECT NO. 22513877A		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 21-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 2

LICENSED PROFESSIONAL ENGINEER K.T.C. POWER 100130652 Apr. 19, 2024 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.P. DITTRICH Apr.19, 2024 PROVINCE OF ONTARIO

PLOT DATE: Apr 19, 2024
FILENAME: S:\Clients\MTO\YraserRoad\09_PROJ\22513877\40_PROD\0001_Foundations\22513877-0001-BD-0002.dwg

MINISTRY OF TRANSPORTATION, ONTARIO

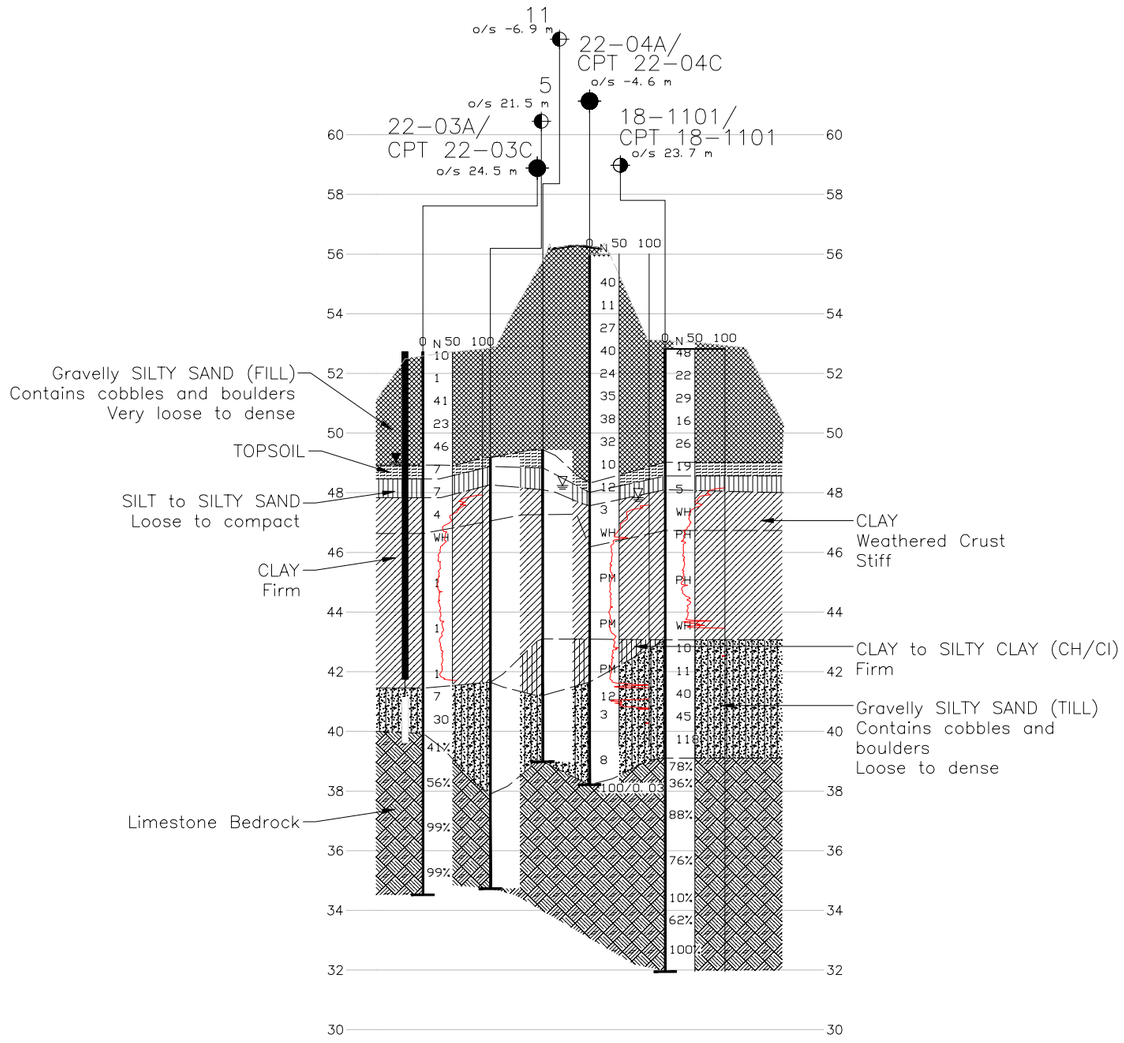
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.

CONT No.
WP No. 4290-15-01

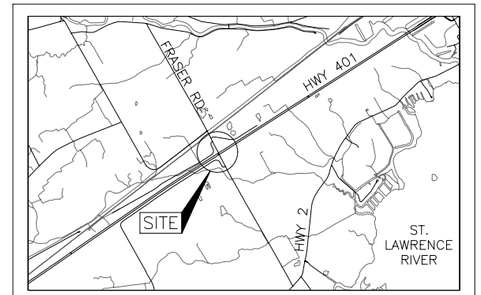
SHEET

REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD

BOREHOLE LOCATIONS AND SOIL STRATA



CROSS-SECTIONS C-C'- NORTH EMBANKMENT



KEY PLAN
SCALE
1 0 1 2 km

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)

No.	ELEVATION	NORTHING	EASTING
22-03A	52.7	4997676.2	222569.8
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0

LICENSED PROFESSIONAL ENGINEER
K.T.C. POWER
100130652
Apr. 19, 2024
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.P. DITTRICH
Apr.19, 2024
PROVINCE OF ONTARIO

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HORIZONTAL SCALE
10 0 10 20 m

VERTICAL SCALE
2 0 2 4 m

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

NO.	DATE	BY	REVISION

Geocres No. 31G-291

HWY. 401	PROJECT NO. 22513877		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 3

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\FraserRoad\09_PROJ\22513877\40_PROD\0001_Foundations\22513877-0001-BD-0003.dwg

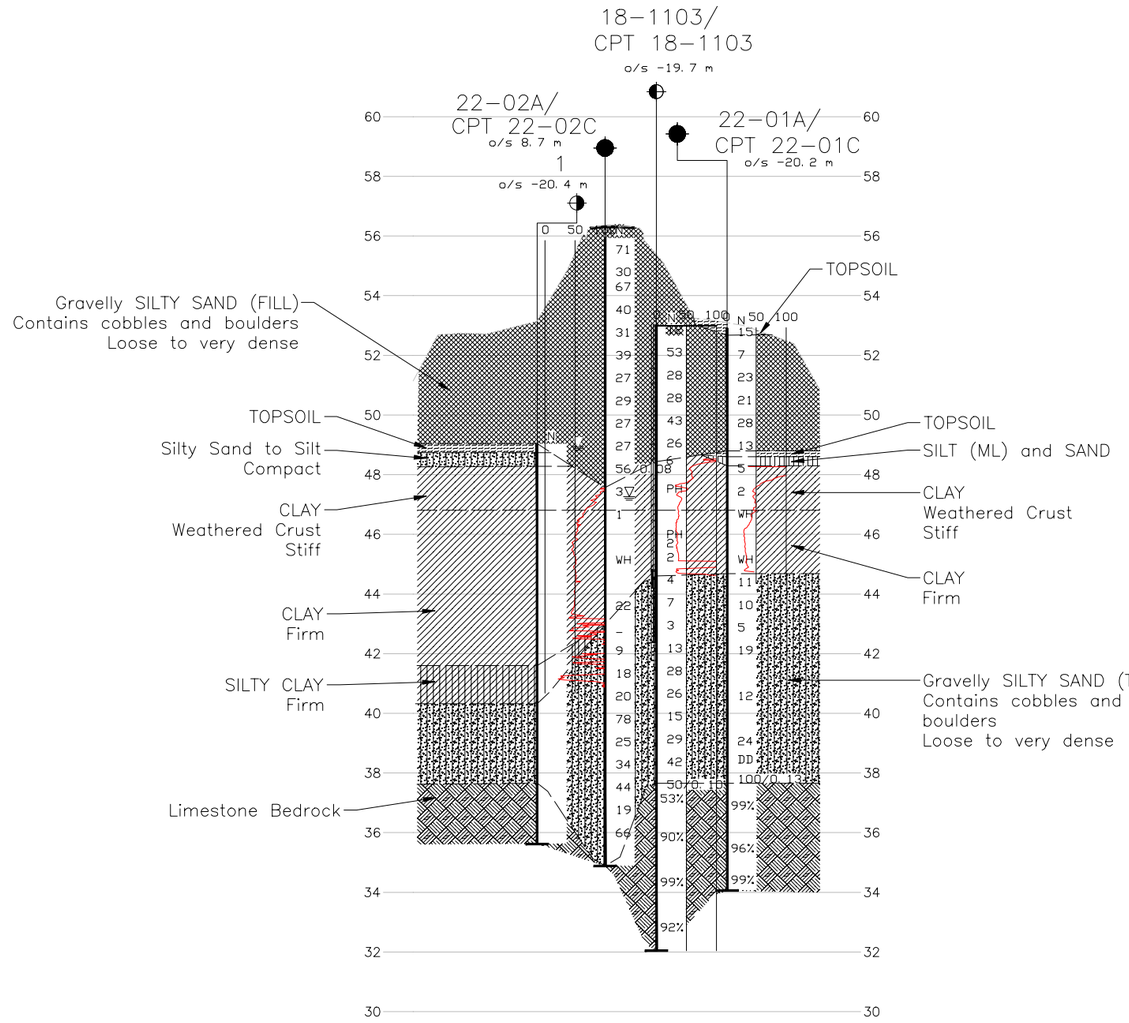
MINISTRY OF TRANSPORTATION, ONTARIO

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.

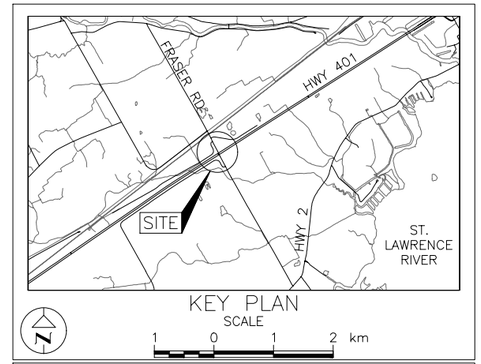
CONT No.
WP No. 4290-15-01

REPLACEMENT OF HIGHWAY 401
UNDERPASS AT FRASER RD
SOIL STRATA

SHEET



CROSS-SECTIONS D-D'-SOUTH EMBANKMENT



KEY PLAN
SCALE
1 0 1 2 km

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)

No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02C	55.8	4997590.7	222609.1
18-1103	53.0	4997614.4	222587.4
1	49.0	4997620.7	222598.0

LICENSED PROFESSIONAL ENGINEER
K.T.C. POWER
100130652
Apr. 19, 2024
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.P. DITTRICH
Apr.19, 2024
PROVINCE OF ONTARIO

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GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

NO.	DATE	BY	REVISION

Geocres No. 31G-291

HWY. 401		PROJECT NO. 22513877	DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 4

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\Fraserfload\09_PROJ\22513877\40_PROD\0001_Foundations\22513877-0001-BD-0004.dwg

APPENDIX B

Source Water Protection Threats - Low Risk Threats

Aircrafts - De-icing Runoff
Application of Agricultural Source Material (ASM) to Land dude
ASM - Storage
ASM Generation - Livestock Grazing
ASM Generation - OCA or Farm Animal Yard
Disposal of Hauled Sewage to Land
DNAPL - Handling & Storage
Fertilizer - Application
Fertilizer - Handling and Storage
Fuel - Handling and Storage
Hauled Sewage - Storage
Industrial Effluent Discharges
Landfarming of Petroleum Refining Waste
Landfilling (Hazardous Waste or LIW)
Landfilling (Municipal Waste)
LIW Injection into a well
NASM - Application
NASM - Handling & Storage
Onsite Sewage Works
Organic Solvent - Handling & Storage
Overflow - CSO or SSO
PCB Waste Storage
Pesticide - Application
Pesticide - Handling & Storage
Pipeline
POW - Application
POW - Storage
Road Salt - Application
Road Salt - Handling & Storage - Exposed
Road Salt - Handling & Storage - Not Exposed
Road Salt - Handling & Storage - Potentially Exposed
Snow - Storage
Storm Water - Infiltration (Industrial/Commercial)
Storm Water - Infiltration (Residential/Institutional)
Storm Water - Infiltration (Rural)
Storm Water - Outfall (Industrial/Commercial)
Storm Water - Outfall (Residential/Institutional)
Storm Water - Outfall (Rural)
Tailings From Mines
Transfer/Processing Site - Municipal Waste
Waste Generation Facility - Registration Exempt or Excluded
Waste Generation Facility - Requiring Registration
Wastewater Collection Facilities and Associated Parts: Sanitary Sewers
Wastewater Collection Facilities and Associated Parts: Sewage Pumping Station or Lift Station Wet Well, a Holding Tank or a Tunnel
WWTF and Associated Parts

APPENDIX C

Water Analytical Results

Certificate of Analysis

Client: WSP Canada Inc (Ottawa)
1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

Dear Nickie Unonius:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: Patrick Jacques 2025.02.04 16:51:40 -05'00'

Patrick Jacques, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

eurofins | Environment Testing

Certificate of Analysis

Client: WSP Canada Inc (Ottawa)
1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

				Lab I.D.	1756397
				Sample Matrix	SURF W
				Sample Type	
				Sampling Date	2025-01-28
				Sample I.D.	18-1103A
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Anions	Cl	1	mg/L		1444
	N-NO2	2.0	mg/L		<2.0
	N-NO3	2.0	mg/L		<2.0
	NO2 + NO3 as N	2.0	mg/L		<2.0
	SO4	1	mg/L		44
General Chemistry	Alkalinity as CaCO3	5	mg/L		392
	CO3 as CaCO3	1	mg/L		N/A-PH
	Conductivity	5	uS/cm		4640
	DOC	0.5	mg/L		3.8
	HCO3 as CaCO3	1	mg/L		392
	pH	1.00		6.5-8.5	7.58
	Saturation pH	0.01			6.80
	TDS (COND - CALC)	1	mg/L		3020
Hardness	Hardness as CaCO3	1	mg/L		738
Indices/Calc	Anion Sum	0.01	meq/L		49.5
	Cation Sum	0.01	meq/L		45.4
	Ion Balance	0.01			0.92
	Langelier Index	-10.00			0.78
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001
	Al	0.01	mg/L	IPWQO 0.075	<0.01
	As	0.001	mg/L	PWQO 0.100	<0.001
	B	0.01	mg/L	IPWQO 0.200	0.12
	Ba	0.01	mg/L		0.44
	Be	0.0005	mg/L	PWQO 0.011	<0.0005
	Ca	1	mg/L		177

Guideline = PWQO - Ontario *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

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				Sample Matrix	SURF W
				Sample Type	
				Sampling Date	2025-01-28
				Sample I.D.	18-1103A
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Metals	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001
	Co	0.0002	mg/L	IPWQO 0.0009	0.0017*
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L	IPWQO 0.005	0.002
	Fe	0.03	mg/L	PWQO 0.30	3.10*
	K	1	mg/L		12
	Mg	1	mg/L		72
	Mn	0.01	mg/L		0.48
	Mo	0.005	mg/L	IPWQO 0.040	<0.005
	Na	1	mg/L		697
	Ni	0.005	mg/L	PWQO 0.025	<0.005
	P	0.002	mg/L	IPWQO 0.01	0.007
	Pb	0.001	mg/L	PWQO 0.005	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005
	Se	0.001	mg/L	PWQO 0.100	<0.001
	Si	0.2	mg/L		14.1
	Sr	0.001	mg/L		5.72
	Ti	0.01	mg/L		<0.01
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001
	U	0.001	mg/L	IPWQO 0.005	<0.001
	V	0.001	mg/L	IPWQO 0.006	<0.001
	Zn	0.01	mg/L	PWQO 0.030	<0.01
Nutrients	N-NH3	0.020	mg/L		0.506
	O-PO4	0.010	mg/L		<0.010

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Attention: Mr. Nickie Unonius
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Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 471394 **Analysis/Extraction Date** 2025-01-30 **Analyst** AaN **Method** EPA 200.8			
Silver	<0.0001 mg/L	116	80-120
Aluminum	<0.01 mg/L	102	80-120
Arsenic	<0.001 mg/L	98	80-120
Boron (total)	<0.01 mg/L	99	80-120
Barium	<0.01 mg/L	96	80-120
Beryllium	<0.0005 mg/L	100	80-120
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	104	80-120
Chromium Total	<0.001 mg/L	110	80-120
Copper	<0.001 mg/L	107	80-120
Iron	<0.03 mg/L	97	80-120
Manganese	<0.01 mg/L	103	80-120
Molybdenum	<0.005 mg/L	92	80-120
Nickel	<0.005 mg/L	102	80-120
P	<0.002 mg/L	102	80-120
Lead	<0.001 mg/L	107	80-120

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K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Antimony	<0.0005 mg/L	90	80-120
Selenium	<0.001 mg/L	97	80-120
Strontium	<0.001 mg/L	97	80-120
Titanium	<0.01 mg/L	99	80-120
Thallium	<0.0001 mg/L	105	80-120
Uranium	<0.001 mg/L	97	80-120
Vanadium	<0.001 mg/L	99	80-120
Zinc	<0.01 mg/L	107	80-120
Run No 471412 **Analysis/Extraction Date** 2025-01-31 **Analyst** Z S **Method** M SM3120B-3500C			
Calcium	<1 mg/L	101	90-110
Potassium	<1 mg/L	103	87-113
Magnesium	<1 mg/L	95	76-124
Sodium	<1 mg/L	101	82-118
Run No 471428 **Analysis/Extraction Date** 2025-01-31 **Analyst** AaN **Method** EPA 200.8			
Silicon	<0.2 mg/L	104	80-120
Run No 471453 **Analysis/Extraction Date** 2025-01-31 **Analyst** AsA **Method** SM2320,2510,4500H/F			

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1931 Robertson Road
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K2H 5B7
Attention: Mr. Nickie Unonius
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Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Alkalinity (CaCO3)	<5 mg/L	96	90-110
Conductivity	<5 uS/cm	100	90-110
pH		100	90-110
Run No 471454 **Analysis/Extraction Date** 2025-01-31 **Analyst** AsA **Method** SM 5310B			
DOC	<0.5 mg/L	102	80-120
Run No 471492 **Analysis/Extraction Date** 2025-02-03 **Analyst** SKH **Method** EPA 350.1			
N-NH3	<0.020 mg/L	97	80-120
Run No 471493 **Analysis/Extraction Date** 2025-02-03 **Analyst** SKH **Method** EPA 365.1			
O-PO4	<0.010 mg/L	97	80-120
Run No 471495 **Analysis/Extraction Date** 2025-02-04 **Analyst** IP **Method** SM 4110			
Chloride	<1 mg/L	100	90-110
N-NO2	<0.10 mg/L	104	90-110
N-NO3	<0.10 mg/L	107	90-110
SO4	<1 mg/L	100	90-110

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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Attention: Mr. Nickie Unonius
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Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 471504 **Analysis/Extraction Date** 2025-02-04 **Analyst** IP **Method** SM 4110			
NO2 + NO3 as N			
Run No 471514 **Analysis/Extraction Date** 2025-02-04 **Analyst** AET **Method** C Ion Balance			
Anion Sum			
Cation Sum			
CO3 as CaCO3			
Hardness as CaCO3			
HCO3 as CaCO3			
Ion Balance			
TDS (COND - CALC)			
Run No 471519 **Analysis/Extraction Date** 2025-02-04 **Analyst** AET **Method** Calculations			
Langelier Index			
Saturation pH			

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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Certificate of Analysis

Client: WSP Canada Inc (Ottawa)
1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013890
Date Submitted: 2025-01-28
Date Reported: 2025-02-04
Project: CA0019704.4282
COC #: 232548

Sample Comment Summary

Sample ID: 1756397 18-1103A N-NO2 and N-NO3 MRL elevated due to matrix interference (dilution was done).

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013891
Date Submitted: 2025-01-28
Date Reported: 2025-02-05
Project: CA0019704.4282
COC #: 232548

Dear Nickie Unonius:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: Patrick Jacques 2025.02.05 11:31:32 -05'00'

Patrick Jacques, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

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Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

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Client: WSP Canada Inc (Ottawa)
1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Mr. Nickie Unonius
PO#:
Invoice to: WSP Canada Inc.

Report Number: 3013891
Date Submitted: 2025-01-28
Date Reported: 2025-02-05
Project: CA0019704.4282
COC #: 232548

Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.
					1756398 / WW / / 2025-01-28 / 18-1103A
Anions	F	0.10	mg/L	MAC 10	0.13
General Chemistry	BOD5	1	mg/L	MAC 300	<1
	Cyanide (total)	0.005	mg/L	MAC 2	<0.005
	pH	1.00		6.0-10.0	7.62
	Phenols	0.002	mg/L	MAC 1.0	<0.002
	Total Suspended Solids	2	mg/L	MAC 350	87
Mercury	Hg	0.0001	mg/L	MAC 0.05	<0.0001
Metals	Ag	0.01	mg/L	MAC 5	<0.01
	As	0.02	mg/L	MAC 1	<0.02
	Cd	0.008	mg/L	MAC 0.7	<0.008
	Co	0.01	mg/L	MAC 5	<0.01
	Cr	0.05	mg/L	MAC 5	<0.05
	Cr(VI)	0.01	mg/L		<0.01
	Cu	0.01	mg/L	MAC 3	<0.01
	Mn	0.01	mg/L		0.41
	Mo	0.01	mg/L	MAC 5	<0.01
	Ni	0.01	mg/L	MAC 3	<0.01
	Pb	0.01	mg/L	MAC 2	<0.01
	Sb	0.01	mg/L	MAC 5	<0.01
	Se	0.02	mg/L	MAC 5	<0.02
	Zn	0.04	mg/L	MAC 3	<0.04
Microbiology	Escherichia Coli	0	ct/100mL		0
Nutrients	Total Kjeldahl Nitrogen	0.100	mg/L	MAC 100	0.694
	Total P	0.020	mg/L	MAC 10	0.059
OCP/PCB	Aldrin + Dieldrin	0.012	ug/L		<0.012

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				Lab I.D.	1756398
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2025-01-28
				Sample I.D.	18-1103A
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
OCP/PCB	alpha-BHC	0.006	ug/L		<0.006
	beta-BHC	0.006	ug/L		<0.006
	Chlordane (Total)	0.018	ug/L		<0.018
	delta-BHC	0.006	ug/L		<0.006
	gamma-BHC (Lindane)	0.006	ug/L		<0.006
	Hexachlorocyclohexane (Total)	0.024	ug/L		<0.024
	Lindane	0.006	ug/L		<0.006
	Mirex	0.006	ug/L		<0.006
	op-DDT	0.006	ug/L		<0.006
	pp-DDD	0.006	ug/L		<0.006
	pp-DDE	0.006	ug/L		<0.006
	pp-DDT	0.006	ug/L		<0.006
Oil and Grease	Oil & Grease - Mineral	1	mg/L	MAC 15	<1
	Oil & Grease - Non-mineral	1	mg/L	MAC 150	4
	Oil & Grease - Total	1	mg/L		4
Others	Nonylphenol	0.20	ug/L		<0.20
	Nonylphenol Ethoxylates (Total)	0.10	ug/L		<0.10
PAH	1,3-dinitropyrene	1.0	ug/L		<1.0
	7H-Dibenzo(c,g)carbazole	0.2	ug/L		<0.2
	Anthracene	0.1	ug/L		<0.1
	Benzo(a)anthracene	0.1	ug/L		<0.1
	Benzo(a)pyrene	0.01	ug/L		<0.01
	Benzo(b)fluoranthene	0.05	ug/L		<0.05
	Benzo(e)pyrene	0.2	ug/L		<0.2
	Benzo(g,h,i)perylene	0.1	ug/L		<0.1

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1756398 WW 2025-01-28 18-1103A
PAH	Benzo(j)fluoranthene	0.05	ug/L		<0.05
	Benzo(k)fluoranthene	0.05	ug/L		<0.05
	Chrysene	0.05	ug/L		<0.05
	Dibenz(a,j)acridine	0.2	ug/L		<0.2
	Dibenzo(a,h)anthracene	0.1	ug/L		<0.1
	Dibenzo(a,i)pyrene	0.1	ug/L		<0.1
	Fluoranthene	0.1	ug/L		<0.1
	Indeno(1,2,3-c,d)pyrene	0.1	ug/L		<0.1
	PAH (Total)	2	ug/L		<2
	Perylene	0.1	ug/L		<0.1
	Phenanthrene	0.1	ug/L		<0.1
	Pyrene	0.1	ug/L		<0.1
Semi-Volatiles	3,3'-dichlorobenzidene	0.5	ug/L		<0.5
	Bis(2-ethylhexyl)phthalate	0.4	ug/L		<0.4
	Di-n-butylphthalate	1.3	ug/L		<1.3
	Hexachlorobenzene	0.01	ug/L		<0.01
	Pentachlorophenol	0.5	ug/L		<0.5
VOCs Surrogates	1,2-dichloroethane-d4	0	%		71
	4-bromofluorobenzene	0	%		86
	Toluene-d8	0	%		84
Volatiles	1,1,2,2-tetrachloroethane	0.5	ug/L	MAC 40	<0.5
	1,2-dichlorobenzene	0.4	ug/L		<0.4
	1,4-dichlorobenzene	0.4	ug/L	MAC 470	<0.4
	Benzene	0.5	ug/L	MAC 10	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1756398 WW 2025-01-28 18-1103A
Volatiles	Chloroform	0.5	ug/L	MAC 40	<0.5
	Dichloromethane	4.0	ug/L	MAC 210	<4.0
	Ethylbenzene	0.5	ug/L	MAC 160	<0.5
	m/p-xylene	0.4	ug/L		<0.4
	o-xylene	0.4	ug/L	MAC 520	<0.4
	t-1,3-Dichloropropylene	0.5	ug/L		<0.5
	Tetrachloroethylene	0.3	ug/L	MAC 50	<0.3
	Toluene	0.4	ug/L	MAC 270	<0.4
	Trichloroethylene	0.3	ug/L	MAC 70	<0.3
	Xylene; total	0.5	ug/L		<0.5

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COC #: 232548

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 208523 **Analysis/Extraction Date** 2025-02-04 **Analyst** C M **Method** P 8270			
Benzo(j)fluoranthene	<0.05 ug/L		
PAH (Total)			
Run No 470793 **Analysis/Extraction Date** 2025-02-03 **Analyst** C M **Method** B 625/P 8270			
Dichlorobenzidine, 3,3'-	<0.5 ug/L	83	20-140
Bis(2-ethylhexyl)phthalate	<0.4 ug/L	56	20-140
Di-n-butylphthalate	<1.3 ug/L	54	20-140
Hexachlorobenzene	<0.01 ug/L	60	20-140
Run No 470794 **Analysis/Extraction Date** 2025-02-03 **Analyst** C M **Method** P 8270			
1,3-dinitropyrene	<1.0 ug/L	100	50-140
7H-Dibenzo(c,g)carbazole	<0.2 ug/L	90	50-140
Anthracene	<0.1 ug/L	52	50-140
Benz[a]anthracene	<0.1 ug/L	51	50-140
Benzo[a]pyrene	<0.01 ug/L	57	50-140
Benzo[b]fluoranthene	<0.05 ug/L	62	50-140

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Benzo(e)pyrene	<0.2 ug/L	99	50-140
Benzo[ghi]perylene	<0.1 ug/L	56	50-140
Benzo[k]fluoranthene	<0.05 ug/L	67	50-140
Chrysene	<0.05 ug/L	57	50-140
Dibenz(a,j)acridine	<0.2 ug/L	88	50-140
Dibenz[a h]anthracene	<0.1 ug/L	55	50-140
Dibenzo(a,i)pyrene	<0.1 ug/L	91	50-140
Fluoranthene	<0.1 ug/L	56	50-140
Indeno[1 2 3-cd]pyrene	<0.1 ug/L	56	50-140
Perylene	<0.1 ug/L	96	50-140
Phenanthrene	<0.1 ug/L	55	50-140
Pyrene	<0.1 ug/L	56	50-140
Run No 470795 **Analysis/Extraction Date** 2025-01-31 **Analyst** C M **Method** B 625/P 8270			
Pentachlorophenol	<0.5 ug/L	102	20-150
Run No 471366 **Analysis/Extraction Date** 2025-01-30 **Analyst** L V **Method** AMBCOLM1			
Escherichia Coli			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 471390 **Analysis/Extraction Date** 2025-01-30 **Analyst** AaN **Method** M SM3112B-3500B			
Mercury	<0.0001 mg/L	105	76-123
Run No 471393 **Analysis/Extraction Date** 2025-02-04 **Analyst** EvS **Method** SM 5210B			
BOD5	<1 mg/L	96	75-125
Run No 471408 **Analysis/Extraction Date** 2025-01-30 **Analyst** AsA **Method** SM2320,2510,4500H/F			
F	<0.10 mg/L	101	90-110
Run No 471445 **Analysis/Extraction Date** 2025-02-02 **Analyst** EvS **Method** SM4500-CNC/MOE E3015			
Cyanide (total)	<0.005 mg/L	95	61-139
Run No 471452 **Analysis/Extraction Date** 2025-02-03 **Analyst** SKH **Method** C SM2540			
Total Suspended Solids	<2 mg/L	98	90-110
Run No 471453 **Analysis/Extraction Date** 2025-01-31 **Analyst** AsA **Method** SM2320,2510,4500H/F			
pH		100	90-110
Run No 471460 **Analysis/Extraction Date** 2025-01-31 **Analyst** SD **Method** ASTM D7485			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Nonylphenol	<0.20 ug/L	86	50-150
Nonylphenol Ethoxylates (Total)			
Run No 471462 **Analysis/Extraction Date** 2025-02-03 **Analyst** IP **Method** SM5530D/EPA420.2			
Phenols	<0.001 mg/L	105	50-120
Run No 471483 **Analysis/Extraction Date** 2025-02-03 **Analyst** Z S **Method** SM 3500-Cr B			
Chromium VI	<0.01 mg/L	94	80-120
Run No 471488 **Analysis/Extraction Date** 2025-02-03 **Analyst** SKH **Method** EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	115	70-130
Run No 471499 **Analysis/Extraction Date** 2025-02-04 **Analyst** ACN **Method** SM 5520B/F			
Oil & Grease - Mineral	<1 mg/L	90	70-130
Oil & Grease - Non-mineral	<1 mg/L		70-130
Oil & Grease - Total	<1 mg/L	90	70-130
Run No 471507 **Analysis/Extraction Date** 2025-02-04 **Analyst** PaS **Method** EPA 8081B			
Aldrin + Dieldrin	<0.012 ug/L		

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
alpha-BHC	<0.006 ug/L	85	50-140
beta-BHC	<0.006 ug/L	85	50-140
Chlordane	<0.018 ug/L		
delta-BHC	<0.006 ug/L	85	50-140
gamma-BHC (Lindane)	<0.006 ug/L	85	50-140
Hexachlorocyclohexane (Total)	<0.024 ug/L		
Hexachlorocyclohexane Gamma-	<0.006 ug/L	90	50-140
Mirex	<0.006 ug/L	85	50-140
op-DDT	<0.006 ug/L	85	50-140
DDD	<0.006 ug/L	90	50-140
DDE	<0.006 ug/L	85	50-140
DDT	<0.006 ug/L	90	50-140
Run No 471516 **Analysis/Extraction Date** 2025-02-04 **Analyst** AaN **Method** EPA 200.8			
Silver	<0.01 mg/L	120	70-130
Arsenic	<0.02 mg/L	115	70-130
Cadmium	<0.008 mg/L	117	70-130
Cobalt	<0.01 mg/L	120	70-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Chromium Total	<0.05 mg/L	117	70-130
Copper	<0.01 mg/L	124	70-130
Manganese	<0.01 mg/L	122	70-130
Molybdenum	<0.01 mg/L	109	70-130
Nickel	<0.01 mg/L	107	70-130
Lead	<0.01 mg/L	118	70-130
Antimony	<0.01 mg/L	120	70-130
Selenium	<0.02 mg/L	126	70-130
Zinc	<0.04 mg/L	123	70-130
Run No 471527 **Analysis/Extraction Date** 2025-02-04 **Analyst** H S **Method** EPA 8260			
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	80	60-130
Dichlorobenzene, 1,2-	<0.4 ug/L	85	60-130
Dichlorobenzene, 1,4-	<0.4 ug/L	85	60-130
Benzene	<0.5 ug/L	78	60-130
Dichloroethylene, 1,2-cis-	<0.4 ug/L	76	60-130
Chloroform	<0.5 ug/L	83	60-130
Methylene Chloride	<4.0 ug/L	80	60-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Ethylbenzene	<0.5 ug/L	80	60-130
m/p-xylene	<0.4 ug/L	99	60-130
o-xylene	<0.4 ug/L	75	60-130
Dichloropropene,1,3-trans-	<0.5 ug/L	71	60-130
Tetrachloroethylene	<0.3 ug/L	71	60-130
Toluene	<0.4 ug/L	74	60-130
Trichloroethylene	<0.3 ug/L	76	60-130
Run No 471533 **Analysis/Extraction Date** 2025-02-04 **Analyst** H S **Method** EPA 8260			
Xylene Mixture			
Run No 471549 **Analysis/Extraction Date** 2025-02-04 **Analyst** SKH **Method** EPA 365.1			
Total P	<0.020 mg/L	111	80-120

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Sample Comment Summary

Sample ID: 1756398 18-1103A Phenols MRL elevated due to matrix interference (dilution was done).

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eurofins 232548

STANDARD CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

3013890

CLIENT INFORMATION

Company: WSP Canada Inc.
Contact: Nickie Unonius
Address:
Telephone: Cell: 613-618-8498
Email: #1: Nickie.Unonius@wsp.com
Email: #2:
Project: CA0019704.4782 Quote #: 192732

INVOICE INFORMATION (SAME AS CLIENT INFORMATION: YES [X] NO [ ])

Company: WSP Canada Inc.
Contact: Email: #1: CApayablesinvoice@wsp.com
Address: Email: #2:
Telephone: PO #:

TURN-AROUND TIME (Business Days)

[ ] 1 Day* (100%) [ ] 2 Day** (50%) [ ] 3-5 Days (25%) [X] 5-7 Days (Standard)

Please contact Lab in advance to determine rush availability. *For results reported after rush due date, surcharges will apply: before 12:00 - 100%, after 12:00 - 50%. **For results reported after rush due date, surcharges will apply: before 12:00 - 50%, after 12:00 - 25%.

TCLP, SPLP, PFAS, and NP/NPE the rush surcharges are 100% (3 day) and 50% (4 day). For farm soils the rush surcharge is 100% (3-5 days). Regular TAT is 10 days.

REGULATION/GUIDELINE REQUIRED

[X] Sanitary Sewer, City: Cornwall
[X] Storm Sewer, City: Cornwall
[ ] ODWSOG (Use DW COC if samples are for human consumption)
[X] PWQO (WSP-PWQO)
[ ] O.Reg. 347 (TCLP)
[ ] Other:

[ ] O. Reg. 153/04
The sample results from this submission will form part of a formal Record of Site Condition (RSC) under O.Reg. 153/04. Analysis of full parameter list only Yes [ ] No [ ]
Table # ___, Coarse / Fine, Surface / subsurface
Type: Com-Ind / Res-Park / Agri / GW / All Other / Sediment

[ ] O. Reg 406 Excess Soils
Table # _____ Full depth/Strat/Ceiling/mSPLP Leachate
Type: Com-Ind /Res-Park /Agri/All Other
Category: Surface /Subsurface

The optimal temperature conditions during transport is 4 - 10°C. Sample(s) cannot be frozen, unless otherwise indicated or agreed upon with the Laboratory. This COC must not be used for drinking water samples. The COC must be complete upon submission of the samples, there will be a $25 surcharge if required information is missing (required fields are shaded in grey).

Occasionally, situations arise in which Eurofins Environment Testing Canada (Ottawa) is unable to process a sample after receipt. By signing this chain-of-custody form, the client agrees that Eurofins Environment Testing Canada (Ottawa) may subcontract samples to a laboratory that is similarly accredited. This subcontracted laboratory will perform the same analysis using the same or similar methodology. Agreements made in advance to subcontract to a specific laboratory will be honored.

Sample Details

Sample ID	Date/Time Collected	Sample Matrix	# of Containers	O.Reg.153/04 parameters: PHC F1 - F4	BTEX	VOCs	PAHs	PCBs	Metals + Inorganics	Metals only	Sanitary Storm (Cornwall)	PWQO (WSP)	RN# (Lab Use Only)
18-1103A	Jan-28-2025 02:05pm	GW	13								X		
18-1103A	Jan-28-2025 02:05pm	GW	02									X	1756397

	PRINT NAME	LOCATION	SIGN	DATE/TIME	TEMP (°C)
Sampled By:	Nickie Unonius	Ottawa Thrg.	Unonius	Jan-28-2025 02:05pm	
Relinquished By:					
Received By:					
Received By:	Shirley Yu	OTT	SY	1/28/25 4°	8.4

COMMENTS:

CUSTODY SEAL: [ ] YES [ ] NO Ice packs submit [ ] Yes [ ] No

APPENDIX D

Groundwater Inflow Analyses

Appendix D

Groundwater Inflow Calculations

Appendix D: Summary of Predicted Groundwater Flow Rate and Zone of Influence at Fraser Road and Highway 401 - Construction Dewatering Calculations for Open-Cut Excavation

Line source and radial flow, unconfined aquifer, steady state conditions (Cooper and Jacob, 1946) $Q = \frac{\pi K(H^2-h^2)}{\ln {}^{R_0}/_{r_s}} + 2\frac{xK(H^2-h^2)}{2R_0}$ (m^3/day) (Powers, 2007)

Sichardt and Kyrieleis Equation $R_{sich} = C(H-h)\sqrt{K}$ (m)

Water Control Alignment	Location	Closest BH/MW	Anticipated Hydraulic Conductivity (m/sec)[1]	Anticipated Hydraulic Conductivity (m/day)	Material Encountered	Groundwater Elevation at closest MW (masl)[2]	Lowest excavation depth (masl)	Base of Aquifer (masl)	Length (m)	Width (m)	Inferred Static Water Level (masl)	Target Pumping Groundwater (masl)	H (m)	h (m)	r_s	Anticipated R_{sich} (m)	Anticipated R_0 (m)	Q (m^3/day) Anticipated Case	S.F.	Assumed Precipitation Event (mm)	Area (m^2)	Assumed Daily Precipitation (Liters)	Calculated Anticipated Construction Dewatering Flow Rate Linear flow (L/day)[1]	Calculated Anticipated Construction Dewatering Flow Rate Linear flow (L/day)[1]
			Anticipated																				Anticipated	Anticipated with S.F.
Water Management during Construction																								
1	Fraser Road - Centre Pier	18-1102	9.0E-07	7.8E-02	Silt with some sand and gravel deposits	49.90	48.50	43.9	12.3	2	49.90	48.00	6.00	4.10	1.00	5.41	6.4	5.4	2.5	72	25	1,771	5,400	13,500
2	Fraser Road - North abutment	22-04 and 22-03	9.0E-07	7.8E-02	Silt with some sand and gravel deposits	49.90	49.50	43.9	12.8	7	49.90	49.00	6.00	5.10	3.50	2.56	6.1	6.1	2.5	72	90	6,451	6,100	15,200
3	Fraser Road - South abutment	22-01, 22-02, 18-1103	9.0E-07	7.8E-02	Silt with some sand and gravel deposits	49.90	49.50	43.9	16.1	7	49.90	49.00	6.00	5.10	3.50	2.56	6.1	6.5	2.5	72	113	8,114	6,500	16,300
																						Total (L/day)	18,000	45,000
																						Total (L/Min)	13	31

Notes: NA: not applicable

(1). Anticipated Hydraulic Conductivity (K) for the SILT with some sand and gravel

(2). The groundwater level in the monitoring well 22-03B

APPENDIX E

Water Supply Wells Information

Well ID	Easting	Northing	Date Completed	Well Depth (m)	Depth to Bedrock (m)	Static Water Level (mbgs)	Driller's Recommended Pump Setting	Kind of Water	Final Status	Water Use 1	Water Use 2
7448972	4995748.000	535786.987	2023-02-13	5.5	12.8	3.6	-	-	Monitoring	Monitoring	Monitoring
2301695	4995472.001	535581.087	1976-06-22	12.8	12.5	1.5	-	Fresh	Water Supply	Domestic	-
7112507	4995224.000	535409.987	2008-09-15	15.2	-	2.8	90 L/min	Fresh	Water Supply	Domestic	-
7382332	4995681.001	535799.988	2019-09-14	10.7	15.3	4.3	-	Tested	Monitoring	Monitoring	Monitoring
2300191	4995732.001	536231.087	1967-10-20	21.9	-	3.0	6 gpm	Fresh	Water Supply	Livestock	Domestic
7043695	4995224.000	535411.987	2007-03-27	-	-	-	-	Untested	-	-	-
7448971	4995690.001	535797.987	2023-02-09	7.4	15.3	3.9	-	Untested	Monitoring	Monitoring	Monitoring
2300347	4996297.001	535381.088	1961-01-12	17.4	-	4.9	6 gpm	Fresh	Water Supply	Livestock	Domestic
7109004	4995272.001	535673.987	2008-07-11	27.4	-	7.7	20 L/min	Fresh	Water Supply	Domestic	-
7448973	4995752.001	535783.987	2023-02-14	13.1	12.8	4.0	-	Untested	Monitoring	Monitoring	Monitoring
2305114	4995720.001	535549.987	2001-07-16	19.5	10.4	1.2	8 gpm	Fresh	Water Supply	Domestic	-



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APPENDIX F

Stage 1-2 Archaeological Assessment Report

REPORT

Stage 1-2 Archaeological Assessment

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00), Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Rasins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario

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January 2025

Distribution List

One PDF - MTO East Region

One PDF - Ministry of Citizenship and Multiculturalism

One PDF - WSP Canada Inc.

Executive Summary

The Executive Summary highlights key points from the report only; for complete information and findings, as well as the limitations, the reader should examine the complete report.

WSP Canada Inc.(WSP) was retained by the Ministry of Transportation (MTO; the Client) to complete a Stage 1-2 Archaeological Assessment (AA) in support of the Municipal Class EA for the Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) located within Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Raisins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario. The Stage 1-2 AA Study Area consists of approximately 0.9 hectares of land encompassing and surrounding municipal right-of-ways (ROW) (Figures 1 and 2).

The Stage 2 AA followed the recommendations of Archaeological Services Inc.'s (ASI) Stage 1 AA completed in 2018 (ASI 2018) which included the majority of the Study Area. The Stage 1 AA component of the assessment was completed within a small area not covered by ASI's Stage 1 AA, situated within the northwest Study Area limit on Laperriere Road.

The Stage 1-2 AA included a review of historical maps, aerial photography, land registry documents, local histories, and previous AA reports. The Client granted WSP permission to access the Study Area to conduct the fieldwork and no limits were placed on this access. The Stage 1-2 AA site inspection and test pit survey were conducted concurrently on November 1, 2024.

The objectives of the Stage 1-2 AA are defined in the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries' (MHSTCI) *Standards and Guidelines for Consultant Archaeologists* (2011). The assessment includes background contextual research, and documentation of archaeological resources within the Study Area to determine whether the Study Area contains archaeological resources requiring further assessment, and if so, recommendations for appropriate Stage 3 AA assessment strategies for archaeological sites identified.

As identified in the previous Stage 1 AA (ASI 2018), the Study Area contained archaeological potential, and, as such, was subject to test pit survey at 5 m intervals. The test pit survey conducted on the property followed the approach in Section 2.1 of the *Standards and Guidelines for Consultant Archaeologists* (MCM, 2011). Test pits were placed at intervals of 5 m within areas of archaeological potential as determined by the Stage 1 AA. The test pits measured at least 30 centimetres (cm) in diameter and were excavated at least 5 cm into subsoil. The bottom and sides of all test pits were examined for the presence of cultural features. All soil was screened through 6-milimetre mesh, and the test pits were subsequently backfilled.

Despite careful scrutiny, no archaeological resources were identified during the Stage 1-2 AA of the Study Area.

As such, this Stage 1-2 AA resulted in the following recommendation:

1) No further AA is required within the Study Area (Figure 9)

It should be noted that the results of this report are not considered final until the MCM has reviewed the above-stated recommendations, and the report has been entered into the Ontario Public Register of Archaeological Reports.

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

The Funeral, Burial and Cremation Services Act (FBCSA), 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner (Government of Ontario 2002). It is recommended that the Registrar, FBCSA at the Ministry of Public and Business Service Delivery, are also immediately notified.

Project Personnel

Project Manager	Carmen Lapointe, P.Eng., PMP
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Administration	Mona Patel

Abbreviations

ASDB	Archaeological Site Database maintained by MCM
BAO	Bereavement Authority of Ontario
BP	Before Present, taken to mean before 1950 and used as an alternative to BC/AD
CHVI	Cultural Heritage Value or Interest
WSP	WSP Canada Inc.
m	Metre(s)
km	Kilometre(s)
MCM	Ministry of Citizenship and Multiculturalism
PIF	Project Information Form

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1 PROJECT CONTEXT

1.1 Objectives

The objectives of a Stage 1 Archaeological Assessment (AA) are as follows:

- Provide information regarding the geography, history, previous archaeological fieldwork, and current land condition of the Study Area;
- Provide a detailed evaluation of the property's archaeological potential;
- Determine whether the property contains archaeological potential requiring further assessment;
- Recommend appropriate Stage 2 assessment strategies, and,
- Document archaeological resources within the Study Area,

The objectives of a Stage 2 Archaeological Assessment are as follows:

- Determine whether the Study Area contains archaeological resources requiring further assessment,
- Recommend appropriate Stage 3 assessment strategies (as necessary).

1.2 Development Context

WSP Canada Inc. (WSP) was retained by the Ministry of Transportation (MTO; the Client) to complete a Stage 1-2 AA in support of the Municipal Class EA for the Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00) located within Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Raisins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario. The Stage 1-2 AA Study Area consists of approximately 0.9 hectares in total (Figures 1 and 2).

The Stage 2 AA followed the recommendations of ASI's Stage 1 AA of the Study Area completed in 2018 (ASI 2018). The Stage 1 AA component of the assessment was completed within an area not covered by the original Stage 1 AA, situated within the northwest Study Area limit on Laperriere Road.

The Stage 2 AA included a review of historical maps, aerial photography, land registry documents, local histories, and previous AA reports. The Client granted WSP permission to access the Study Area to conduct the fieldwork and no limits were placed on this access. The Stage 1-2 AA site inspection and test pit survey were conducted concurrently on November 1, 2024.

2 HISTORICAL CONTEXT

The following historical narrative is intended to provide a general overview of the interpreted land use during the "Pre-Contact Period" and "Early Contact Period" within the vicinity of the current Study Area. This historical overview is based on archaeological and historical interpretations inferred over the past 100 years, and generally reflect inferences and interpretations made by non-Indigenous representatives. The text below is not intended to provide a comprehensive historical overview of the occupation and landscape prior to and following the arrival of Europeans to the modern-day area of eastern Ontario, but rather provide a general overview context that can be referenced when determining the potential for archaeological resources within the current project study area.

The text and comments below, including the cited references, may reflect archaeological literature within general publications, but are not suggested to represent the opinions of those Indigenous communities whose history it is purported to reflect.

2.1 Regional Indigenous History

Southeastern Ontario was covered by the Laurentide ice sheet until approximately 11,000 years before present (BP). Following the period of deglaciation, southeastern Ontario was inundated by the Champlain Sea which is interpreted to have extended from the Rideau Lakes in the south, along the Ottawa Valley and St. Lawrence areas and terminating in the vicinity of Petawawa in the west. The exact western boundary is unconfirmed as current elevation levels reflect the isostatic adjustment of the land following the melting of the glaciers which has obscured definitive traces of the Champlain Sea shoreline at the time of its existence. The eastern portion of the sea extended into the Atlantic Ocean.

During much of the Paleo Period (11,000 to 10,000 BP), southeastern Ontario would have remained inundated by the Champlain Sea, although as the Champlain Sea receded towards the end of this period it is possible that people migrated along the changing waterfront landscape eventually moving into the area (Watson 1999a).

The ridges and old shorelines of the Champlain Sea generally represent areas most likely to contain evidence of Paleo Period occupation in this region, however identifying the location and dates of these ancient shorelines has proved challenging. The boundaries of the Champlain Sea are not marked by a continuous identifiable shoreline, especially along the western shore where rocky conditions were not favourable to the formation of beaches (Chapman and Putnam 1973). Attempts to use deposits of marine mollusk shells as a source for radiocarbon dates to delineate the transgression of the shorelines have proved unreliable as shells absorb carbon at different rates according to their depth below the surface and geological location (Robinson 2012). Additionally, earlier interpretations showing discrete stages of regression (see Chapman 1937) have proven not to be supported by the geological record. Unlike the catastrophic flood events during the Younger Dryas climatic event that led to the rapid formation of the Champlain Sea, its regression was a slow process occurring as sea waters drained during isostatic rebound (Robinson 2012). The interpretation of the presence of shorelines is further complicated by the fact that isostatic rebound may have raised the general study area above its current elevation before it receded to its current level (Fulton and Richard 1987). Flooding resulting from the overflow of glacial Lake Agassiz also eroded and manipulated topographic landforms within the evolving landscape (Fulton et al. 1987). As a consequence, only the margins of the Champlain Sea at its maximum extent, a time when most of eastern Ontario would have been fully submerged, have been reliably mapped due to the rapid inundation creating pronounced shoreline features (Loring 1980). Although recent studies using various dating techniques that do not rely upon deposits of mollusk shells have provided some favourable results (Tremblay 2008), considerable work remains in developing the chronology of the Champlain Sea's regression.

The earliest possible settlement in the St. Lawrence Valley and surrounding area would have occurred during the recession of the Champlain Sea when the vegetation and wildlife began to develop within the area, which enabled the sustainability of humans (Watson 1999a). The ridges and old shorelines of the Champlain Sea and early river channels reflect areas most likely to contain evidence of Paleo Period occupation in the region. Archaeological and geological investigations in the Ottawa Valley have suggested these early sites may be identified within the 550 foot (167.6 m) or higher contour topography, although additional research may be required to confidently assess this correlation (Kennedy 1976).

Evidence of human occupation during this period has been documented by a variety of archaeological discoveries including fluted points (laurel leaf shaped points with a channel flake scar extending from the base of the point)

recorded in the Rideau Lakes area (Watson 1982; 1999b). Although very few Paleo Period sites have been documented in southeastern Ontario, discoveries in the Ottawa area, including sites interpreted to have produced Paleo Period material near Greenbank Road (Swayze 2003), Albion Road and Rideau Road (Swayze 2004), suggests evidence of early occupation. A lack of diagnostic material represented at these sites and the inferred climatic environment, however, indicates these sites may rather be reflective of Archaic Period occupation following the recession of the Champlain Sea. While no Paleo Period sites have been registered within Charlottenburgh Township, late Paleo Period materials have been recovered within the region near Lake St. Francis and to the west in the 1,000 Islands (MCM 2024).

During the succeeding Archaic Period (ca. 10,000 to 2,800 BP), the environment of southeastern Ontario approached modern conditions (Ellis et al. 1990). Occupation within the region and surrounding area developed as the environment became habitable, with an Early Archaic Dovetail projectile point recovered approximately 85 kilometres (km) northwest of the current Study Area in Ottawa South sometime around 1918-1920 (Pilon and Fox 2015).

Archaic Period inhabitants generally continued to employ a hunter-gatherer subsistence strategy focused on localized faunal and floral resources including deer, fish, berries and nuts. The McIntyre Site, located on the north shore of Rice Lake and south of Peterborough, contained the remains of a large variety of floral and faunal species and reflects the diversity of subsistence resources available during this period (Ellis et al. 1990). Plant remains recovered from the McIntyre site included butternut, acorn, hickory, plum, cherry, blueberry and hawthorn, and provides evidence of the diversity in subsistence. Faunal remains included deer, canine, beaver, muskrat, bear, and a large variety of fish including bass, bullheads, and suckers. The inhabitants of the site may also have been gathering wild rice (McAndrews 1984). The first significant evidence for occupation of the St. Lawrence Valley appears during this period. These include a larger number of sites within the area of the St. Lawrence Seaway as well as on Lake St. Francis.

The St. Lawrence and Ottawa Rivers, as well as their tributary waterways, were important routes for the movement of natural copper, either through direct trade between individual groups, or through trips to Lake Superior to exploit the surface deposits located there. Copper artifacts similar to those documented on Allumette Island in the Ottawa River have been discovered in Wisconsin, Michigan, New York State and Manitoba (Kennedy 1970). This commodity, as well as other tradable goods, was presumably transported by canoes and other vessels along the navigable waterways including the Ottawa and St. Lawrence Rivers.

The earliest evidence of human burials within eastern Ontario are interpreted to date to the Archaic Period (Pilon and Young 2009). Excavations at Allumette and Morrison Islands have found burial sites containing the remains of dozens of individuals within deposits that appear to have been used continuously for millennia (Kennedy 1966). The inclusion of grave offerings such as natural copper pieces in burials found at the site of Coteau-du-Lac provides evidence for Archaic Period ritual practice (Pilon and Young 2009). Other sites with Archaic Period components within eastern Ontario have been noted on Aylmer Island, Chaudière Falls, Wilber Lake, Leamy Lake, the Rideau Lakes (Watson 1982), Jessups Falls, and in Pendleton (Daechsel 1980).

The Woodland Period (*ca*. 2,800 to 450 BP) is primarily distinguished from the Archaic Period by the introduction of ceramics (Wright 1972). Initial pottery forms were crude and imitated vessels made in the Archaic Period out of steatite. One example of this type of pot was located northwest of the Study Area along the Ottawa River at a site (CaGi-1) in Hull, Québec (Watson 1999b: 59). Over time, pottery became more refined and began to include elaborate decorative patterns. These decorative styles are distinct for specific regional populations as well as specific date ranges (Laliberté 1999: 73).

The decorative styles found in eastern and south-central Ontario during this period are part of what has been identified as the “Point Peninsula” Tradition. The western region of Ontario was occupied by Saugeen populations and the north-western area was occupied by the Laurel populations (Laliberté 1999: 73).

Early Woodland populations continued to live as hunter gatherers and fishers in much the same way as their ancestors. They also participated in elaborate burial ceremonialism evidenced by the inclusion of exotic artifacts with burials (Spence et al. 1990: 129). For example, the Morrison Island-2 site located near Pembroke had burials containing red ochre encrusted projectile points and native copper beads (Pilon & Young 2009: 198-199). Extensive trade networks continued through the early and middle portions of this period with influences from populations south of the Great Lakes including the Adena and Hopewell as scene by the construction of burial mounds in the region of Lake Rice (Oberholtzer 2013: 163-164). Mounds construction was mostly centered on Rice Lake, the lower Trent River system, and the eastern end of Lake Ontario but they have also been found in small numbers in most other parts of Ontario (Williamson 2013: 51). Early Woodland sites have been reported near Arnprior and to the south in the Lake Ontario St.-Lawrence River drainage area including Wolfe Island.

By the Middle Woodland Period (2,400 to 1,150 BP) regional cultural expressions or traditions have been distinguished by archaeologists. These traditions are the primary basis to differentiate the Middle Woodland Period from the Early Woodland Period and have been identified based on patterns of ceramic decorations, use of lithic materials, and in the case of eastern Ontario, the emergence of a fine bone technology.

While Middle Woodland populations continued as hunter gatherers, the appearance of larger sites in areas where there was intensive exploitation of spawning fish suggests a major change in the settlement subsistence system for this period (Spence et al. 1990: 167). It has been suggested that the repeated use and reliance upon these sites assisted with the stabilization of the settlement cycle (Spence et al. 1990: 168). This would have provided the means for the adoption of agriculture in the southern areas of eastern Ontario.

Based upon the proliferation of sites there appears to have been an appreciable increase in the population of eastern Ontario. The greater number of known sites investigated from this period have enabled archaeologists to develop a better picture of the seasonal round followed in order to exploit a variety of resources within a home territory. Through the late fall and winter, small groups would occupy an inland “family” hunting area. In the spring, these dispersed families would congregate at specific lakeshore sites to fish and hunt in the surrounding forest and socialize. This gathering would last through to the late summer when large quantities of food would be stored for the approaching winter.

A number of Middle Woodland sites have been identified in the Lake St. Francis area, and in the 1,000 Islands and Gananoque River Drainage Basin to the west. Along the St. Lawrence River in the vicinity of the study area, occupation during the Middle Woodland Period was documented at the St. David’s Cemetery site (BgFr-7), the Little Ault Park site (BgFr-4), the Snapper site (BgFq-6) and the Thistle site (BgFq-9), indicating the use of this waterway during the Middle Woodland Period.

The Ottawa River, located northwest of the study area, represents another major waterway utilized for transportation and subsistence strategies during the Middle Woodland Period in eastern Ontario. Middle Woodland Period sites have been identified at Marshall’s and Sawdust Bays (Daechsel 1980; Daechsel 1981), Rockcliffe Park (Pilon 2008; Pilon and Boswell 2015), as well as at Leamy Lake (Laliberté 1995), along the Rideau River (Golder 2017; Patterson Group 2016) and within the City of Ottawa west of Bank Street (Golder 2014). Sawdust Bay 2 (BiGb-6), located approximately 750 m west of where the Mississippi River drains into the Ottawa River, represents a camp site radiocarbon dated to 1560 BP (± 290 BP) and interpreted to reflect the Point Peninsula Tradition. The corresponding artifact assemblage shows that subsistence was focused on hunting

fauna living in the adjacent lakes and swamps. The Leamy Lake and Rockcliffe Park Sites, all located in the area around the mouth of the Gatineau River and the east shore of the Ottawa River, show evidence of seasonal warm weather settlement spanning a period from 4000 BP up to at least the Middle Woodland Period (Pilon and Boswell 2015). Along the South Nation River, one Middle Woodland Period site, Kittle Creek 1 (BgFt-3), has been registered west of Chesterville (MCM 2024).

Another significant development during the Woodland Period was the introduction of agriculture and appearance of domesticated plants ca. 1,450 BP. Initially, only a minor addition to the diet, the cultivation of corn, beans, squash, sunflowers and tobacco gained economic importance during the Late Woodland Period (1,150 BP – 450 BP). Unlike in southwestern Ontario, where the shift in subsistence resulted in the development of semi-permanent and permanent villages, evidence suggests that much of eastern Ontario remained primarily occupied by mobile hunter-gatherers. In part, this was because the terrain was less than suitable for early agriculture. It was also a reflection of the increased pressure on hunting territories and conflict over trade routes at the end of the Woodland Period. The few village sites that have been documented in eastern Ontario are most commonly located near the St. Lawrence River, including the Beckstead Site (BfFt-1) (Pendergast 1984).

Smaller Late Woodland Period (1,150 BP – 450 BP) sites have also been recorded throughout the general area and north of the Study Area within the Ottawa Valley. Two small Late Woodland sites were identified on a property near the Village of Cumberland (Ferris 2002). A significant Woodland Period occupation has also been identified at the Leamy Lake site and several burials dating to the Archaic Period have also been documented on the north side of the Ottawa River, just east of the Chaudière Falls. Many of these burials were observed during the mid-19th century, with upwards of twenty individuals documented along the northern shore of the Ottawa River between the Chaudière Falls and the Gatineau River. Many of these interments were associated with red ochre deposits, although there does not appear to be a consistent deposition positional pattern to those recorded (Pilon and Boswell 2015). Within the United Counties of Stormont, Dundas, and Glengarry, Late Woodland sites include the Beckstead Site (BfFt-1) (Pendergast 1984), the Steward Site (BfFt-2) situated within the town of Morrisburg approximately 50 km west of Study Area (Jamieson 1982), and the Chesterville 2 Site (BgFt-6) (MCM 2024).

By the end of the Late Woodland Period, distinct regional populations occupied specific areas of Ontario separated by vast stretches of largely unoccupied land, including the Huron along the north shore of Lake Ontario, the Algonquins along the Ottawa River and the St. Lawrence Iroquois along the St. Lawrence River. Facing persistent hostilities with Iroquoian populations based in what is now New York State, the Huron moved from the north shore of Lake Ontario to the Lake Simcoe and Georgian Bay region and the St. Lawrence Iroquois relocated sometime in the late 16th century with refugees possibly dispersing among the Algonquin populations in the Ottawa Valley region (Pendergast 1999).

The Algonquins, who occupied the lands north of the Huron, had historical hunting territories in the Ottawa Valley that may have extended as far east as the St. Maurice River in Quebec. They also claimed the lowlands south of the St. Lawrence River after the disappearance of the St. Lawrence Iroquois in the late 16th century (Trigger and Day 1994). At the time of initial contact, the French documented several Algonquin groups residing in the vicinity of the general study area (Heidenreich and Wright 1987). These included the Kichesipirini of Morrison Island, the Matouweskarini along the Madawaska River to the west, the Onontchataronon in the Gananoque River basin to the southwest, and the Weskarini, the largest of the three, situated in the Petite Nation River basin to the northeast.

Though it is often difficult to link archaeological sites to specific historical Indigenous groups, the Highland Lake site (BiGh-1), located west of Ottawa, may be an Algonquin site associated with the Matouweskarini (von Gernet 1992). Ottawa Valley Algonquin sites typically consist of shallow deposits characteristic of seasonal occupation by

small family groups within family or band territorial limits and are typically located on the headwaters of major tributaries (Pendergast 1999). Exceptions include a number of summer camps identified at Morrison Island and Leamy Lake where larger groups came together (Pilon and Boswell 2015).

The Algonquins' location along the same river networks used for transportation by early French traders positioned them to monopolize the early fur trade with the two communities becoming close allies following Champlain's expedition in 1603. Competition for furs increased existing tensions between the Algonquin communities and their neighbours including the Haudenosaunee Nations, such as the Mohawk, residing to the south in what is now Ontario and New York State. The 17th century saw a period of conflict known as the Beaver Wars between the Algonquin and the Haudenosaunee that resulted in the significant disruption of life. Mohawk raids against Algonquin villages in the Upper Ottawa and St. Lawrence Valleys resulted in the abandonment or destruction of many Algonquin settlements in these areas (Trigger and Day 1994). Some Algonquin's found refuge in French settlements such as Trois-Riviéres, Quebec City, Sillery, and Montreal while others may have retreated to interior locations along the Ottawa River's tributaries (Holmes 1993). At the end of the 17th century, the Haudenosaunee were driven out of much of southern Ontario by the Mississaugas though they continued to occupy parts of eastern Ontario on a seasonal basis.

The French brokered a peace treaty in 1701 at Montreal where the Algonquin, the French, and the Haudenosaunee agreed to peacefully share the lands around the Great Lakes (INAC 2011). In exchange for peace, the Algonquin gave the Haudenosaunee secure access to furs which the Haudenosaunee used to secure their alliance with the British. Between 1712-1716, Algonquins were noted as living along the Gatineau River with the Haudenosaunee occupation located south of the St. Lawrence River (Holmes 1993). By 1740, Algonquin communities were present in the vicinity of Trois-Rivières, Riviere Lievre and Mohawk community members were residing near Lake of Two Mountains (Holmes 1993).

Following the Seven Years' War during the mid-18th century, the defeat of the French, Algonquin, and their allies by the British and the Haudenosaunee resulted in the further loss of Algonquin hunting territories in southern Quebec and eastern Ontario as the British seized France's colonies. The extension of Quebec's boundaries in 1774 through the Quebec Act and the use of the Ottawa River as the boundary of Upper and Lower Canada following the 1791 Constitution Act separated the Algonquins between two government administrations (AOP n.d.).

Britain's colonial policy differed from the French in that the Crown was much more interested in securing land surrenders from the Indigenous populations for settlement by Europeans. The Royal Proclamation of 1763 issued by King George III enabled the Crown to monopolize the purchase of Indigenous lands west of Quebec. Although the proclamation recognized Indigenous rights to their land and hunting grounds, it also provided a way through which these rights could be taken away (Surtees 1994). Land cession agreements between Indigenous groups and the Crown increased following the War of 1812 as a new wave of settlers arrived in Upper Canada primarily from Britain. The Crown implemented annuity systems in the purchase of lands from Indigenous peoples where the interest payments of settlers on the land would cover the cost of the annuity rather than pay a one-time lump sum. By the 1850s, Indigenous groups had become cautious of these agreements and began to demand the retention of reserved land and preservation of hunting and fishing rights (Surtees 1994).

Between 1783 and 1784, Captain William Redford Crawford negotiated on behalf of the Crown with the Mississauga chiefs living in the Bay of Quinte region. In the so-called "Crawford Purchase," Crawford negotiated for the lands located east of the Bay of Quinte to the Trent River. This agreement was intended to provide land to the United Empire Loyalists and Indigenous allies following the American Revolution (Ontario 2020). The lands

covered by the Crawford Purchase now includes the communities of Kingston and Brockville. The Crown again negotiated with the Mississauga of the Bay of Quinte and Kingston areas during the Rideau Purchase (1819/1822) which included a portion of Algonquin territory in the Ottawa Valley (Surtees 1994). The Algonquin and Nipissing, who were left out of the talks, protested the purchase, but were largely ignored (Holmes 1993).

The Indian Act of 1876 framed the relationship between the Canadian government and Canada's Indigenous peoples as a paternalistic one where the government served as their guardian until their cultures were able to integrate into Canadian society (INAC 2011). The Department of Indian Affairs was granted the authority to make policy decisions such as determine who was classified as Indigenous, manage their lands, resources and money, and promote "civilization". The consequence was the further erosion of Indigenous rights to autonomy and self-governance. The implementation of residential schools and adoption of Algonquin children by non-Indigenous families in the mid-20th century reflected further discrimination and the disregard of rights (AOP n.d.).

2.2 Post-Contact Regional History

Samuel de Champlain was the first European to document his explorations of the Ottawa Valley, initially in 1613 and again in 1615. He was preceded by two of his emissaries, Etienne Brule around 1610 and Nicholas de Vigneau in 1611. In the wake of Champlain's voyages, the St. Lawrence and Ottawa Rivers became principal routes for explorers, missionaries and fur traders travelling to the interior, and throughout the 17th and 18th centuries these waterways remained important links in the French fur trade.

Similar to other counties fronting the St. Lawrence River, substantial settlement in the United Counties of Stormont, Dundas and Glengarry began in the late 18th century with the arrival of United Empire Loyalists following the American Revolutionary War. The Surveyor General for Canada, Major Samuel Holland started to lay out the new lands in 1784. Initially, the new townships were simply assigned numbers due to the fast pace in which they were being surveyed (Leavitt 1879).

Following their arrival, the Loyalists drew their lots with each soldier receiving a grant of 100 acres fronting on the St. Lawrence and an additional 200 acres further inland within the same township. Officers were entitled to larger grants, based on their rank, with children of Loyalists also being granted free land. As a result, the entire riverfront within the newly surveyed Townships of Charlottenburgh, Cornwall, Osnabruck, Williamsburgh and Matilda (originally identified simply by numbers) were settled almost simultaneously (Lockwood 1996). Generally, Scots were placed in the eastern townships and the western townships were comprised mostly German immigrants.

Shortly after the distributions of property lots, the early settlers expressed desire for local governance. This area was considered part of the Montreal District until 1788 when Lord Dorchester announced the formation of new districts west of Montreal and the Counties of Stormont, Dundas and Glengarry became affiliated with the most eastern district of Lunenburg (Harkness 1946).

Glengarry County, established in 1792, was one of Upper Canada's first 19 counties (Bowering 2006). The first European settlers were Scottish Loyalists who arrived in the region from the Scottish Highlands between 1785 and 1793. Surveyor Lieutenant Walter Sutherland and his men settled along the waterfront of Lake St. Francis approximately 3.5 km east of the Study Area in the town of Lancaster, known as South Lancaster today. This settlement was the site of the first Presbyterian Church in Upper Canada, St. Andrew's built in 1796 (Mika & Mika 1977). Besides the Scottish, Glengarry County also saw settlement by French-Canadians, the Dutch, and the Swiss beginning in the early 1800's.

During the War of 1812 with the neighbouring United States, many attempts were made to take Montreal. Just west of Montreal, the United Counties of Stormont, Dundas and Glengarry were not unaffected by this war. In November of 1813, the American military, led by General Wilkinson, arrived on Canadian soil between Prescott and Cornwall at Crysler's Farm near present-day Morrisburg. Even though the British were outnumbered in the battle they soundly defeated the American invaders, and the Canadian Parliament commemorated the battle with a plaque at Crysler's Farm in 1895 (Harkness 1946). The victory at the Battle of Crysler's Farm led to the American's abandoning their attempt to take Montreal (Bowering 1992).

By the end of the eighteenth century, the townships along the waterfront in the District of Lunenburg had been surveyed and partially settled. In 1826, the original districts had been broken up into to smaller districts, as settlement increased and the desire for further localized government grew. The United Counties became part of the Eastern District, and by the mid-1800s the districts were phased out as counties and townships took on more governing responsibilities.

The inauguration of steamships from Montreal made South Lancaster an important transportation hub, giving it the nickname the "Gateway to Glengarry." This position was reinforced by the construction of the Grand Trunk Railway (now part of the Canadian National Railway), built to link Brockville with Montreal, which opened its station 1 km north of the Raisin River in 1855 (Bowering 2006: 27). The construction of the station lead to the creation of New Lancaster which is now known as Lancaster which grew rapidly as businesses moved there to be near the railway (Mika & Mika 1977).

The townships farther from the St. Lawrence River were not settled nearly as quickly as those along the water. It wasn't until the 1880's, with the addition of several railways in the northern section of the county, that development in these areas began in earnest. Small centres such as Alexandria, Chesterville, and Avonmore grew considerably and new villages such as Maxville were established (Harkness 1946). By the end of the 19th century, Glengarry County was known for producing cheese and manufacturing sleighs and carriages (Lanken 2010).

The St. Lawrence River had always been an important transportation route even prior to European settlement within the county, although there were several rapids between Cornwall and Prescott making navigation difficult. Several canals were constructed in an effort to improve navigation through the area, with the Cornwall Canal opening in 1842 and the Williamsburg Canals (Farran Point, Rapide Plat, Galop and Iroquois) completed in 1847. As early as 1895, a joint commission between the United States and Canada was initiated to discuss further developments to ensure the river could be utilized as a viable shipping route (Marin and Marin 1982).

Fires during the 1920's destroyed much of Lancaster's original business centre. The only historic building to be spared was the Moose Head Inn, a stagecoach Inn built in 1825 that also doubled as a courthouse in its early years (Mika & Mika 1977). Of note, later renovations of the building's basement revealed a deteriorated gunpowder keg placed under where the judge would have sat.

Most citizens along the riverfront protested the flooding of their lands, while large companies lobbied for the construction of the St. Lawrence Seaway. Although the project was delayed due to two world wars and American inaction, in 1951 the *St. Lawrence Seaway Act* was approved in Canada and in 1954, the *American Seaway Act* was passed with approval granted for New York to join Ontario Hydro on the project (Marin & Marin 1982).

There were great expectations for the St. Lawrence Seaway as many believed it would bring significant economic growth to the United Counties of Stormont, Dundas and Glengarry. Ground was officially broken in August 1954 and the Seaway was officially opened five years later following construction of three large dams and several

cofferdams. In the United Counties, Ontario Hydro bought 37,000 acres, with 6,500 people losing their homes and eight villages being affected including Iroquois, Aultsville, Farran's Point, Dickinson's Landing, Wales, Moilinette, Mille Roches, and Morrisburg. Railways and roads, including Highway 2, were moved while some structures were relocated, and two new towns (Ingleside and Long Sault) were created for the displaced people from the historic villages (Marin and Marin 1982). Two cemeteries were raised, and 14 cemeteries originally positioned along the waterfront were amalgamated and moved to the St. Lawrence Valley Union Cemetery (Marin & Marin 1982).

The creation of the St. Lawrence Seaway was considered by many to be the most significant engineering project of the decade in North America and possibly one of the most important in the world at the time (Marin and Marin 1982). Unfortunately, the Seaway did not bring the substantial economic growth to the area that was predicted, and the region's population has not drastically changed since the 1950's.

Upper Canada Village was created to showcase the history of the United Counties, and more than half of the buildings showcased at the site originated from the United Counties (Marin and Marin 1982). Many parks and beaches were created along the river with signs and plaques commemorating historic sites and villages which had a positive effect on tourism in the area. In addition to these efforts to preserve the history of the United Counties, an archaeological investigation was carried out over three summers on Sheek Island to gather information and artifacts prior to the flooding of the area. An aboriginal settlement, including a burial site, was identified as being from the Point Peninsula Period (Marin & Marin 1982).

In 1998, the Lancaster and Charlottenburgh townships were amalgamated to create South Glengarry County.

2.2.1 The Township of Charlottenburgh

The township of Charlottenburgh is situated on the north shore of the St. Lawrence River and is named for Charlotte of Macklenburg-Strelitz, the wife of King George III (Mika & Mika 1977: 399). Loyalist leader Sir John Johnson received Crown land grants after the American Revolution in Glengarry County and arrived in 1784 with a party of settlers. In 1790, Johnson established the town of Williamstown where he built a manor house, grist mill and sawmill along the River Aux Raisin. Williamstown is also of note for being the location of the oldest continually operated agricultural fair in Ontario which has been held in the town since 1808.

Fraserfield, located west of Williamstown, was the home of Alexander Fraser who served as Quartermaster of the Canadian Fencibles during the War of 1812 (Mika & Mika 1977: 399). He later served as the colonel of the Glengarry Militia and first Warden of the Eastern District between 1842 and 1849.

The first Roman Catholic Church in Upper Canada was built at St. Raphael in the northern region of the township. The parish was established in 1802 by Reverend Alexander Macdonell who immigrated to Glengarry County with 500 Scottish immigrants. They constructed a stone church in 1821, and it served as the administrative centre of the church in the province until 1826. In 1974 St. Raphael's was destroyed by a fire and the ruins were designated a National Historic site in 1999 (St. Raphael's Ruins 2017).

By 1846, Charlottenburgh had a population of nearly 5000 people and contained four grist and six sawmills (Smith 1846: 30-31). The construction of the Grand Trunk Railway in 1855 saw the opening of a station at Camerontown.

2.3 Study Area History

Historical plans, topographic maps, and aerial photographs provide evidence of the historical use of the study area. A plan of Glengarry County dating to 1862 shows the Stage 1 AA Study Area was owned by a [redacted]. In addition to several structures west of the subject property, one structure is illustrated within the north section of

the lot, north of the Study Area. A creek is shown extending on a roughly east to west axis through the southwest corner of the lot. The Grand Trunk Railway is also shown in its present location on the 1862 map (Figure 3).

By the 1879 mapping of the counties of Stormont, Dundas, and Glengarry, the property changed ownership to a [redacted]. The map indicates increased development in proximity to the Study Area including the construction of an historical roadway along the present-day location of Fraser Road. The creek illustrated on the 1862 map appears to have been diverted farther south through the south section of the Stage 2 AA Study Area (Figure 3).

Topographic maps from the 20th century show that the Study Area remained undeveloped and surrounded by forest and a wetland to the southeast (Figure 4).

A review of the aerial imagery from the 20th century shows no additional development within the Study Area.

3 ARCHAEOLOGICAL CONTEXT

3.1 Current Conditions

The Study Area consists of two sections that measure a total of approximately 0.9 hectares, located north and south of Highway 401 along Lapierre and Fraser Roads. The north section subject property consists of the west side and berm of Lapierre Road, and unkept grass along east side of Lapierre Road extending southwards along west side of Fraser Road. The south section consists of a wooded lot with primarily maple and some birch along the east side of Fraser Road, south of the Highway 401. The Stage 1 AA section of the Study Area appears to be extensively and deeply disturbed from the construction of Lapierre Road. The areas recommended for Stage 2 AA test pit survey appear to contain an undisturbed context adjacent to the roadways.

3.2 Study Area Environment

The Study Area lies within the Lancaster Flats Physiographic Region (Chapman & Putman 1966: 205). The till plain in this area has been buried by alluvial deposits from the St. Lawrence River leaving only a few drumlins and ridges exposed from the surrounding sediments that range from clay to very fine sand. The flatness of the land has resulted in poor drainage with much of the original vegetation being water-loving species. These include American elm, white ash, and red maple.

The surficial geology indicates that the Study Area is underlain by coarse–textured glaciomarine deltaic and estuarine of medium to fine sand deposits (Figure 6). The soils are classified as Bainsville silty loam, which consist of a dark grey gleysolic water-laid fine sand and silts with poor drainage (Figure 6).

The Study Area is located in proximity to Raisin River and Fraser Creek within the Fraser Creek subwatershed of the Raisin River watershed. The St. Lawrence River lies approximately 3 km south of the current Study Area.

3.3 Previously Completed Archaeological Assessments

A search of the Ontario Public Register of Archaeological Reports database and a review of archaeological reports in the area indicates that one previous AA has been conducted within or adjacent to the Study Area. Basic information regarding the previous archaeological report is provided in Table 1. Figure 6 depicts the location of the previous assessments in relation to the current Study Area and known Archaeological Sites.

Table 1: Previous Archaeological Assessments within 50 m of the Study Area

Year	Title	Author	PIF
2018	*Stage 1 Archaeological Assessment, Highway 401 and Fraser Road Underpass Replacement, Part of Lot 2, Concession 1, and Lots 1-2 Concession 1 South of River Aux Raisins, Former Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas and Glengarry*	ASI	P450-0040-2018

In 2018, ASI was retained by Dillon Consulting Limited to complete a Stage 1 AA as part of the Highway 401 and Fraser Road Underpass in the township of South Glengarry. Aside from a small section within Laperriere Road, this Stage 1 AA covered the current Study Area, north and south of Highway 401 along Frasier Road. The assessment determined that undisturbed sections within the forested area and agricultural fields required further assessment. As such, a Stage 2 test pit or pedestrian survey was recommended within these areas retaining archaeological potential.

3.4 Registered Archaeological Sites

A search of the Ontario Archaeological Sites Database (OASD) indicates that there are no registered archaeological sites within 1 km of the Study Area (MCM 2024).

3.5 Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present within a property. In accordance with the MCM's 2011 *Standards and Guidelines for Consultant Archaeologists* the following are features or characteristics that indicate archaeological potential:

- Previously identified archaeological sites.
- Water sources:
  - Primary water sources (lakes, rivers, streams, creeks).
  - Secondary water sources (intermittent streams and creeks; springs; marshes; swamps).
  - Features indicating past water sources (e.g., glacial lake shorelines indicated by the presence of raised gravel, sand, or beach ridges; relic river or stream channels indicated by clear dip or swale in the topography; shorelines of drained lakes or marshes; and cobble beaches).
  - Accessible or inaccessible shoreline (e.g., high bluffs, swamps or marsh fields by the edge of a lake; sandbars stretching into marsh).
- Elevated topography (eskers, drumlins, large knolls, plateaux).
- Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground; distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases (there may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings).
- Resource areas including:
  - Food or medicinal plants.
  - Scarce raw minerals (e.g., quartz, copper, ochre or outcrops of chert).
  - Early Euro-Canadian industry (fur trade, mining, logging).
- Areas of Euro-Canadian settlement.
- Early historical transportation routes.

In recommending a Stage 2 property survey based on determining archaeological potential for an area, the MCM stipulates the following:

- No areas within 300 m of a previously identified site; water sources; areas of early Euro-Canadian Settlement; or locations identified through local knowledge or informants can be recommended for exemption from further assessment.
- No areas within 100 m of early transportation routes can be recommended for exemption from further assessment.

- No areas within the property containing an elevated topography; pockets of well-drained sandy soil; distinctive land formations; or resource areas can be recommended for exemption from further assessment.

The Study Area was therefore determined to contain archaeological potential for historical and pre-contact Indigenous sites. Pre-contact Indigenous and historical archaeological potential is based on water sources in proximity to the Study Area (Raisin River, Fraser Creek, wetland) and early transportation routes (Grand Trunk Railway) (Figures 4 & 5).

3.6 Features Indicating the Removal of Archaeological Potential

As stated in Section 1.3.2 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), archaeological potential can be determined to be removed either entirely or in part when background research and property inspection confirm extensive and deep land alterations that have severely damaged the integrity of any archaeological resources that may be present. Types of disturbance that remove archaeological potential may include quarrying; major landscaping involving grading below topsoil; building footprints; and sewage and infrastructure development.

As discussed in Section 3.1 above, the Study Area has been impacted by activities related to the development of Lapierre Road. This includes the west side of the roadway and berm.

The Study Area was surveyed and documented accordingly to confirm the presence and extent of surface disturbance (see Section 4.1 below).

4 FIELD METHODS

4.1 Stage 1 Property Inspection

As part of the Stage 1 AA, a property inspection was conducted by Joel Bush on November 1, 2024, under archaeological consulting license P1192, issued to Joel Bush by the MCM (PIF# P1192-0032-2024).

The weather was 14°Celsius and mostly sunny, permitting good visibility of land features and contributing to no reduction in the chance of observing features of archaeological potential. Access to the Study Area was granted by the Client and Township of South Glengarry with no limitations. Field notes and photographs of the Study Area were taken during the inspection. The photograph locations and directions can be seen on Figure 7 (Images 1-3).

The inspection was undertaken to gain first-hand knowledge of the Study Area, to determine if there were any areas of disturbance that would affect archaeological potential, and to determine what survey strategies would be appropriate for a Stage 2 AA, should it be required. All portions of the Study Area were systematically inspected to confirm if features of archaeological potential were present and if there were any areas of deep and extensive disturbance, which would have removed archaeological potential. As stated in Section 1.4.2 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), a property may only be exempt from Stage 2 AA once deep and extensive ground disturbance has been confirmed through a property inspection.

The Stage 1 AA Study area comprised of the lands not previously assessed by ASI consisted of the west side of Lapierre Road and west berm. The entire Stage 1 AA Study Area (100%) was thus recorded as deeply and extensively disturbed from the construction of Lapierre Road and berm.

4.2 Stage 2 Test Pit Survey

The Stage 2 AA was conducted concurrently with the Stage 1 AA on November 1, 2024, under archaeological consulting license P1192, issued to Joel Bush by the MCM (PIF# P1192-0032-2024).

The weather was 14°Celsius and mostly sunny, permitting good visibility of land features and contributing to no reduction in the chance of observing features of archaeological potential. Access to the Study Area was granted by the Client and the Township of South Glengarry with no limitations. Field notes and photographs of the Study Area were taken during the inspection.

Photo locations are illustrated on Figure 8 (Images 4-9). All activities undertaken during the assessment are in compliance with the *Ontario Heritage Act* (Government of Ontario 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

All features of topographic or archaeological significance were recorded using the ESRI ArcGIS Field Maps program on a Samsung Tab Active3 tablet connected via Bluetooth to a Garmin GLO2 device, achieving an average GPS accuracy of 3 m.

The entire Stage 2 AA Study Area (100%) was subject to test pit survey at 5 metre (m) intervals.

The test pit survey conducted on the property followed the approach in Section 2.1 of the *Standards and Guidelines for Consultant Archaeologists* (MCM, 2011). Test pits were placed at intervals of 5 m within areas of archaeological potential as determined by the Stage 1 site inspection conducted concurrently with the test pit survey. The test pits measured at least 30 centimetres (cm) in diameter and were excavated at least 5 cm into subsoil. The bottom and sides of all test pits were examined for the presence of cultural features. All soil was screened through 6-milimetre (mm) mesh, and the test pits were subsequently backfilled.

The Study Area conditions within the north section consisted of unkept grass along the east side of Lapierre and west side of Fraser Road. The conditions within the south section consisted of a widely spaced wooded lot with primarily maple and some birch trees along the east side of Fraser Road and south of the Highway 401/Fraser Road underpass.

The documented natural stratigraphy indicated an intact subsurface context within the south section and part of the north section along Lapierre Road. A representative test pit within the Study Area was comprised of 15-19 cm of moderately-compact medium brown sandy loam over moderately-compact light brown silt subsoil. The subsurface conditions along the west side of Fraser Road, within the north section, contained a disturbed context down to subsoil that consisted of 50-60 cm of mottled medium and dark brown compact clay with 15 % gravel over 14-17 cm of compact dark brown clay loam over moderately compact light brown silt subsoil. No archaeological resources were encountered.

5 RECORD OF FINDS

Intact natural stratigraphy was documented within part of the Study Area. The subsurface conditions within the north section, along the east side of Lapierre Road, and within the south wooded section consist of 15-19 cm of moderately-compact medium brown sandy loam over moderately-compact light brown silt subsoil. A representative test pit from junction of Fraser and Lapierre Road and along west side of Fraser Road shows a disturbed context down to subsoil. The soil conditions consist of 50-60 cm of mottled medium and dark brown compact clay with 15 % gravel over 14-17 cm of compact dark brown clay loam over moderately compact light brown silt subsoil.

Despite the presence of archaeological potential within the Study Area, no archaeological resources were identified during the Stage 2 AA fieldwork.

5.1 Inventory of Documentation Records

The following represents all the documentation taken in the field relating to this project and is being retained by WSP:

- 2 pages of field notes.
- 10 digital photographs in JPG format.

6 ANALYSIS AND CONCLUSIONS

A section within the northwest Study Area, located along Lapierre Road, was determined to be deeply and extensively disturbed following the Stage 1 AA site inspection.

As identified in the previous Stage 1 AA (ASI 2018), parts of the Study Area contained archaeological potential, and, as such, were subject to test pit survey at 5 m intervals.

Despite careful scrutiny, no archaeological resources were identified during the Stage 1-2 AA of the Study Area (Figure 9).

7 RECOMMENDATIONS

This Stage 1-2 AA resulted in the following recommendation:

1) No further AA is required within the Study Area (Figure 9).

It should be noted that the results of this report are not considered final until the MCM has reviewed the above-stated recommendations, and the report has been entered into the Ontario Public Register of Archaeological Reports.

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

The Funeral, Burial and Cremation Services Act (FBCSA), 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner (Government of Ontario 2002). It is recommended that the Registrar, FBCSA at the Ministry of Public and Business Service Delivery, are also immediately notified.

8 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the *Standards and Guidelines for Consultant Archaeologists* (MCM 2011) that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

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

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

9 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

WSP Canada Inc. (WSP) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

This report has been prepared for the specific site, design objective, developments and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without WSP's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the Client, WSP may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to WSP. The report, all plans, data, drawings and other documents as well as all electronic media prepared by WSP are considered its professional work product and shall remain the copyright property of WSP, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of WSP. The Client acknowledges the electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of WSP's report or other work products.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project.

Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain archaeological resources. The sampling strategies incorporated in this study comply with those identified in the Ministry of Citizenship and Multiculturalism's *Standards and Guidelines for Consultant Archaeologists* (2011).

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11 IMAGES



Image 1: Stage 1 AA Study Area conditions consist of a disturbed context from the construction of Lapierre Road and berm. Facing north.



Image 2: Stage 1 AA Study Area consists of west side of Lapierre Road and berm. Facing south.



Image 3: Stage 1 AA Study Area conditions showing west side of Lapierre Road and berm. Facing west.



Image 4: Stage 2 AA Study Area conditions consist of unkept grass along Lapierre and Fraser Road. Crew test pitting at 5 m intervals in background. Facing north.



Image 5: A representative test pit along east side of Lapierre Road showing intact subsurface context. The stratigraphy consists of 15-19 cm of moderately compact medium brown sandy loam over moderately compact light brown silt subsoil. Facing down.



Image 6: A representative test pit from junction of Fraser and Lapierre Road and along west side of Fraser Road shows disturbed context down to subsoil. Soil conditions consist of 50-60 cm of mottled medium and dark brown compact clay with 15 % gravel over 14-17 cm of compact dark brown clay loam over moderately compact light brown silt subsoil. Facing down.



Image 7: Crew test pitting at 5 m intervals at junction of Lapierre and Fraser Road. Facing north.

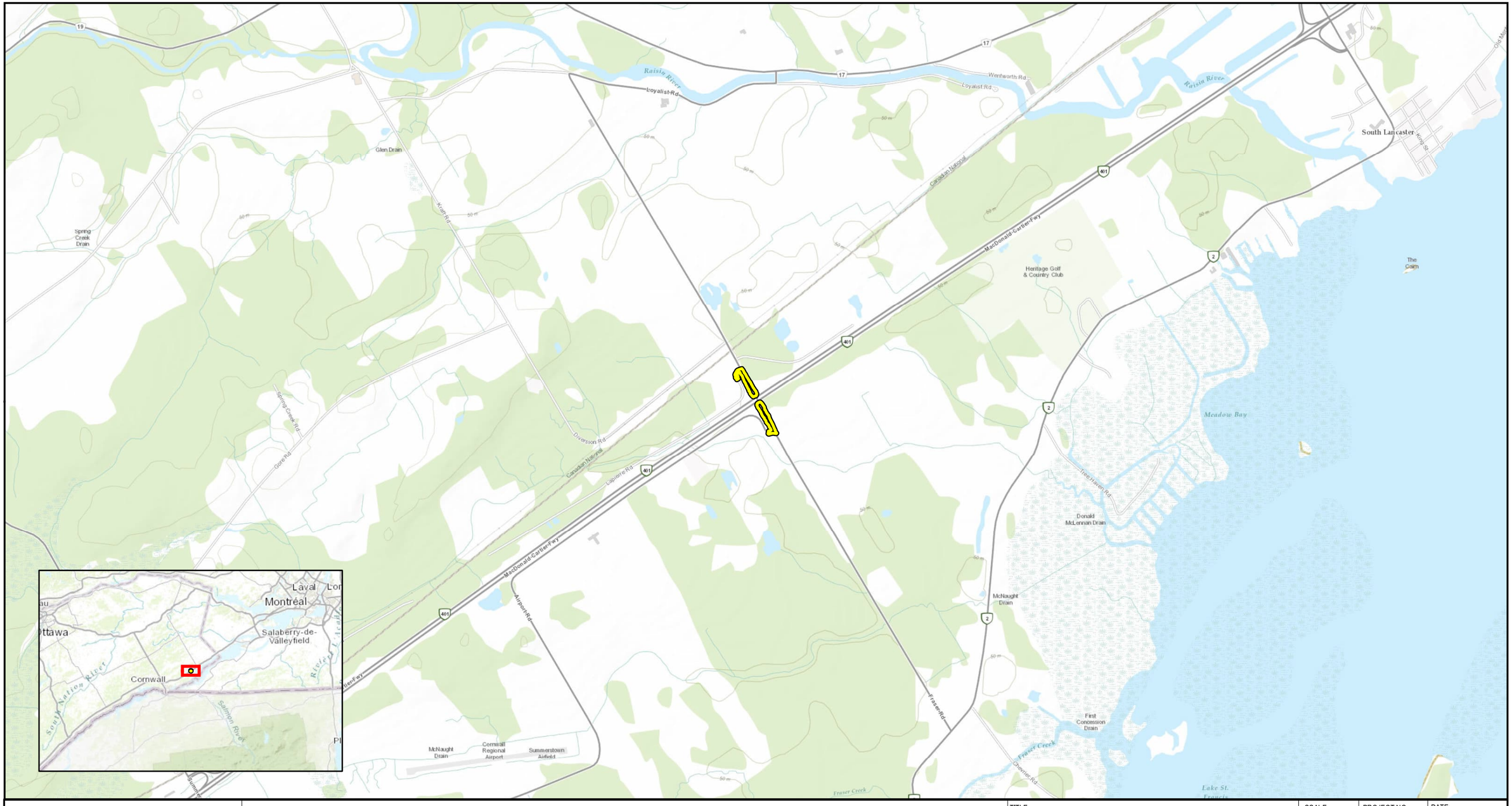


Image 8: Study Area conditions within wooded section south of Highway 401 consist of flat topography adjacent to Fraser Road with birch and maple trees. Fraser Road/Highway 401 underpass in background. Facing west.



Image 9: Crew testing at 5 m intervals within wooded section of Study Area. Facing north.

12 FIGURES



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LEGEND

Study Area

TITLE:

FIGURE 1: PROJECT LOCATION

SCALE:	PROJECT NO:	DATE:
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PROJECT:

STAGE 1 ARCHAEOLOGICAL ASSESSMENT, RIVERSIDE CAMPUS, PARKING LOT C AND PARKING LOT D, 1967 RIVERSIDE DRIVE, PART OF LOT 16, GORE, FORMER GEOGRAPHIP TOWNSHIP OF GLOUCESTER, CARLETON COUNTY, OTTAWA, ONTARIO

0 500 1,000 m

N

CREDITS:

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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LEGEND

Study Area

TITLE:
FIGURE 2: STUDY AREA

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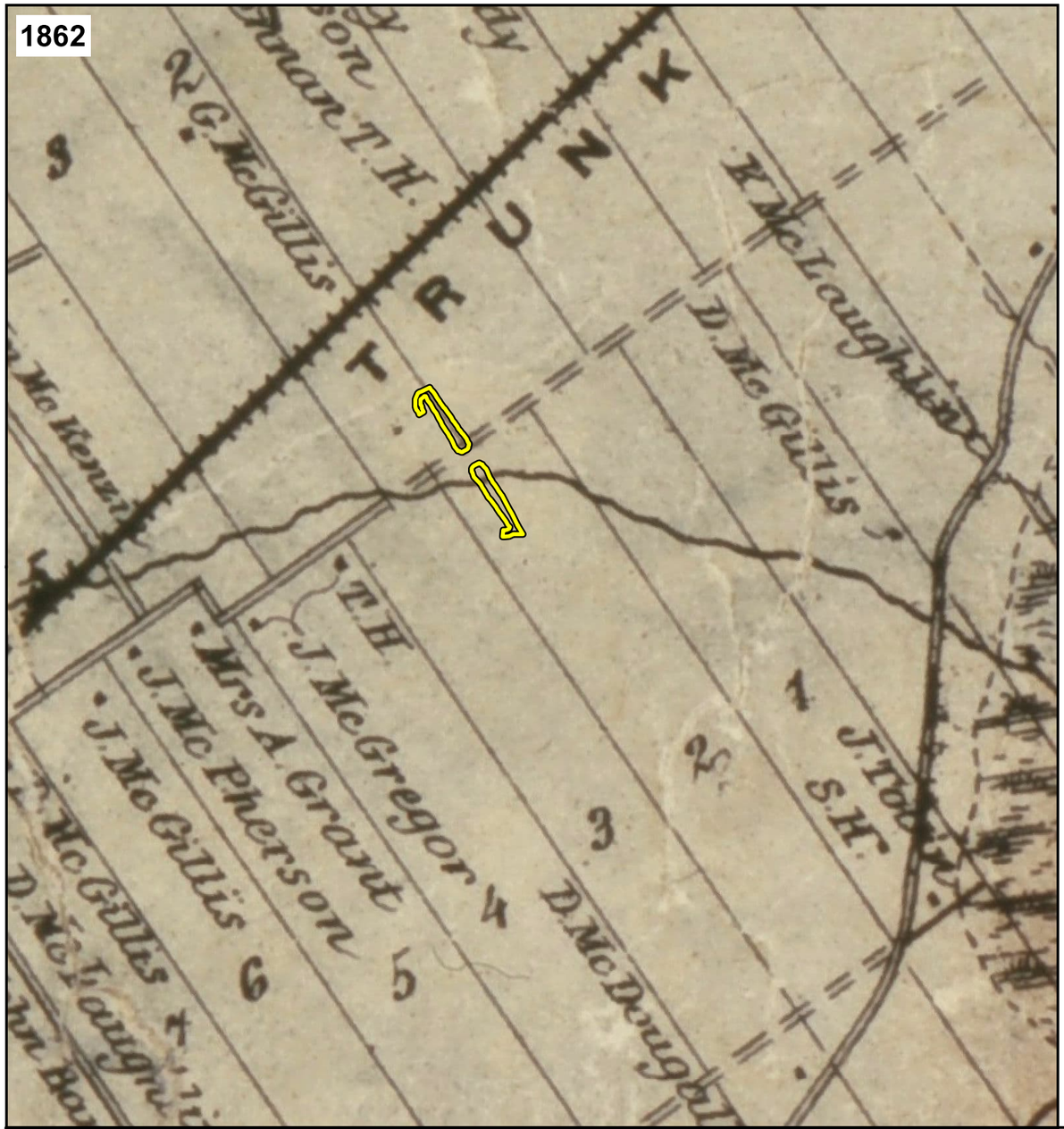
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STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT, HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00), PART OF LOT 2, CONCESSION 1 AND LOTS 1-2, CONCESSION 1 SOUTH OF RIVER AUX RASINS, FORMER GEOGRAPHIC TOWNSHIP OF CHARLOTTENBURG, TOWNSHIP OF SOUTH GENGARRY, UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY, ONTARIO

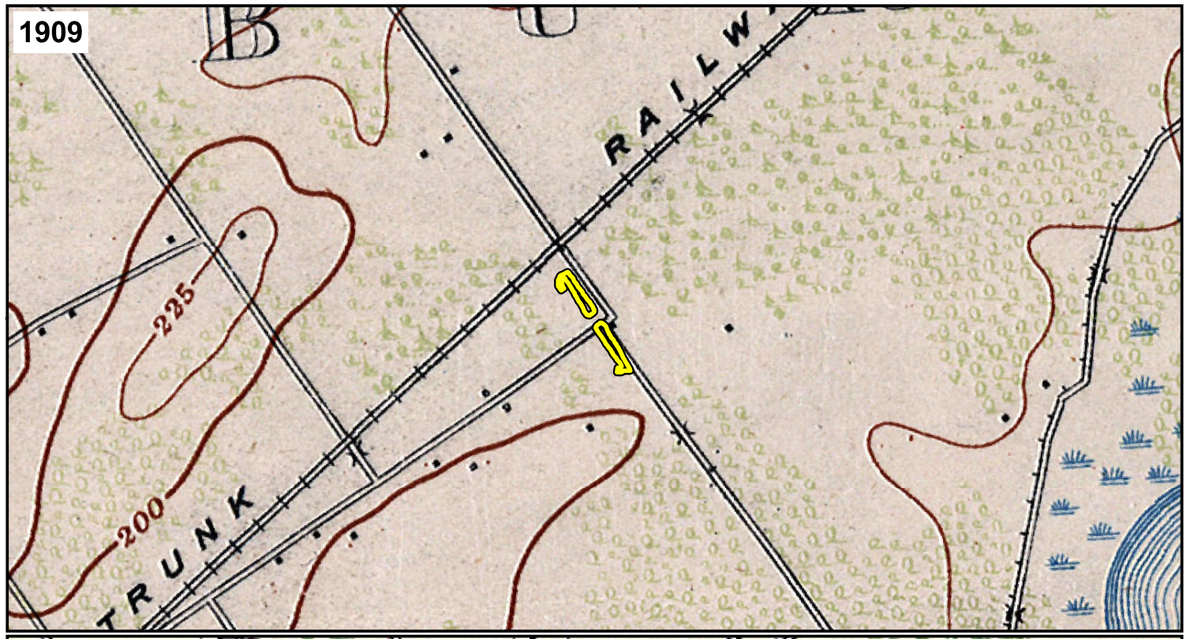
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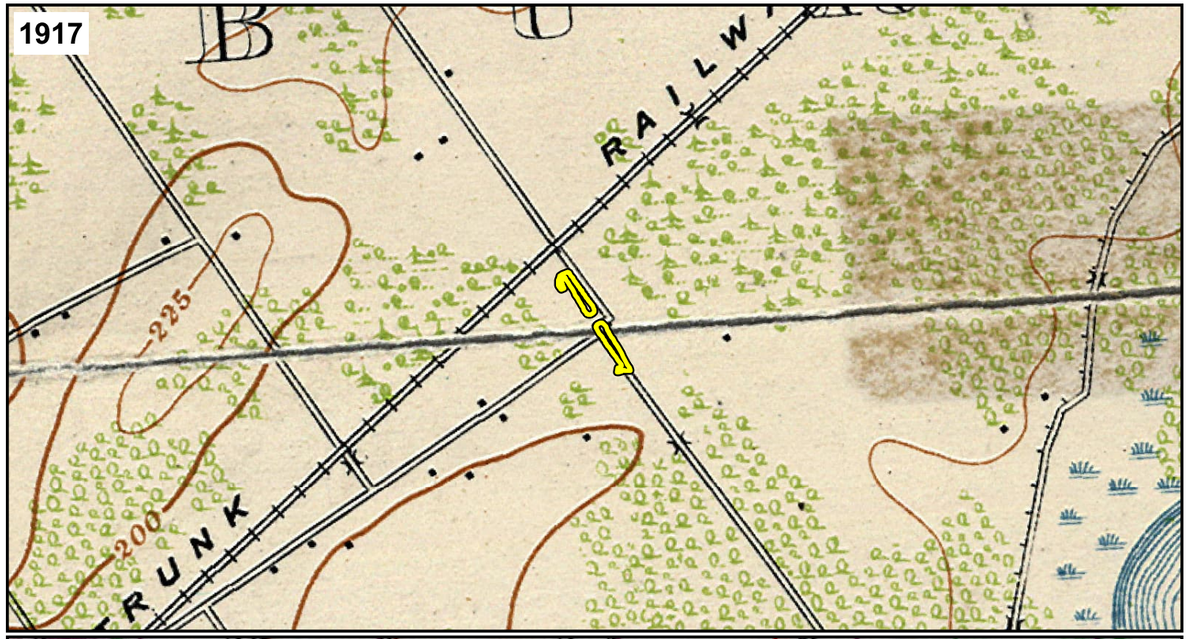
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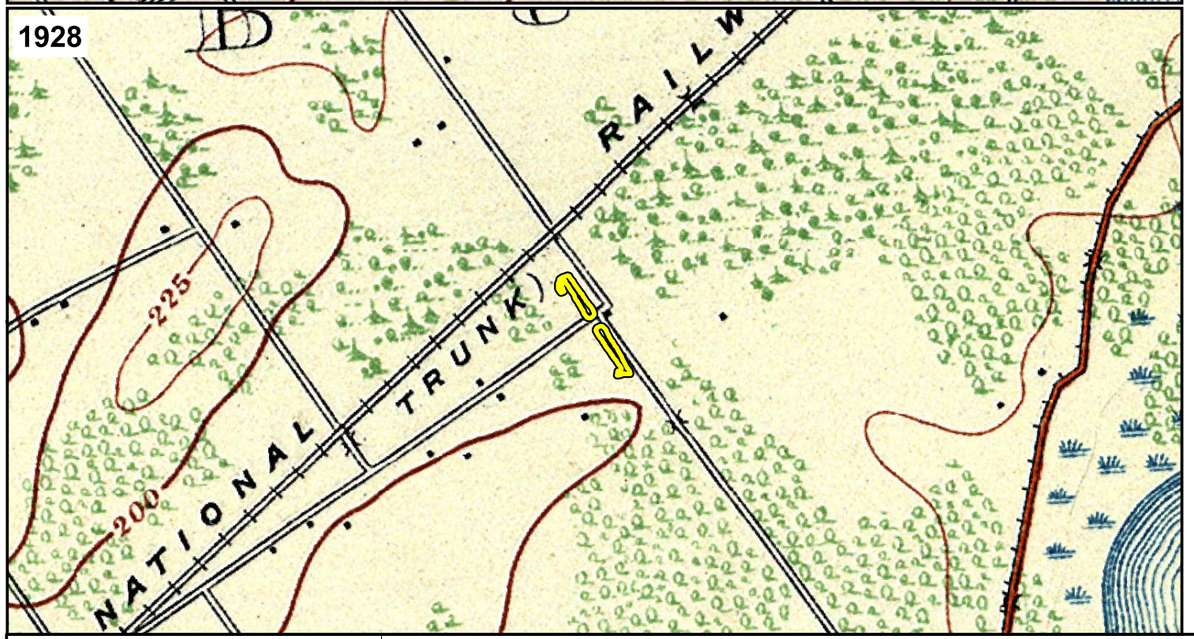
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Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

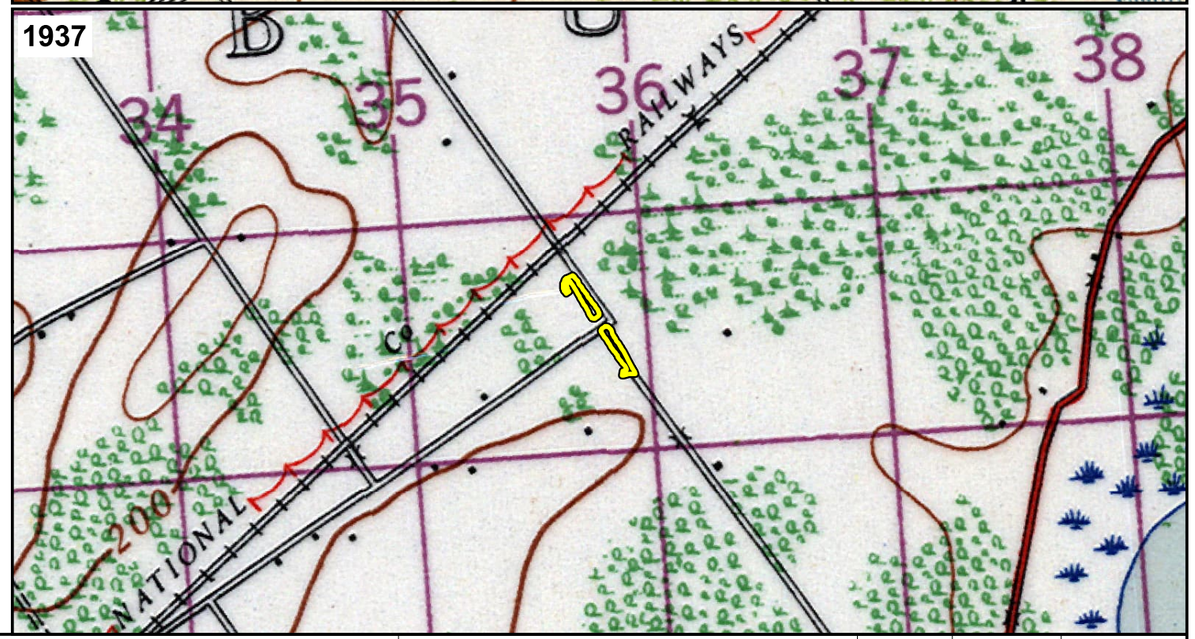
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1862
Mrs A. Grant
J. Mc Gillis
D. Mc Douglas
J. Mc Gillis
D. Mc Gillis
J. Mc Gillis
D. Mc Laughlin
D. Mc Gillis
J. Mc Gillis
J. Mc Gillis
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LEGEND

Study Area

TITLE:

FIGURE 4: TOPOGRAPHIC MAPPING

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STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT, HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00), PART OF LOT 2, CONCESSION 1 AND LOTS 1-2, CONCESSION 1 SOUTH OF RIVER AUX RASINS, FORMER GEOGRAPHIC TOWNSHIP OF CHARLOTTENBURG, TOWNSHIP OF SOUTH GENGARRY, UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY, ONTARIO

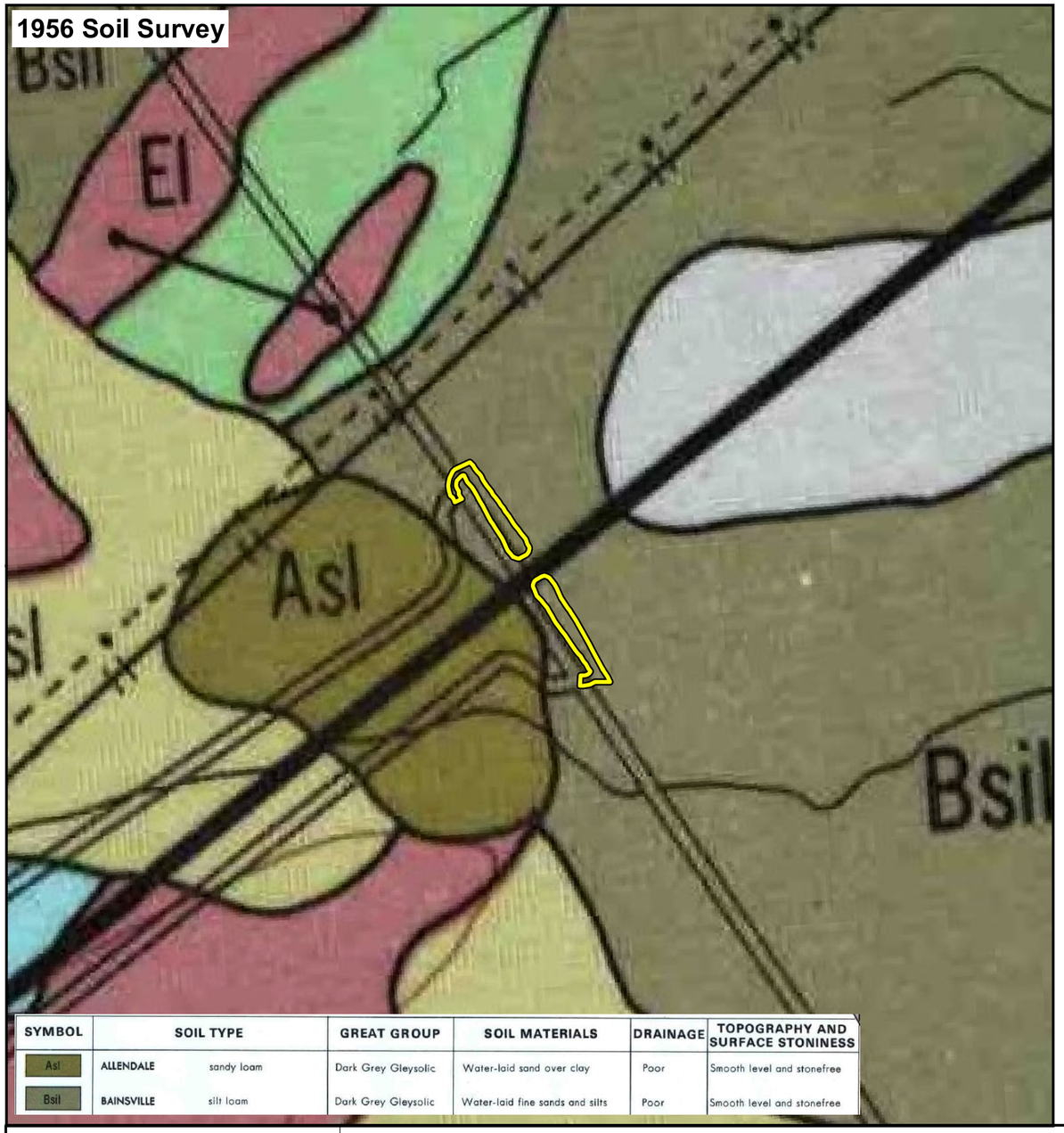
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SYMBOL	SOIL TYPE		GREAT GROUP	SOIL MATERIALS	DRAINAGE	TOPOGRAPHY AND SURFACE STONINESS
Asl	ALLENDALE	sandy loam	Dark Grey Gleysolic	Water-laid sand over clay	Poor	Smooth level and stonefree
Bsil	BAINSVILLE	silt loam	Dark Grey Gleysolic	Water-laid fine sands and silts	Poor	Smooth level and stonefree



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LEGEND

- Study Area
- 11a. MEDIUM TO FINE GRAINED SAND. DELTAIC AND ESTURINE DEPOSITS
- 5b. TILL: STONE. POOR. SANDY SILT TO SILTY SAND TEXTURED TILL ON PALEOZOIC TERRAIN

TITLE:
FIGURE 5: SOILS

SCALE:	PROJECT NO:	DATE:
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PROJECT:
STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT, HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00), PART OF LOT 2, CONCESSION 1 AND LOTS 1-2, CONCESSION 1 SOUTH OF RIVER AUX RASINS, FORMER GEOGRAPHIC TOWNSHIP OF CHARLOTTENBURG, TOWNSHIP OF SOUTH GENGARRY, UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY, ONTARIO

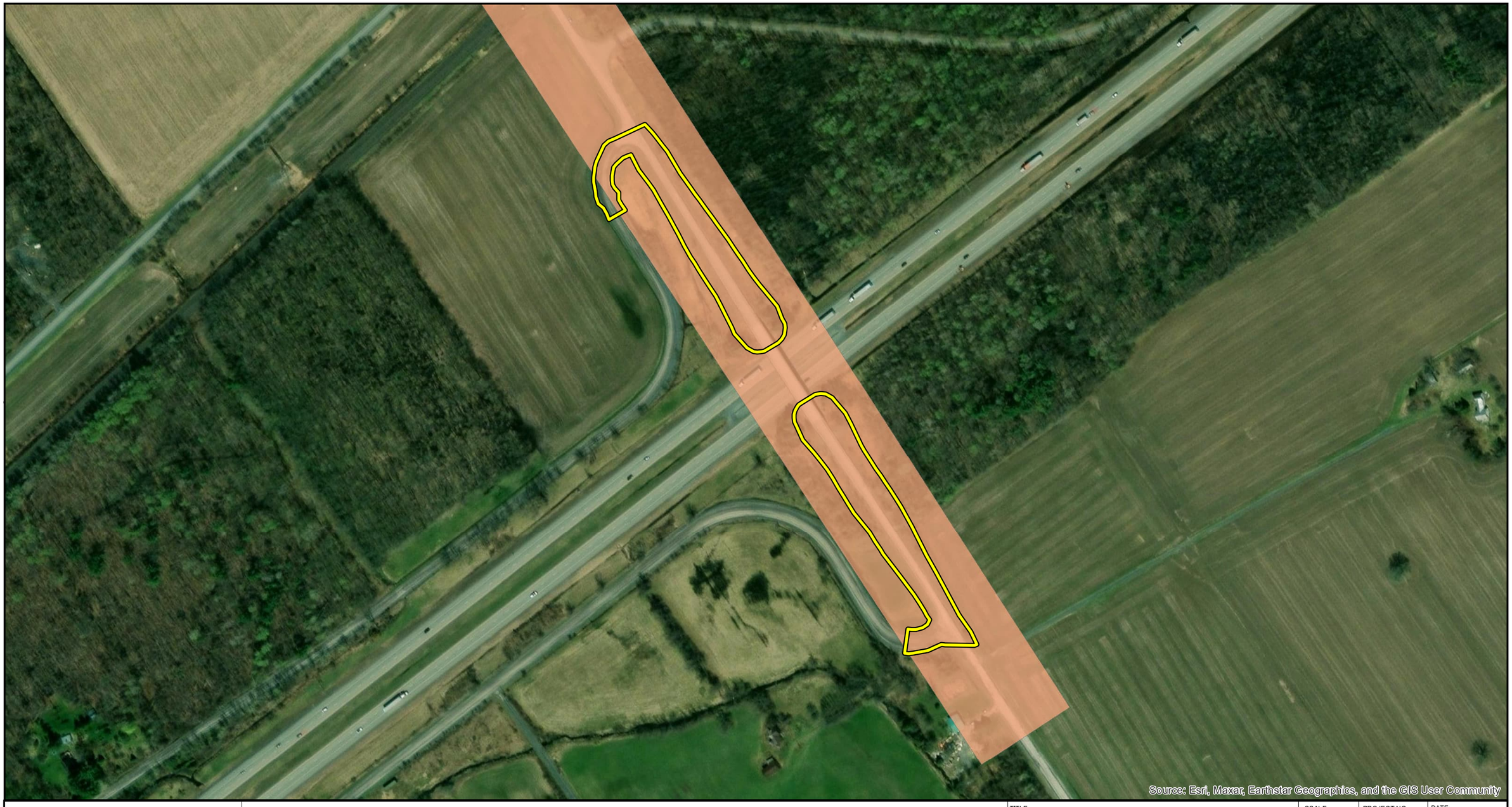
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- Study Area
- ASI (P450-0040-2018)

TITLE:
FIGURE 6: PREVIOUS ASSESSMENTS

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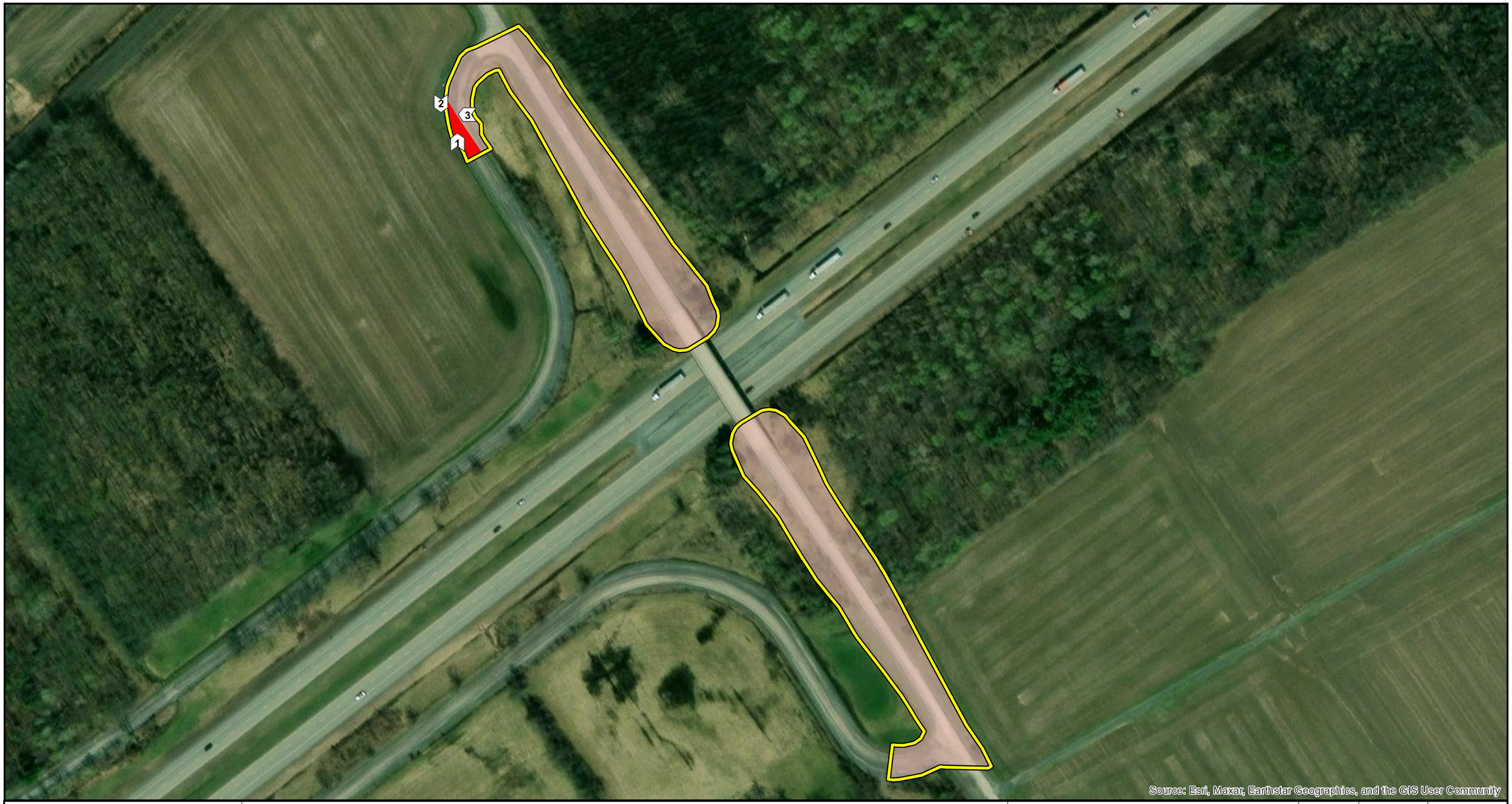
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LEGEND

- Study Area
- Photo Locations
- Visually Confirmed Disturbance
- Previously Subject to Stage 1 Archaeological Assessment

TITLE:
FIGURE 7: RESULTS OF THE STAGE 1 ARCHAEOLOGICAL ASSESSMENT

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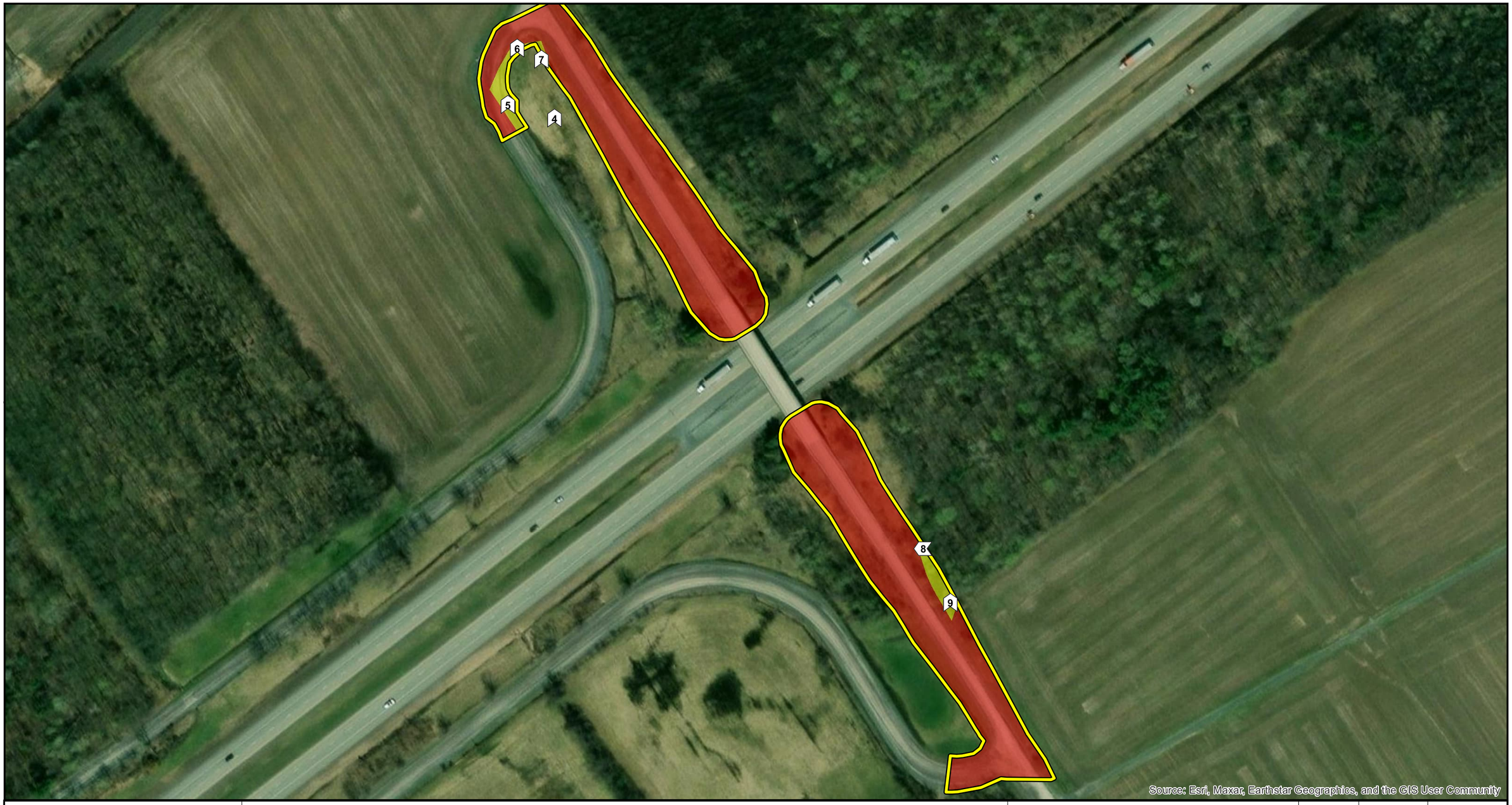
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LEGEND

- Photo Locations
- Study Area
- Visually Confirmed Disturbance
- Test Pit Survey at 5m Intervals

TITLE:
FIGURE 8: RESULTS OF THE STAGE 2 ARCHAEOLOGICAL ASSESSMENT

SCALE:	PROJECT NO:	DATE:
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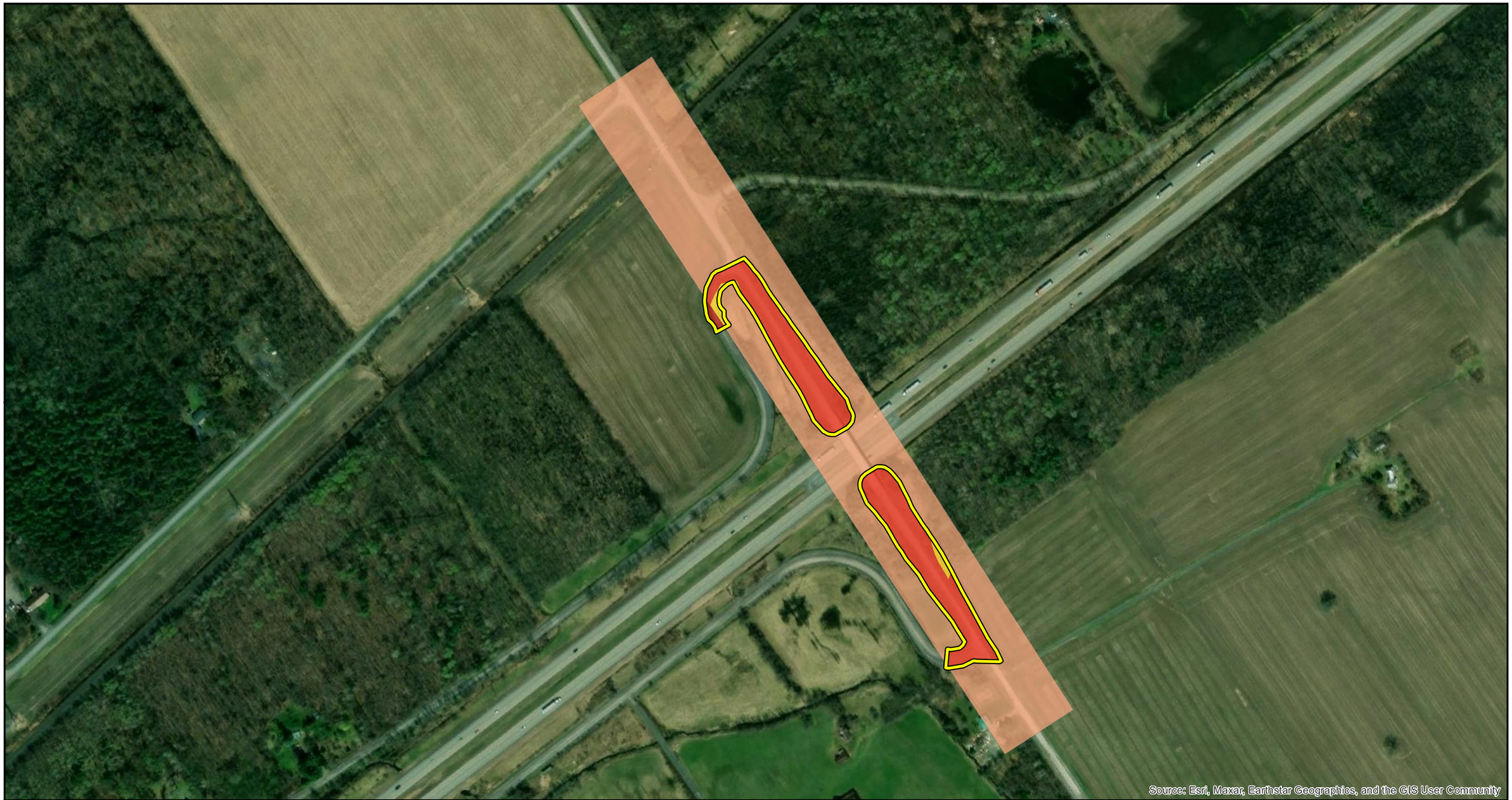
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STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT, HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00), PART OF LOT 2, CONCESSION 1 AND LOTS 1-2, CONCESSION 1 SOUTH OF RIVER AUX RASINS, FORMER GEOGRAPHIC TOWNSHIP OF CHARLOTTENBURG, TOWNSHIP OF SOUTH GENGARRY, UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY, ONTARIO

CREDITS:

0 40 80 m

N

Document Path: P:\Archaeology and Heritage\1) ARCHAEOLOGY\1) Projects\GIS\Fraser Road\FraserRd_Fig8_Stg2Results.mxd



LEGEND

- Study Area
- Visually Confirmed Disturbance
- Previous Stage 1 Study Area (ASI) - Unassessed
- Test Pit Survey at 5m Intervals - No Further Work Recommended

TITLE:
FIGURE 9: RESULTS OF THE ARCHAEOLOGICAL ASSESSMENT AND RECOMMENDATIONS

SCALE:	PROJECT NO:	DATE:
1:3,876	CA0019704.4282	NOV 2024

DRAWN BY: BR

CLIENT: MTO EAST REGION

PROJECT:
STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT, HIGHWAY 401 AND FRASER ROAD UNDERPASS REPLACEMENT (GWP 4248-15-00), PART OF LOT 2, CONCESSION 1 AND LOTS 1-2, CONCESSION 1 SOUTH OF RIVER AUX RASINS, FORMER GEOGRAPHIC TOWNSHIP OF CHARLOTTENBURG, TOWNSHIP OF SOUTH GENGARRY, UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY, ONTARIO

CREDITS:

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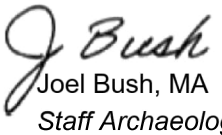
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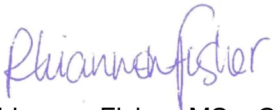
Signature Page

We trust that this report meets your current needs. If you have any questions, or if we may be of further assistance, please contact the undersigned.

WSP Canada Inc.



Joel Bush, MA
Staff Archaeologist



Rhiannon Fisher, MSc, CAHP, RPA
Lead Archaeologist

https://wsponlinecan.sharepoint.com/sites/ca-ca00197044282/shared documents/05. technical/.06 environmental/04. archaeology/final report/p1192-0032-2024_6jan2025_final.docx



wsp.com

SUPPLEMENTARY DOCUMENTATION

Stage 1-2 Archaeological Assessment

Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00), Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Rasins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario

Licensee: Joel Bush

PIF P1192-0032-2024

Submitted to:
Lee Collins, Project Manager
Ministry of Transportation, Project Delivery East
(613) 583-6752
Lee.Collins@ontario.ca
1355 John Counter Boulevard, Postal Bag 4000, Kingston, Ontario K7L 5A3

Submitted by:
WSP E & I Canada Limited
1931 Robertson Road Ottawa, Ontario K2H 5B7
Canada

1 613 592-9600

CA0019704.4282

September 10, 2025

Distribution List

One PDF - Ministry of Transportation

One PDF - Ministry of Citizenship and Multiculturalism

One PDF - WSP E & I Canada Limited

Table of Contents

1.0 SUPPLEMENTARY DOCUMENTATION: INDIGNEOUS ENGAGEMENT CORRESPONDENCE 1

1.0 SUPPLEMENTARY DOCUMENTATION: INDIGNEOUS ENGAGEMENT CORRESPONDENCE

The succeeding pages include email correspondence with Indigenous communities engaged with during the Stage 1-2 Archaeological Assessment of Highway 401 and Fraser Road Underpass Replacement (GWP 4248-15-00), Part of Lot 2, Concession 1 and Lots 1-2, Concession 1 South of River Aux Rasins, former geographic Township of Charlottenburgh, Township of South Glengarry, United Counties of Stormont, Dundas, and Glengarry, Ontario.

Outlook

Ministry of Transportation's Notice of Study Commencement - GWP 4248-15-00

From Li, Galvin (MTO) <Galvin.Li@ontario.ca>
on behalf of
Sacchetti, Franca (She/Her) (MTO) <Franca.Sacchetti@ontario.ca>

Date Fri 10/4/2024 3:23 PM

To consultations <consultations@metisnation.org>

2 attachments (490 KB)

Notice of Study Commencement Letter - GWP 4248-15-00.pdf; Notice of Study Commencement - GWP 4248-15-00.pdf;

Dear Consultation Coordinator,

Please see the attached letter regarding the replacement of the Fraser Road Underpass on Highway 401.

Regards,

Franca Sacchetti
Director, East Operations Branch
Operations Division
Ministry of Transporation | Ontario Public Service
647-638-5359, franca.sacchetti@ontario.ca

Ontario

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Outlook

FW: UPDATED: Stage 2 Archaeological Assessment Field Work - Fraser Road Underpass (GWP4248-15-00)

From Copping, Peter A. (MTO) <Peter.A.Copping@ontario.ca>
Date Mon 5/26/2025 1:09 PM
To Collins, Lee (MTO) <lee.collins@ontario.ca>; Pipe, Erin (MTO) <erin.pipe@ontario.ca>
Cc Moniz, Patricia (MTO) <Patricia.Moniz@ontario.ca>

Hi Lee and Erin,

For your awareness language re: Fraser Rd archaeology and the draft arch report have gone out to Mohawks of Akwesasne.

Thanks,

Peter

From: Sacchetti, Franca (She/Her) (MTO) <Franca.Sacchetti@ontario.ca>
Sent: Monday, May 26, 2025 12:45 PM
To: Grand Chief <grand.chief@akwesasne.ca>
Cc: Adam Jacobs <adam.jacobs@akwesasne.ca>; Cactus Sunday <cactus.sunday@akwesasne.ca>; Copping, Peter A. (MTO) <Peter.A.Copping@ontario.ca>; Moniz, Patricia (MTO) <Patricia.Moniz@ontario.ca>; Millett, Charlene (MTO) <Charlene.Millett@ontario.ca>
Subject: UPDATED: Stage 2 Archaeological Assessment Field Work - Fraser Road Underpass (GWP4248-15-00)

Dear Grand Chief Leonard Akwiratekha Lazore,

On behalf of Ministry of Transportation (MTO), I would like to bring to your attention that stage 2 archaeological field work was undertaken in the 2024 field season as part of the Detail Design and Class Environmental Assessment Study for the replacement of the Fraser Road Underpass (GWP 4248-15-00) and I was made aware that the Mohawks of Akwesasne were not invited to attend the field work. I sincerely apologize that Mohawks of Akwesasne was missed during the planning of this field work.

The MTO has put in place policies and procedures to provide guidance and help prevent situations such as this from occurring. This includes, but is not limited to the following:

- Developing robust contact lists of Indigenous Communities with potential or direct interests in MTO projects.
- Establishing plans and milestones in support of project objectives and goals.
- Ensuring ongoing dialogue between ministry staff and service providers as projects progress.

We regret this shortcoming in effectively reaching out to Mohawks of Akwesasne. The MTO, along with our consultants or contractors undertaking work on our behalf, will make every effort to ensure our outreach is more thorough going forward.

The ministry is also undertaking further review of procedures to identify and minimize any other potential gaps in diligent communication and is incorporating additional language in documents such as terms of reference and contracts with external parties. This will help to further clarify the roles and responsibilities of ministry staff and service providers carrying out work on MTO projects.

I have attached the draft stage 1/2 archaeological assessment report to this email for your consideration. We appreciate any questions or comments that you have on the report ahead of MTO submitting the document to Ministry of Citizenship and Multiculturalism. We would appreciate your response on the report by July 10, 2025.

Should Mohawks of Akwesasne have any comments, questions, or concerns in relation to the archaeological work which was undertaken and the report shared, or would like to schedule a virtual meeting with the project team, please do not hesitate to contact me.

Sincerely,

Franca Sacchetti
Regional Director, East Region
Operations Division
Ministry of Transportation | Ontario Public Service
647-638-5359, franca.sacchetti@ontario.ca

Ontario

Taking pride in strengthening Ontario, its places and its people

Subject: UPDATED: Stage 2 Archaeological Assessment Field Work - Fraser Road Underpass (GWP4248-15-00)
Sent: 2025-05-26, 12:45:27 PM
From: Sacchetti, Franca (She/Her) (MTO)<Franca.Sacchetti@ontario.ca>
To: Grand Chief
Cc: Adam Jacobs; Cactus Sunday; Copping, Peter A. (MTO); Moniz, Patricia (MTO); Millett, Charlene (MTO)
Attachments: 4248-15-00 Stage 1-2 AA Report (Rev2) - FINAL - 2025-01-06.pdf

---

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Operations Division
Ministry of Transportation | Ontario Public Service
647-638-5359, franca.sacchetti@ontario.ca

Ontario

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Outlook

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Date Mon 5/26/2025 1:09 PM
To Collins, Lee (MTO) <lee.collins@ontario.ca>; Pipe, Erin (MTO) <erin.pipe@ontario.ca>
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Sent: Monday, May 26, 2025 12:45 PM
To: Grand Chief <grand.chief@akwesasne.ca>
Cc: Adam Jacobs <adam.jacobs@akwesasne.ca>; Cactus Sunday <cactus.sunday@akwesasne.ca>; Copping, Peter A. (MTO) <Peter.A.Copping@ontario.ca>; Moniz, Patricia (MTO) <Patricia.Moniz@ontario.ca>; Millett, Charlene (MTO) <Charlene.Millett@ontario.ca>
Subject: UPDATED: Stage 2 Archaeological Assessment Field Work - Fraser Road Underpass (GWP4248-15-00)

Dear Grand Chief Leonard Akwiratekha Lazore,

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Operations Division
Ministry of Transportation | Ontario Public Service
647-638-5359, franca.sacchetti@ontario.ca

Ontario

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APPENDIX G

Detail Design Drawings

MINISTRY OF TRANSPORTATION, ONTARIO PH-D-302 89-10

CONTRACT DRAWINGS

CONTRACT No. 2025-4017

BOOK 1 OF 1

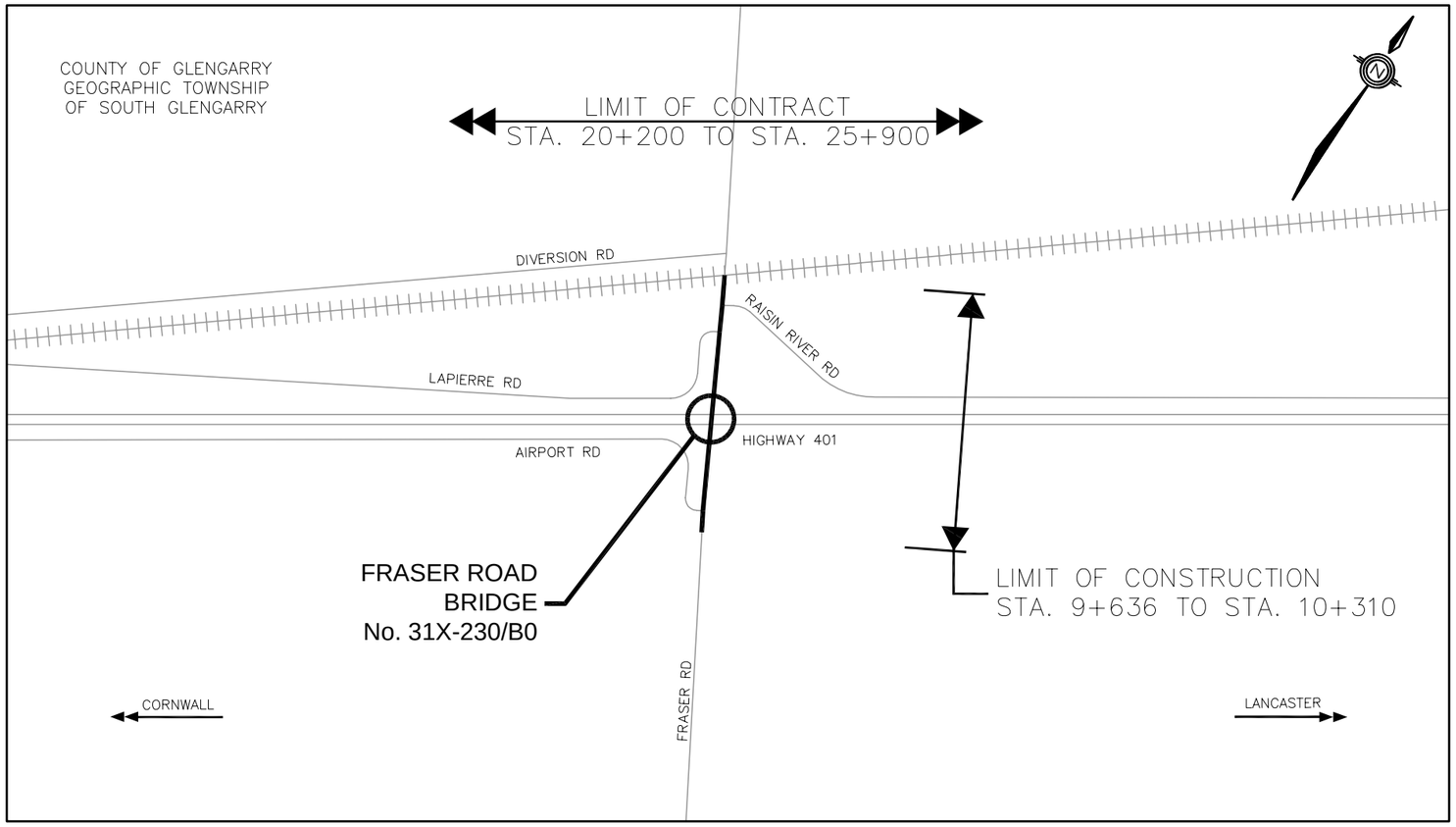
EAST REGION

Preliminary

Ministry of Transportation

Ontario

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DRAWN BY: J.P. MODIFIED: 24/11/04 14:04:13 Revised



WP No 4290-15-01
GWP No 4248-15-00 Contract No 2025-4017

Work of GRADING, DRAINAGE, GRANULAR BASE, HOT MIX PAVING, STRUCTURAL

Hwy No 401 District No OTTAWA

Location FRASER ROAD UNDERPASS (SITE No. 31X-230/B0), 4.5KM WEST OF LANCASTER

Length 5.70 km.

Reference Plans

KEY PLAN

SCALE

125 0 250m

Preliminary

Ministry Of Transportation

Ontario

MINISTRY OF TRANSPORTATION, ONTARIO 89-10
PH-O-302
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DRAWN BY: S.C. MODIFIED: 24/11/04 14:06:23 Revised

I N D E X

G.W.P. 4248-15-00
CONT. NO. 2025-4017

SHEET No	DESCRIPTION
	TITLE SHEET
	KEY PLAN
	INDEX
	GRADING
01	FRASER RD CLOSURE DETOUR AND ADVISORY SIGNAGE
02	HIGHWAY 401 CLOSURE DETOUR AND ADVISORY SIGNAGE
03-08	HIGHWAY 401 STAGING - INSIDE LANE CLOSURE/OUTSIDE LANE CLOSURE
09-17	REMOVALS, NEW CONSTRUCTION, PROFILES
18	TYPICAL SECTIONS
19-20	EXPANDED POLYSTYRENE DETAILS
21	MONITORING INSTRUMENTATION PLAN AND TYPICAL SECTION
22-23	MISCELLANEOUS DETAILS
24	STRUCTURAL EXCAVATION AND BACKFILL
25-30	PAVEMENT MARKINGS & SIGNAGE
31-34	BOREHOLE DATA
	LANDSCAPING
35-36	LANDSCAPE PLAN 1-2
37	LANDSCAPE NOTES
38	PLANTING DETAILS I
	STRUCTURAL
39	GENERAL ARRANGEMENT
40-43	BOREHOLE LOCATIONS AND SOIL STRATA
44	REMOVALS
45	FOUNDATIONS
46	ABUTMENT
47	WINGWALLS
48	PIER
49-52	STRUCTURAL STEEL I-IV

SHEET No	DESCRIPTION
53	DECK DETAILS
54-55	DECK REINFORCEMENT I-II
56-57	PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4 OPTION A/B
58	RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4
59	BURIED APPROACH SLAB
60	DETAILS OF CONCRETE SLOPE PAVING
61	STANDARD DETAILS

Preliminary

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DRAWN BY: J.P. MODIFIED: 24/11/04 14:05:00 Revised

LEGEND

DETOUR ROUTE

ROAD CLOSURE

TC-10AR TC-10BR TC-10C TC-10AL TC-10BL TC-10FR TC-10D

NOTES:

1. ADVANCE NOTIFICATION SIGNS TO BE INSTALLED A MINIMUM OF TWO WEEKS PRIOR TO SCHEDULED FRASER ROAD FULL CLOSURES.
2. TRAFFIC CONTROL SIGN INSTALLATION AND OFFSETS AS PER OTM BOOK 7.
3. TEMPORARY TRAFFIC CONDITIONS TO BE IMPLEMENTED IN ACCORDANCE WITH THE REQUIREMENTS OF OTM BOOK 7 (TEMPORARY CONDITIONS).
4. CONTRACTOR IS RESPONSIBLE FOR PLACEMENT AND MAINTAINING ALL TEMPORARY SIGNS.
5. MINOR ADJUSTMENTS OF SIGN POSITIONING MAY BE REQUIRED TO SUIT FIELD CONDITIONS.
6. COVER EXISTING GROUND MOUNTED SIGNS AS NEEDED.
7. CONTRACTOR TO ENSURE ALL DETOUR ROUTE SIGNS ARE IN PLACE AND ACCOUNTED FOR PRIOR TO IMPLEMENTING THE FRASER ROAD FULL CLOSURE.

METRIC

PLATE No

CONT No 2025-4017

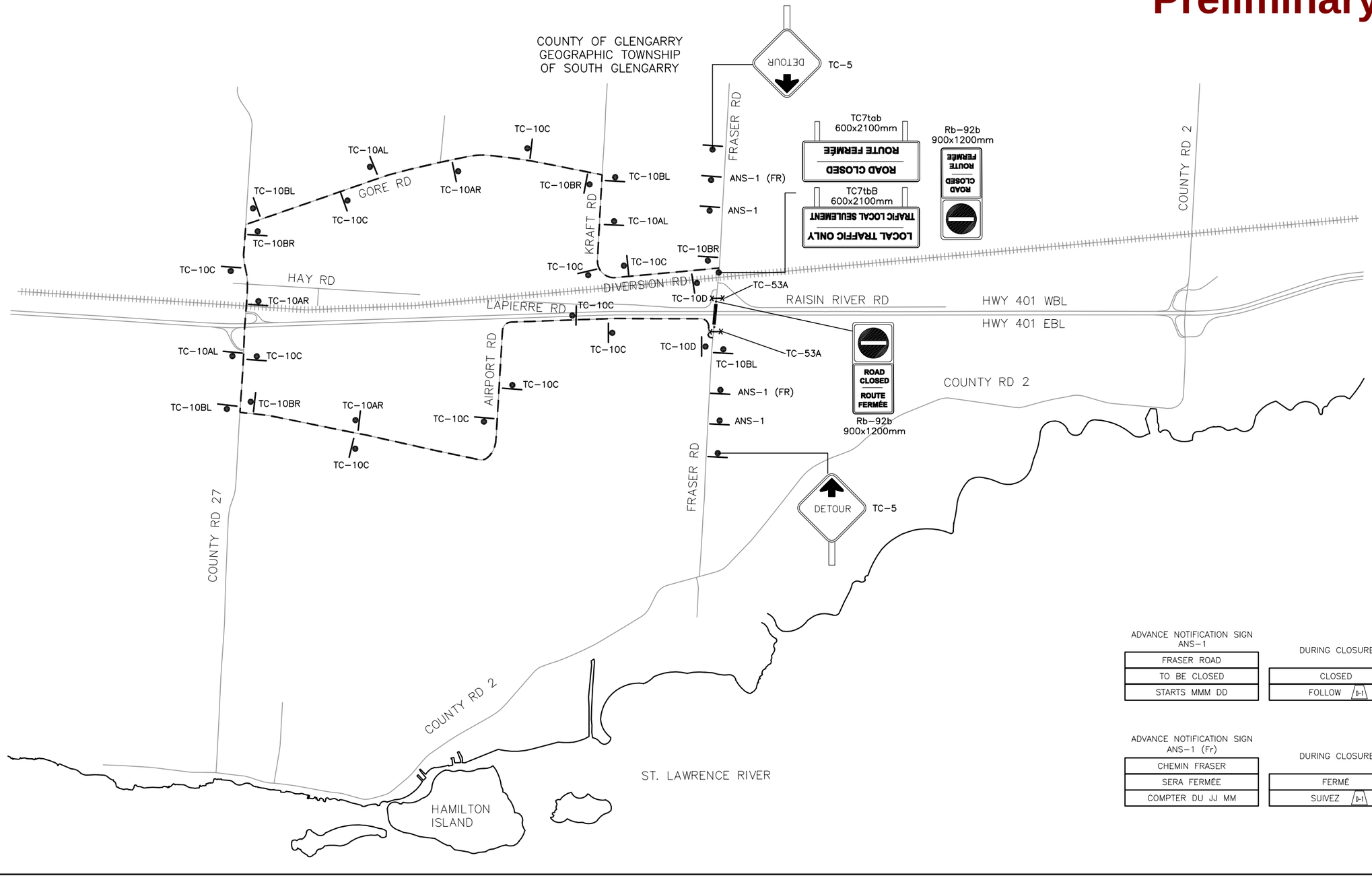
GWP No 4248-15-00

FRASER RD CLOSURE DETOUR AND ADVISORY SIGNAGE

SHEET 01

wsp

Preliminary



ADVANCE NOTIFICATION SIGN ANS-1

FRASER ROAD	DURING CLOSURE	
TO BE CLOSED	CLOSED	TAB
STARTS MMM DD	FOLLOW D-1	TAB

ADVANCE NOTIFICATION SIGN ANS-1 (Fr)

CHEMIN FRASER	DURING CLOSURE	
SERA FERMÉE	FERMÉ	TAB
COMPTER DU JJ MM	SUIVEZ D-1	TAB

N.T.S.

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 05-05

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DRAWN BY: J.P. MODIFIED: 24/09/23 11:10:37 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

HIGHWAY 401 CLOSURE DETOUR AND ADVISORY SIGNAGE

SHEET 02

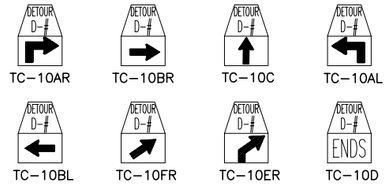
wsp

Preliminary

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

LEGEND

- EBL DETOUR ROUTE
- WBL DETOUR ROUTE
- HIGHWAY CLOSURE
- PVMS



ADVANCE NOTIFICATION SIGN ANS-1

	DURING CLOSURE	
401 EAST	CLOSED	TAB
TO BE CLOSED	FOLLOW EDR	TAB
STARTS MMM DD		

ADVANCE NOTIFICATION SIGN ANS-1 (Fr)

401 EST	FERMÉ	TAB
SERA FERMÉE	SUIVEZ EDR	TAB
COMPTER MMM JJ		

ADVANCE NOTIFICATION SIGN ANS-2

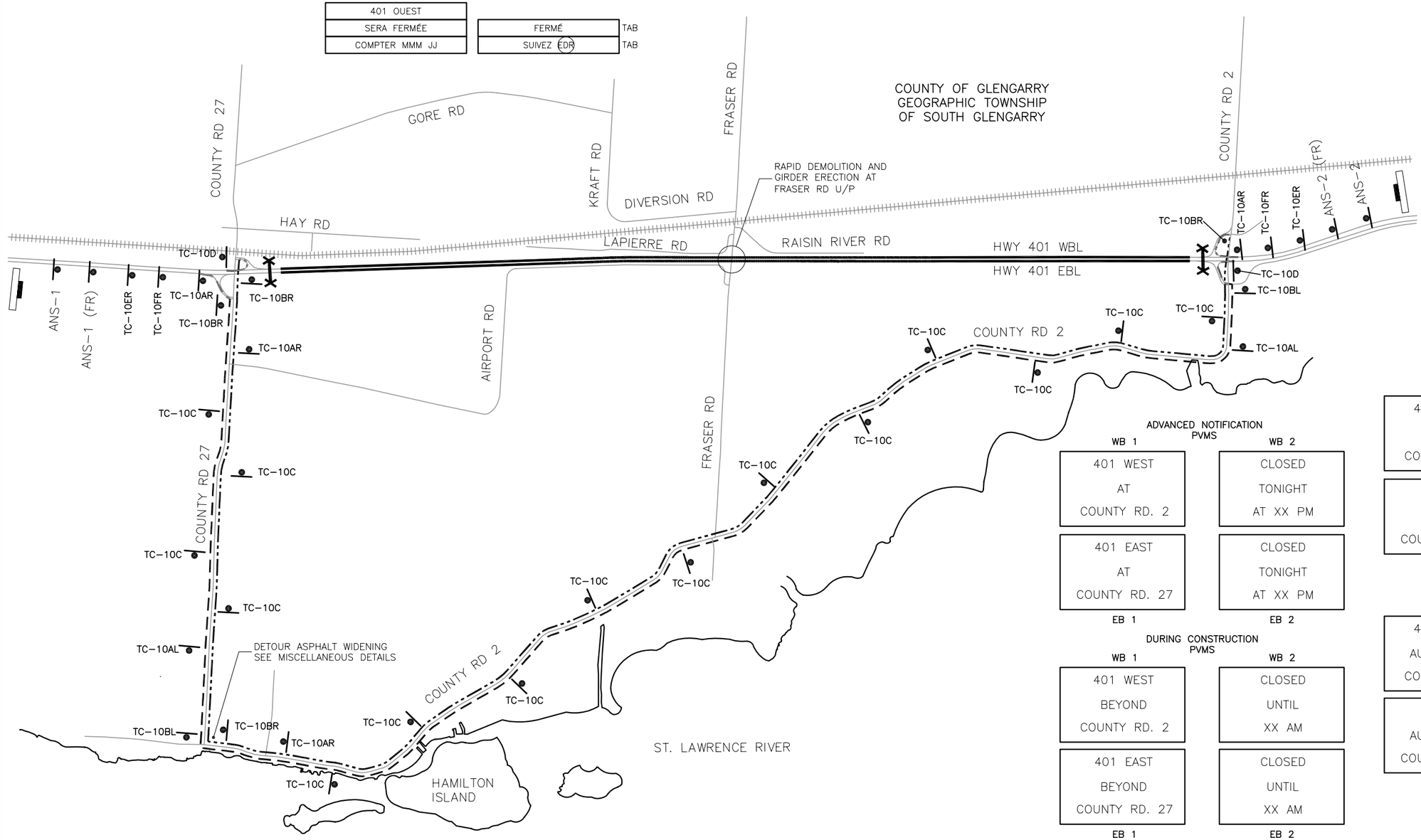
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TO BE CLOSED	FOLLOW EDR	TAB
STARTS MMM DD		

ADVANCE NOTIFICATION SIGN ANS-2 (Fr)

401 OUEST	FERMÉ	TAB
SERA FERMÉE	SUIVEZ EDR	TAB
COMPTER MMM JJ		

NOTES:

1. ADVANCE NOTIFICATION SIGNS TO BE INSTALLED A MINIMUM OF TWO WEEKS PRIOR TO SCHEDULES HWY 401 FULL CLOSURES.
2. TRAFFIC CONTROL SIGN INSTALLATION AND OFFSETS AS PER OTM BOOK 7.
3. TEMPORARY TRAFFIC CONDITIONS TO BE IMPLEMENTED IN ACCORDANCE WITH THE REQUIREMENTS OF OTM BOOK 7 (TEMPORARY CONDITIONS).
4. CONTRACTOR IS RESPONSIBLE FOR PLACEMENT AND MAINTAINING ALL TEMPORARY SIGNS.
5. MINOR ADJUSTMENTS OF SIGN POSITIONING MAY BE REQUIRED TO SUIT FIELD CONDITIONS.
6. COVER EXISTING GROUND MOUNTED SIGNS AS NEEDED.
7. CONTRACTOR TO ENSURE ALL EDR SIGNS ARE IN PLACE AND ACCOUNTED FOR PRIOR TO IMPLEMENTING THE HWY 401 FULL CLOSURE.
8. CONTRACTOR TO USE TABS TO SPECIFY WHEN HWY 401 CLOSURE IS "TO BE CLOSED" OR "CLOSED".
9. MINIMUM SEPARATION BETWEEN ENGLISH AND FRENCH SIGNS SHALL BE 150m ON HIGHWAY 401.



ADVANCED NOTIFICATION PVMS

WB 1	WB 2
401 WEST AT COUNTY RD. 2	CLOSED TONIGHT AT XX PM
401 EST AT COUNTY RD. 27	CLOSED TONIGHT AT XX PM
EB 1	EB 2

DURING CONSTRUCTION PVMS

WB 1	WB 2
401 WEST BEYOND COUNTY RD. 2	CLOSED UNTIL XX AM
401 EST BEYOND COUNTY RD. 27	CLOSED UNTIL XX AM
EB 1	EB 2

ADVANCED NOTIFICATION PVMS (FR)

WB 1	WB 2
401 OUEST À COUNTY RD. 2	FERMÉ CE SOIR À XXH
401 EST À COUNTY RD. 27	FERMÉ CE SOIR À XXH
EB 1 (FR)	EB 2 (FR)

DURING CONSTRUCTION PVMS (FR)

WB 1	WB 2
401 OUEST AU-DELÀ DE COUNTY RD. 2	FERMÉ JUSQU'À XXH
401 EST AU-DELÀ DE COUNTY RD. 27	FERMÉ JUSQU'À XXH
EB 1 (FR)	EB 2 (FR)

N.T.S.

FILE LOCATION=D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-DETOUR-S01.DWG
DRAWN BY: J.P. MODIFIED: 24/09/23 11:10:37 Revised

LEGEND

1.	SOLID YELLOW, 10cm
2.	SOLID DOUBLE YELLOW, 10cm
3.	363 BROKEN YELLOW, 10cm
4.	SOLID YELLOW, 20cm
5.	SOLID WHITE, 10cm
6.	333 BROKEN WHITE, 10cm
7.	363 BROKEN WHITE, 10cm
8.	393 BROKEN WHITE, 10cm
9.	SOLID WHITE, 20cm
10.	111 BROKEN WHITE, 20cm
11.	333 BROKEN WHITE, 20cm
15.	SOILD WHITE, 60cm
20.	SYMBOLS
] [	LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use (1) to Denote PAVEMENT MARKING, GROUP 4
6. Use △1 to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
8. Use [1] to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP II

NOTES:

1. STAGING DRAWINGS TO BE READ IN CONJUNCTION WITH STRUCTURAL DRAWINGS.
2. THIS DRAWING DEPICTS THE CONFIGURATION OF HWY 401 FOR ACCESS AND THE GENERAL LAYOUT OF TRAFFIC DEVICES. THIS DRAWING DOES NOT SHOW ALL TRAFFIC CONTROL DEVICES OR SIGNING THAT MAY BE REQUIRED; THE CONTRACTOR SHALL REMAIN RESPONSIBLE FOR MAINTAINING AND PROVIDING ALL SIGNING AND TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH OTM BOOK 7 UNLESS OTHERWISE SPECIFIED.
3. LANE CLOSURES ARE CATEGORIZED AS LONG DURATION.
4. TEMPORARY TRAFFIC CONDITIONS TO BE IMPLEMENTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO TRAFFIC MANUAL (OTM), BOOK 6 (WARNING SIGNS), BOOK 7 (TEMPORARY CONDITIONS), AND BOOK 11 (PAVEMENT HAZARD AND DELINEATION MARKINGS).
5. MINOR ADJUSTMENTS OF SIGN POSITIONING MAY BE REQUIRED TO SUIT FIELD CONDITIONS.
6. COVER EXISTING GROUND MOUNTED SIGNS AS NEEDED.
7. ADVANCED NOTIFICATION SIGNS (ANS) TO BE PLACED 1km UPSTREAM OF THE SUMMERSTOWN RD. EXIT (EXIT 804) AND 1.7km UPSTREAM OF THE LANCASTER/ALEXANDRIA/HAWKESBURY EXIT (EXIT 814).
8. EXISTING SIGN LOCATIONS AS SHOWN ARE APPROXIMATE AND TO BE MAINTAINED DURING CONSTRUCTION, TEMPORARY SUPPORTS MAY BE REQUIRED.
9. CONTRACTOR TO MAINTAIN EXISTING DRAINAGE PATTERNS AT ALL TIMES.

LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

METRIC

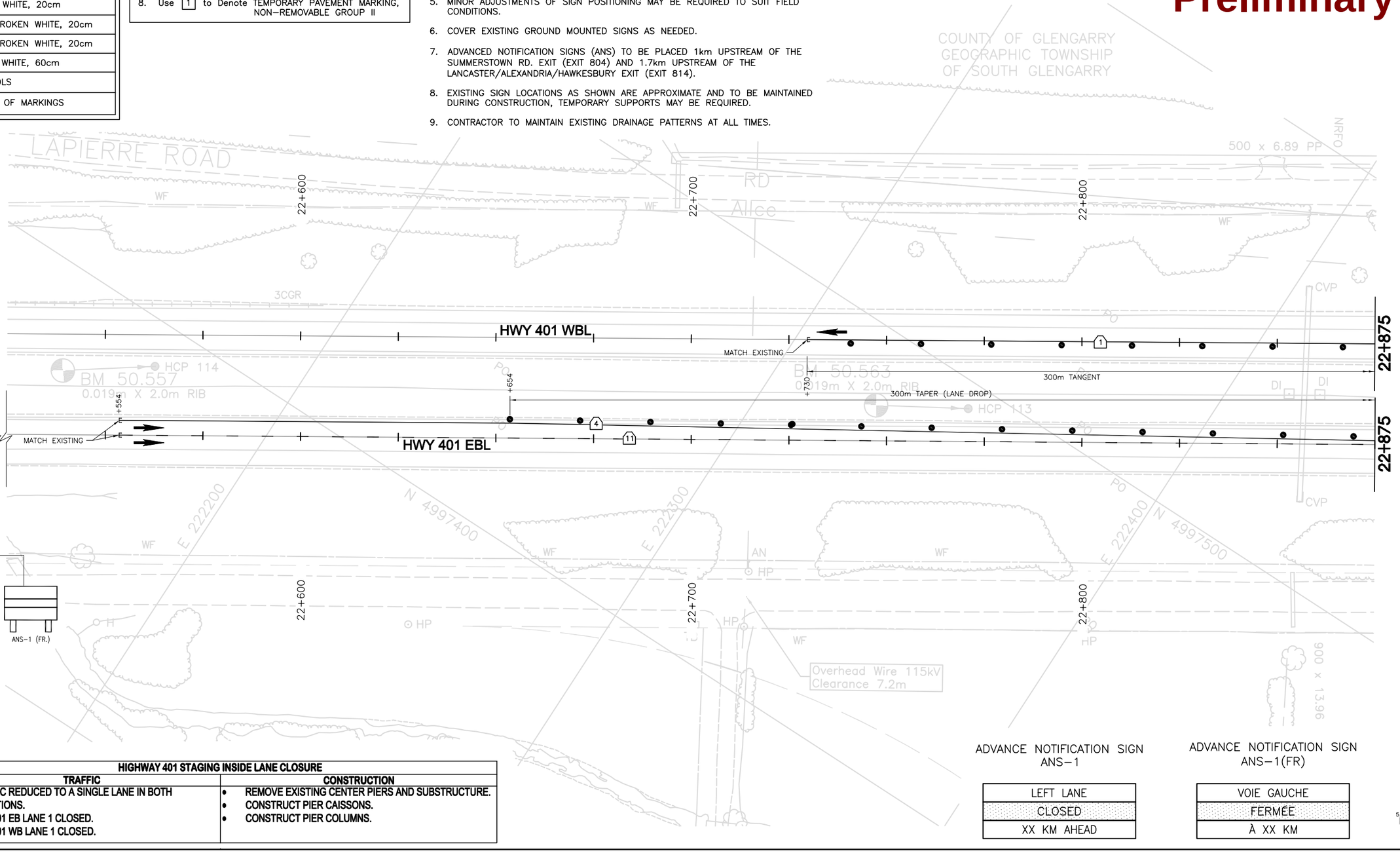
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING
INSIDE LANE CLOSURE
STA 16+650 TO STA 22+875
Survey Revised

wsp

SHEET 03

Preliminary



HIGHWAY 401 STAGING INSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 1 CLOSED. • HWY 401 WB LANE 1 CLOSED.	• REMOVE EXISTING CENTER PIERS AND SUBSTRUCTURE. • CONSTRUCT PIER CAISSONS. • CONSTRUCT PIER COLUMNS.

ADVANCE NOTIFICATION SIGN
ANS–1

LEFT LANE
CLOSED
XX KM AHEAD

ADVANCE NOTIFICATION SIGN
ANS–1(FR)

VOIE GAUCHE
FERMÉE
À XX KM

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–D–707 86–05

FILE LOCATION–G:\CA00\19704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00\19704.4282–N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use (1) to Denote PAVEMENT MARKING, GROUP 4
6. Use △1 to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
8. Use [1] to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP II

NOTES:

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3. LANE CLOSURES ARE CATEGORIZED AS LONG DURATION.
4. TEMPORARY TRAFFIC CONDITIONS TO BE IMPLEMENTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO TRAFFIC MANUAL (OTM), BOOK 6 (WARNING SIGNS), BOOK 7 (TEMPORARY CONDITIONS), AND BOOK 11 (PAVEMENT HAZARD AND DELINEATION MARKINGS).
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9. CONTRACTOR TO MAINTAIN EXISTING DRAINAGE PATTERNS AT ALL TIMES.
10. EMERGENCY ACCESS ROAD TO BE CONSTRUCTED PRIOR TO THE FULL CLOSURE OF FRASER ROAD. SEE EMERGENCY ACCESS ROAD DETAIL ON MISCELLANEOUS DETAILS SHEET.

LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

METRIC

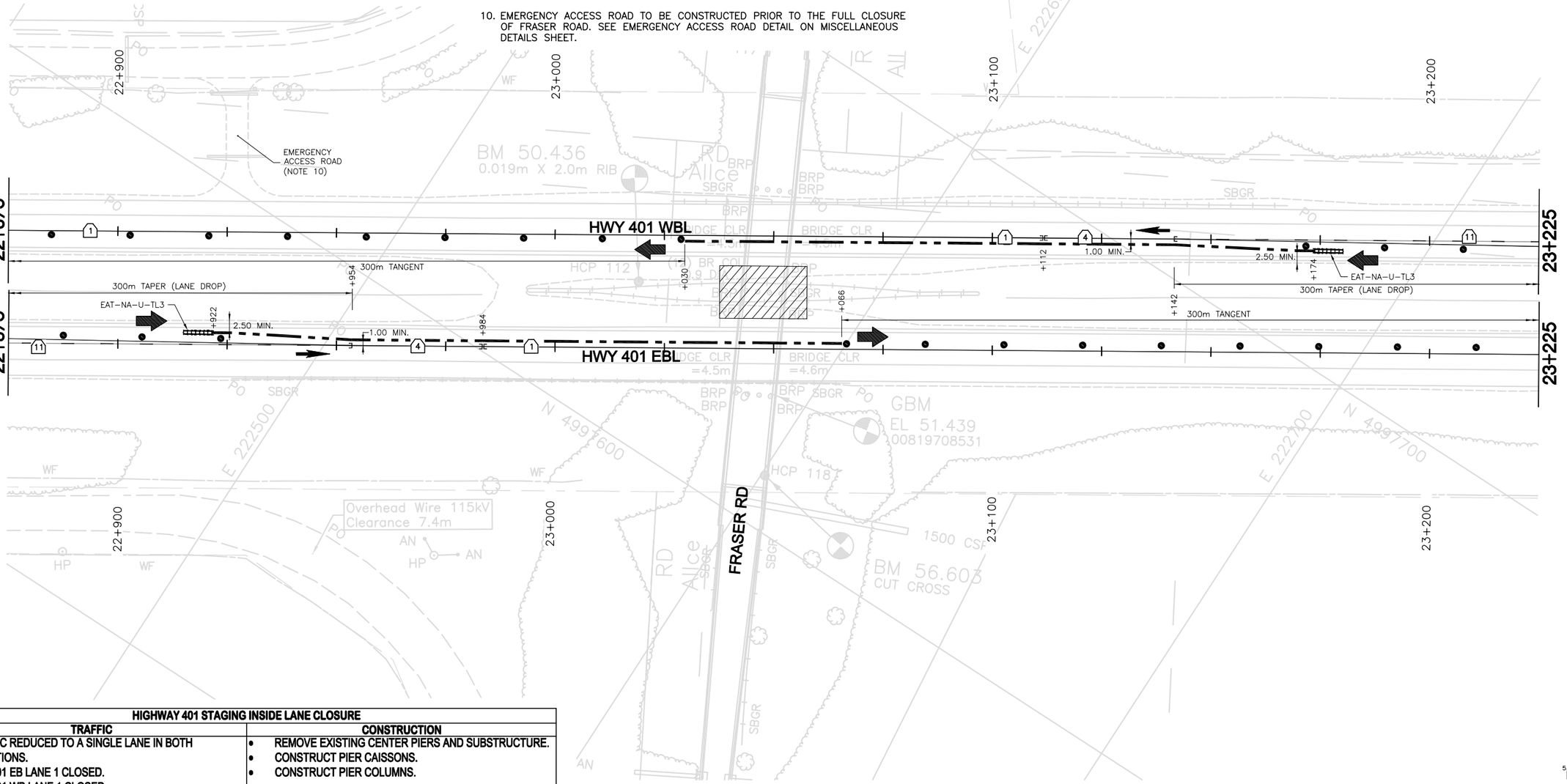
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING
INSIDE LANE CLOSURE
STA 22+875 (Survey) TO STA 23+225 (Revised)

wsp

SHEET 04

Preliminary



HIGHWAY 401 STAGING INSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 1 CLOSED. • HWY 401 WB LANE 1 CLOSED.	• REMOVE EXISTING CENTER PIERS AND SUBSTRUCTURE. • CONSTRUCT PIER CAISSONS. • CONSTRUCT PIER COLUMNS.

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–D–707 86–05

FILE LOCATION–G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282–N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
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7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

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3. Use ◇1◇ to Denote PAVEMENT MARKING, GROUP 2
4. Use ⬠1⬠ to Denote PAVEMENT MARKING, GROUP 3
5. Use ⬡1⬡ to Denote PAVEMENT MARKING, GROUP 4
6. Use △1△ to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1▽ to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
8. Use [1] to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP II

NOTES:

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9. CONTRACTOR TO MAINTAIN EXISTING DRAINAGE PATTERNS AT ALL TIMES.

LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

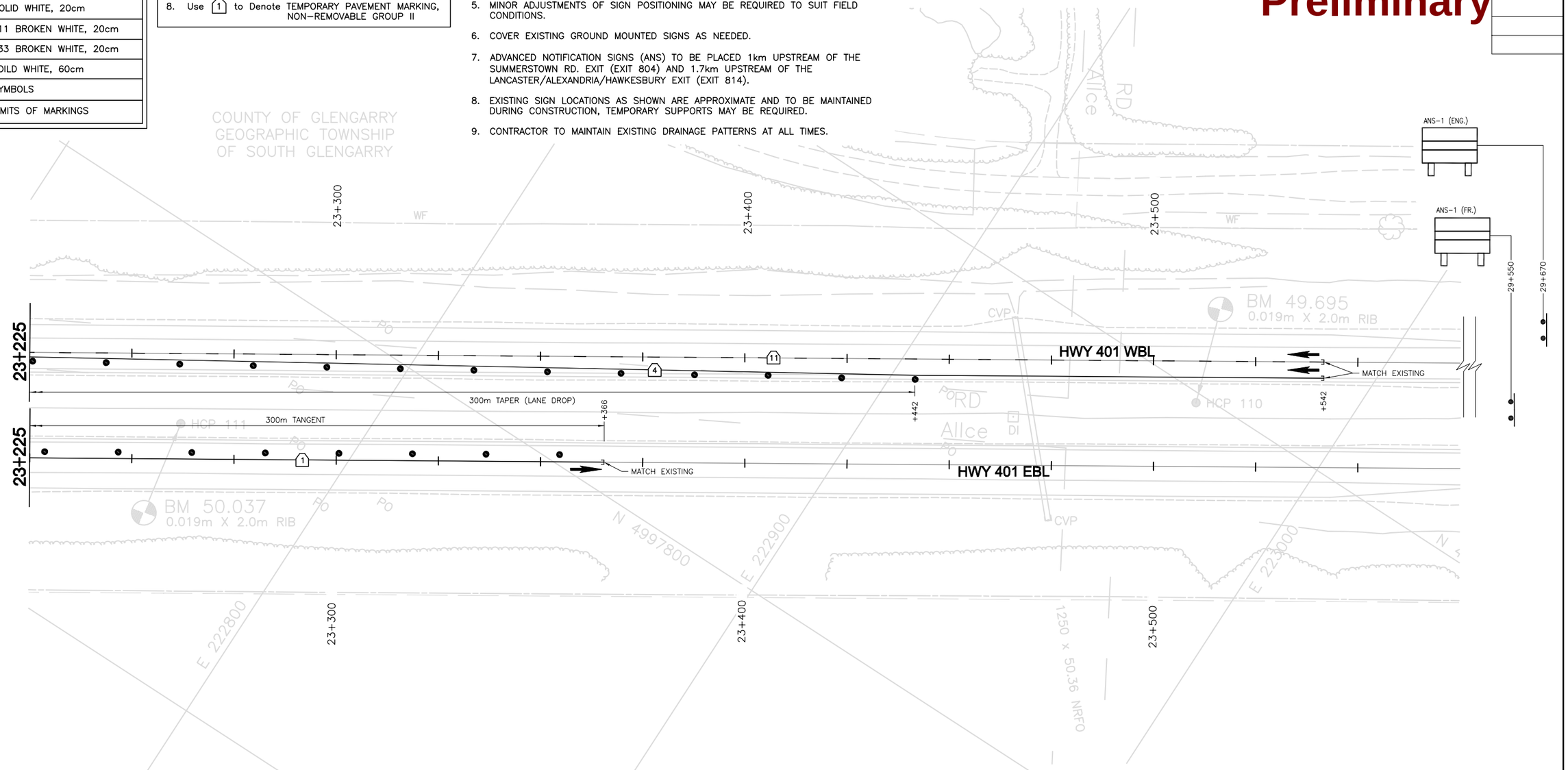
METRIC

PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING
INSIDE LANE CLOSURE
STA 23+225 (Survey) TO STA 29+670 (Revised)

SHEET 05

Preliminary



HIGHWAY 401 STAGING INSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 1 CLOSED. • HWY 401 WB LANE 1 CLOSED.	• REMOVE EXISTING CENTER PIERS AND SUBSTRUCTURE. • CONSTRUCT PIER CAISSONS. • CONSTRUCT PIER COLUMNS.

ADVANCE NOTIFICATION SIGN
ANS–1

LEFT LANE
CLOSED
XX KM AHEAD

ADVANCE NOTIFICATION SIGN
ANS–1(FR)

VOIE GAUCHE
FERMÉE
À XX KM

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–S–707 88–05

FILE LOCATION=Q:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282–N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
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7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
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3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use (1) to Denote PAVEMENT MARKING, GROUP 4
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7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
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NOTES:

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LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

METRIC

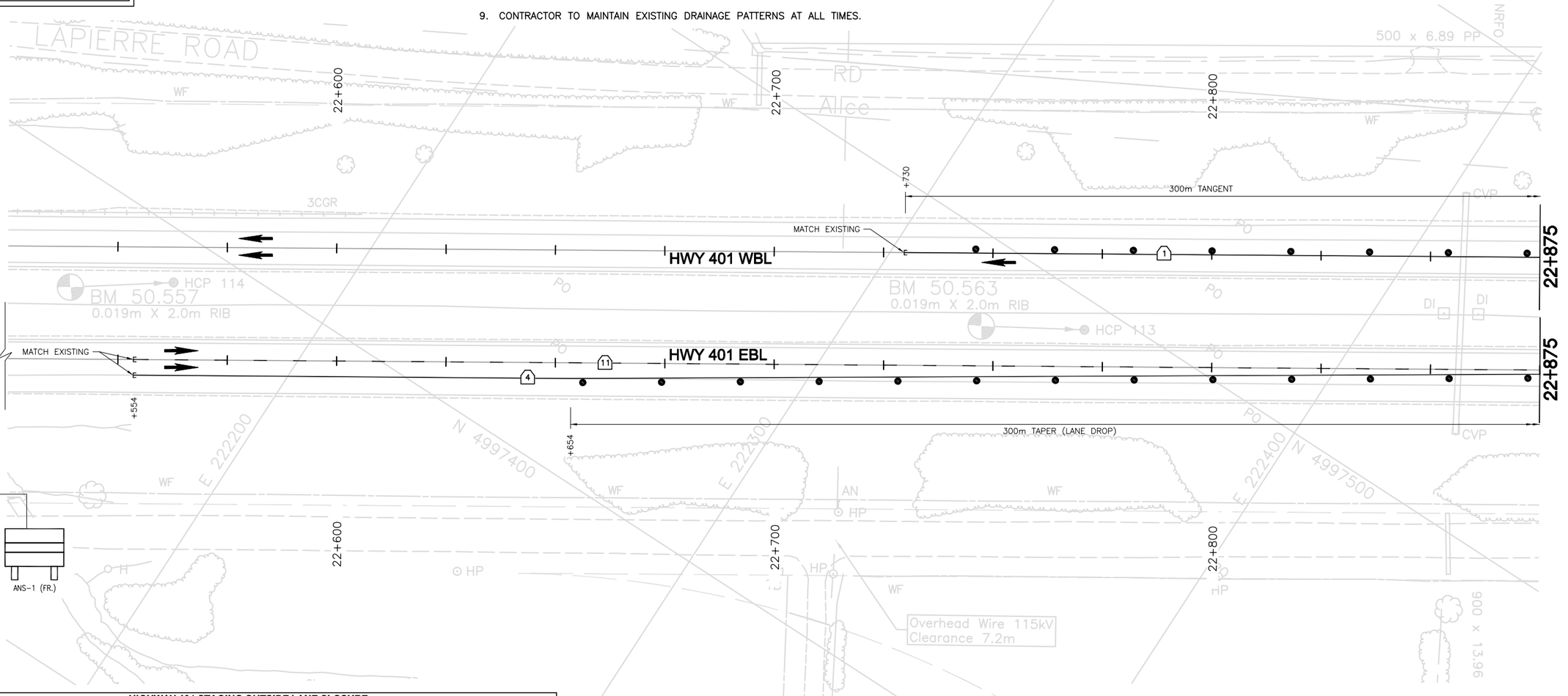
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING
OUTSIDE LANE CLOSURE
STA 16+650 (Survey) TO STA 22+875 (Revised)

wsp

SHEET 06

Preliminary



HIGHWAY 401 STAGING OUTSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 2 CLOSED. • HWY 401 WB LANE 2 CLOSED.	• REMOVE EXISTING NORTH AND SOUTH PIERS. • REMOVE EXISTING ABUTMENTS, SLOPE PAVING AND SUBSTRUCTURE. • INSTALL ABUTMENT PILES AND CONSTRUCT NEW SUBSTRUCTURE. • INSTALL GIRDERS AND CONSTRUCT NEW BRIDGE DECK.

ADVANCE NOTIFICATION SIGN
ANS–1

RIGHT LANE
CLOSED
XX KM AHEAD

ADVANCE NOTIFICATION SIGN
ANS–1(FR)

VOIE DROITE
FERMÉE
À XX KM

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–D–707 86–05

FILE LOCATION–G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282–N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
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8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

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7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
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NOTES:

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LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

METRIC

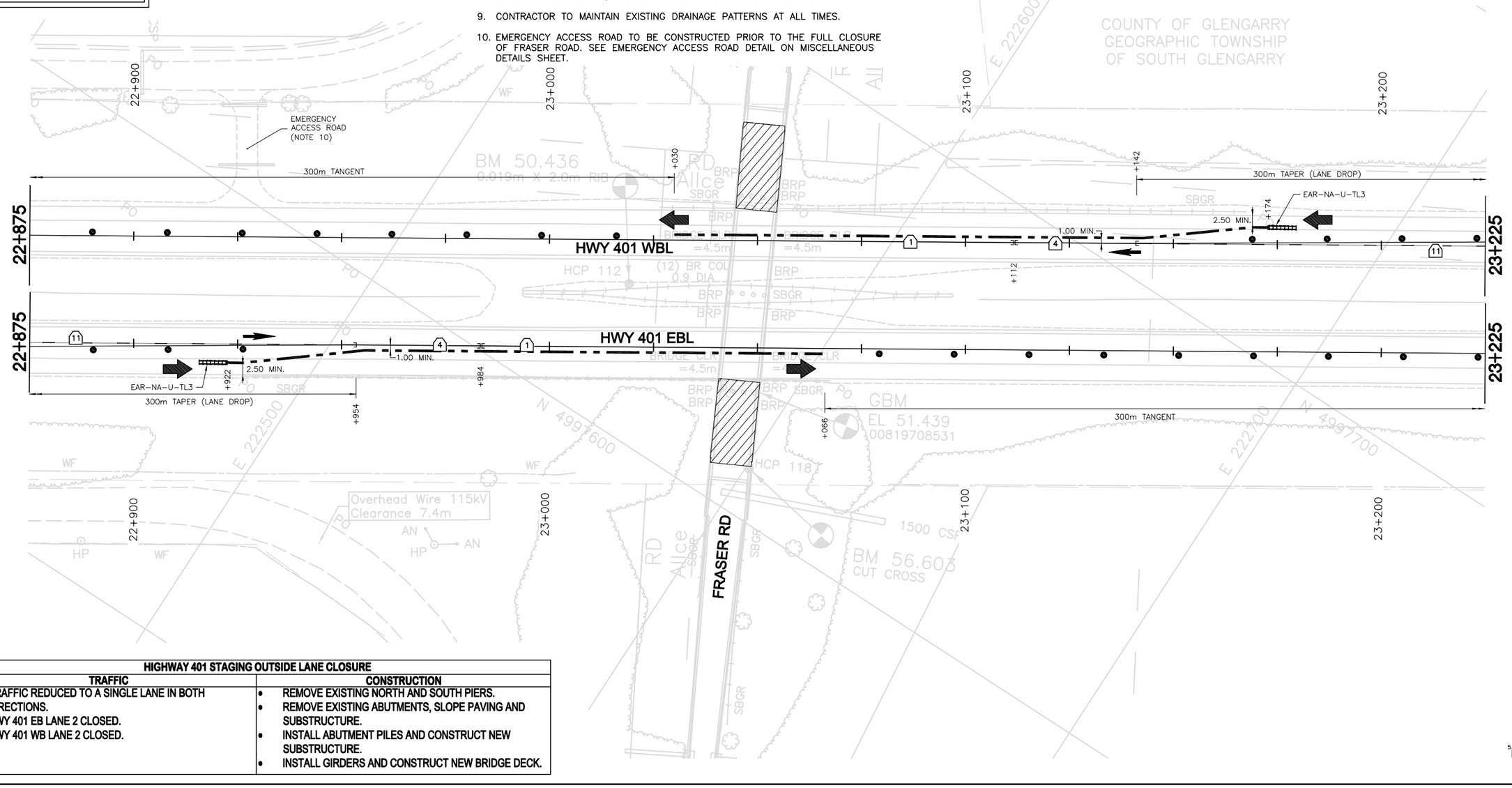
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING OUTSIDE LANE CLOSURE
STA 22+875 Survey TO STA 23+225 Revised

SHEET 07

wsp

Preliminary



HIGHWAY 401 STAGING OUTSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 2 CLOSED. • HWY 401 WB LANE 2 CLOSED.	• REMOVE EXISTING NORTH AND SOUTH PIERS. • REMOVE EXISTING ABUTMENTS, SLOPE PAVING AND SUBSTRUCTURE. • INSTALL ABUTMENT PILES AND CONSTRUCT NEW SUBSTRUCTURE. • INSTALL GIRDERS AND CONSTRUCT NEW BRIDGE DECK.

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–D–707 86–05

FILE LOCATION–O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282–N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
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8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

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7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
8. Use (1) to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP II

NOTES:

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LEGEND

- WORKZONE
- TRAFFIC FLOW
- CONSTRUCTION INGRESS/EGRESS
- TEMPORARY CONSTRUCTION BARRIER CATEGORY I (TCB)
- TC–54

METRIC

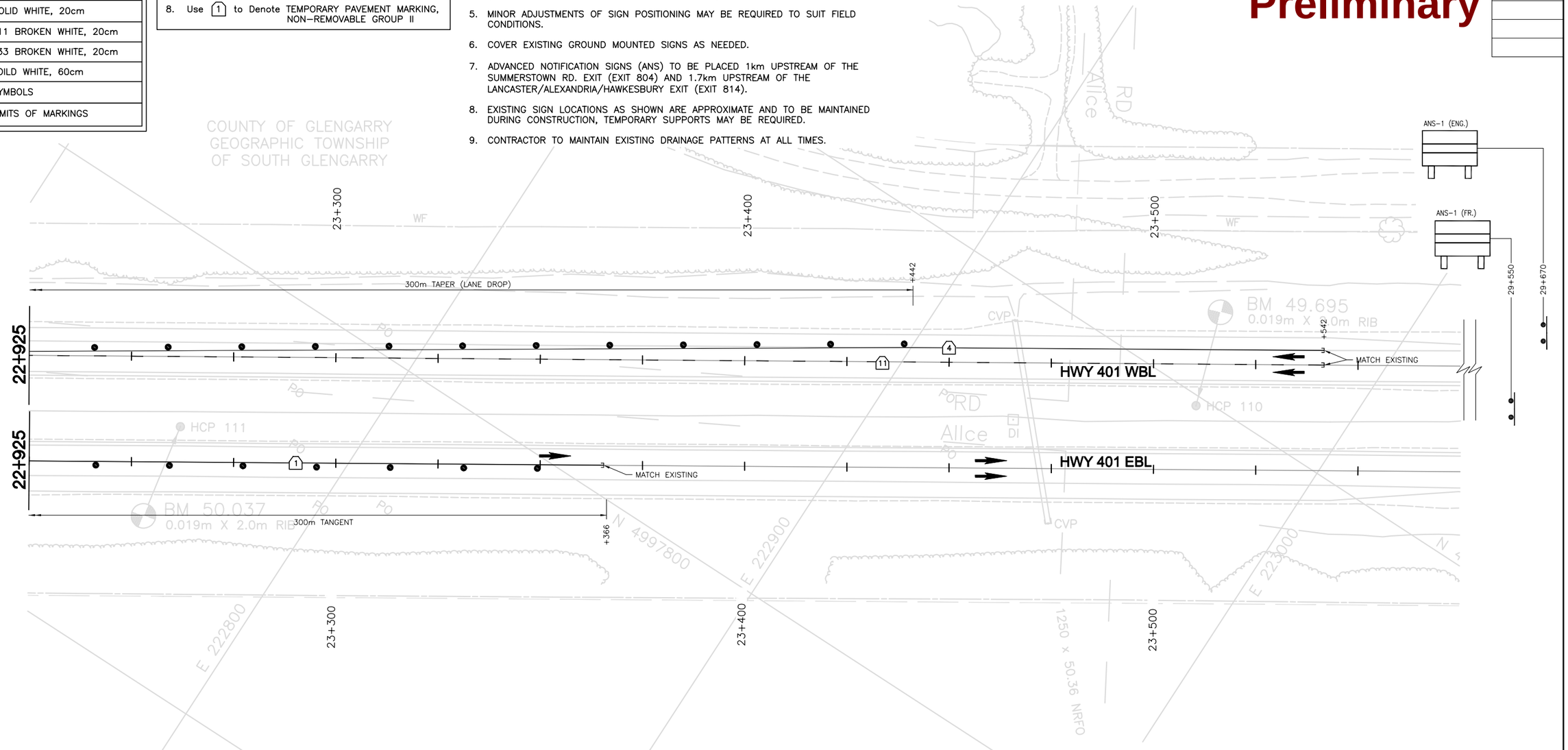
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

HIGHWAY 401 STAGING OUTSIDE LANE CLOSURE
STA 22+925 (Survey) TO STA 29+670 (Revised)

wsp

SHEET 08

Preliminary



HIGHWAY 401 STAGING OUTSIDE LANE CLOSURE	
TRAFFIC	**CONSTRUCTION**
• TRAFFIC REDUCED TO A SINGLE LANE IN BOTH DIRECTIONS. • HWY 401 EB LANE 2 CLOSED. • HWY 401 WB LANE 2 CLOSED.	• REMOVE EXISTING NORTH AND SOUTH PIERS. • REMOVE EXISTING ABUTMENTS, SLOPE PAVING AND SUBSTRUCTURE. • INSTALL ABUTMENT PILES AND CONSTRUCT NEW SUBSTRUCTURE. • INSTALL GIRDERS AND CONSTRUCT NEW BRIDGE DECK.

ADVANCE NOTIFICATION SIGN
ANS–1

RIGHT LANE
CLOSED
XX KM AHEAD

ADVANCE NOTIFICATION SIGN
ANS–1(FR)

VOIE DROITE
FERMÉE
À XX KM

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR–D–707 86–05

FILE LOCATION–G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282–N02.DWG
DRAWN BY: JP. MODIFIED: 24/11/13 14:45:00 Revised

MINISTRY OF TRANSPORTATION, ONTARIO
PR-D-707 88-05

LEGEND:

- REMOVAL ASPHALT PAVEMENT– FULL DEPTH
- REMOVAL ASPHALT PAVEMENT ON STRUCTURES
- REMOVE ASPHALT PAVEMENT ON CONCRETE SURFACES
- CLEARING AND GRUBBING
- GUIDE RAIL REMOVAL
- CURB AND GUTTER REMOVAL
- CULVERT REMOVAL

NOTE:

1. CONTRACTOR TO COORDINATE WITH CN RAIL FOR FLAGGING AND PAVEMENT TRANSITION WITHIN RAILWAY ROW.

METRIC

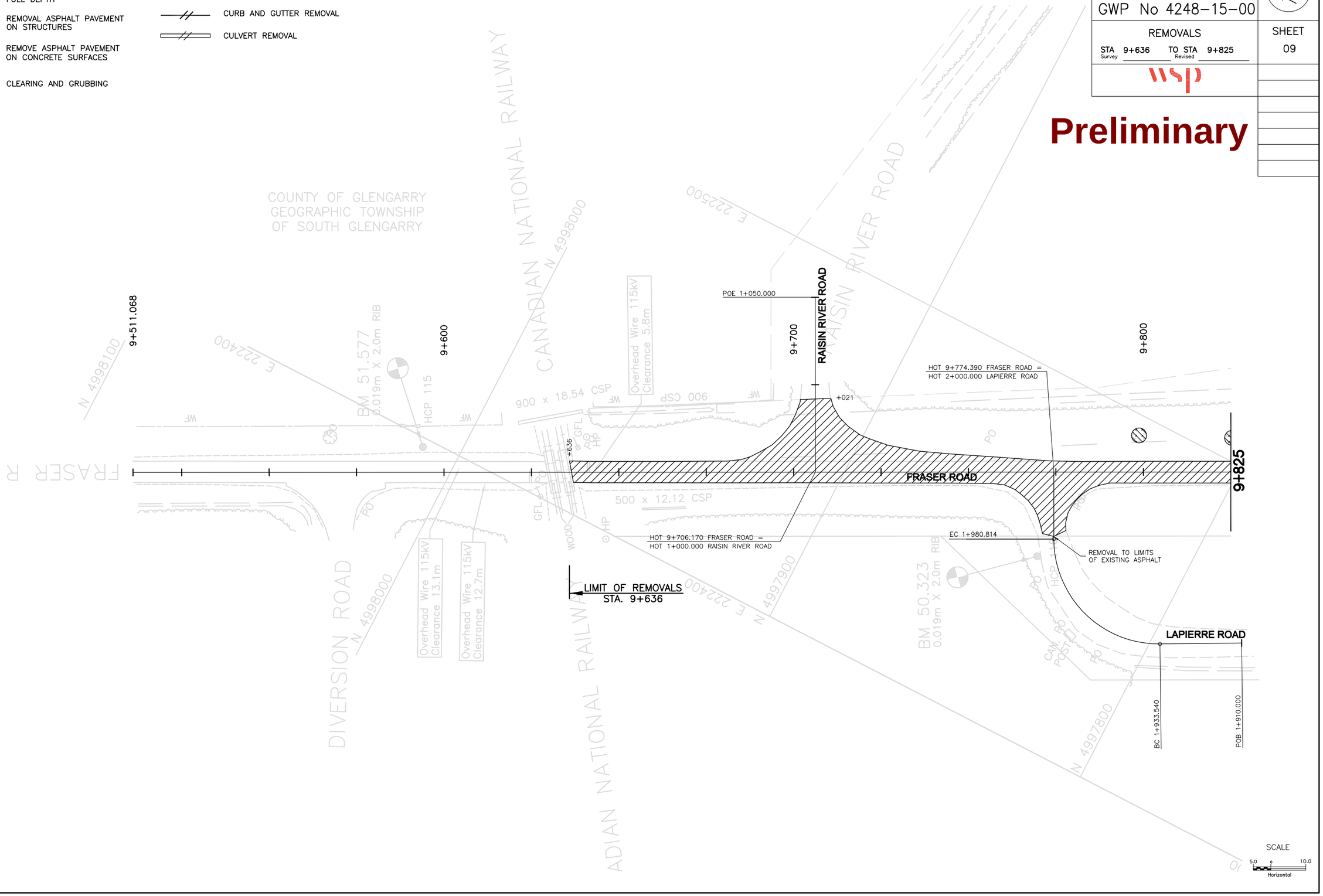
PLATE No
CONT No 2025–4017
GWP No 4248–15–00

REMOVALS
STA 9+636 (Survey) TO STA 9+825 (Revised)

SHEET 09

wsp

Preliminary



FILE LOCATION=D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-N01.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:08 Revised

LEGEND:

FLOW CHECK OPSD 219.180

SEDIMENT FENCE BARRIER MTOD 219.110

100mmØ PERFORATED SUBDRAIN

NOTES:

1. PAVING TIE–IN TO EXISTING RAILWAY SHALL MEET THE REQUIREMENTS OF THE TRANSPORT CANADA GRADE CROSSING STANDARDS (JANUARY 2019).
2. CONTRACTOR TO COORDINATE WITH CN RAIL FOR FLAGGING AND PAVEMENT TRANSITION WITHIN RAILWAY ROW.

METRIC

PLATE No

CONT No 2025–4017

GWP No 4248–15–00

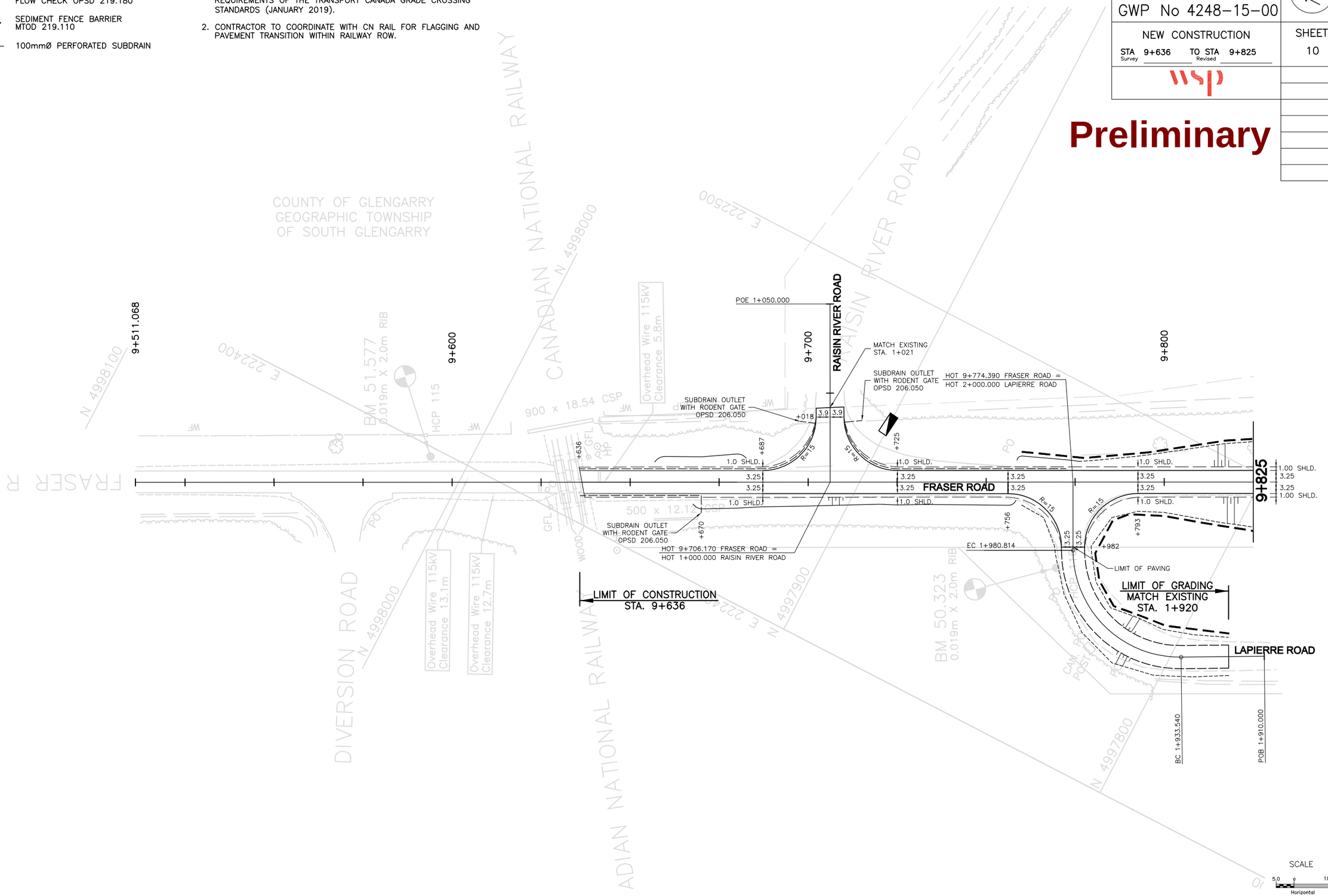
NEW CONSTRUCTION

STA Survey 9+636 TO STA Revised 9+825

SHEET 10

wsp

Preliminary



MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 85-05

FILE LOCATION–G:\CA00197704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
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DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:08 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PROFILE
STA 9+636 TO STA 9+825

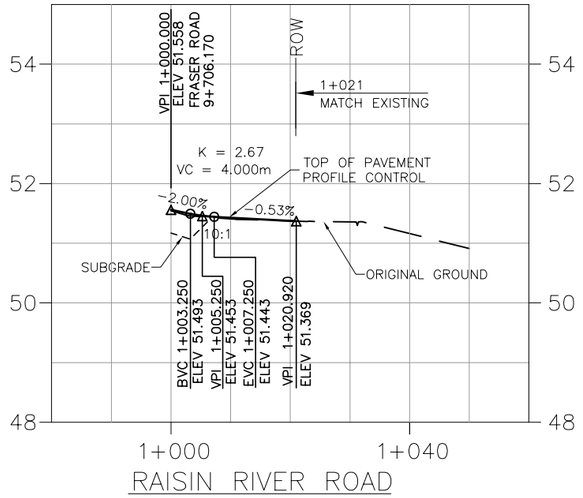
SHEET 11

wsp

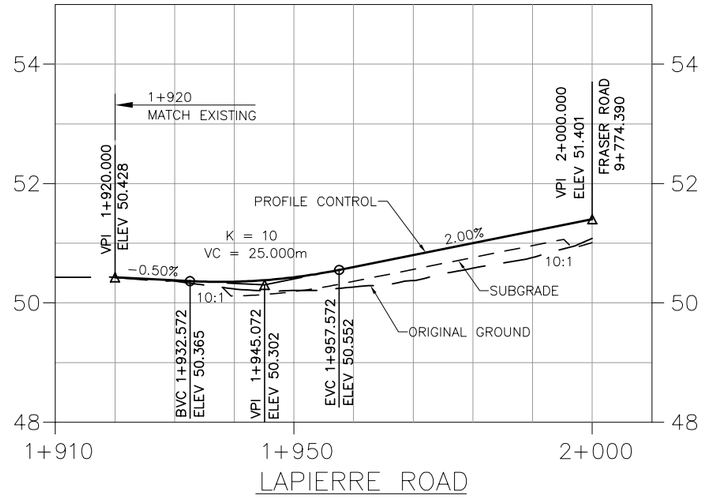
Preliminary

NOTES:

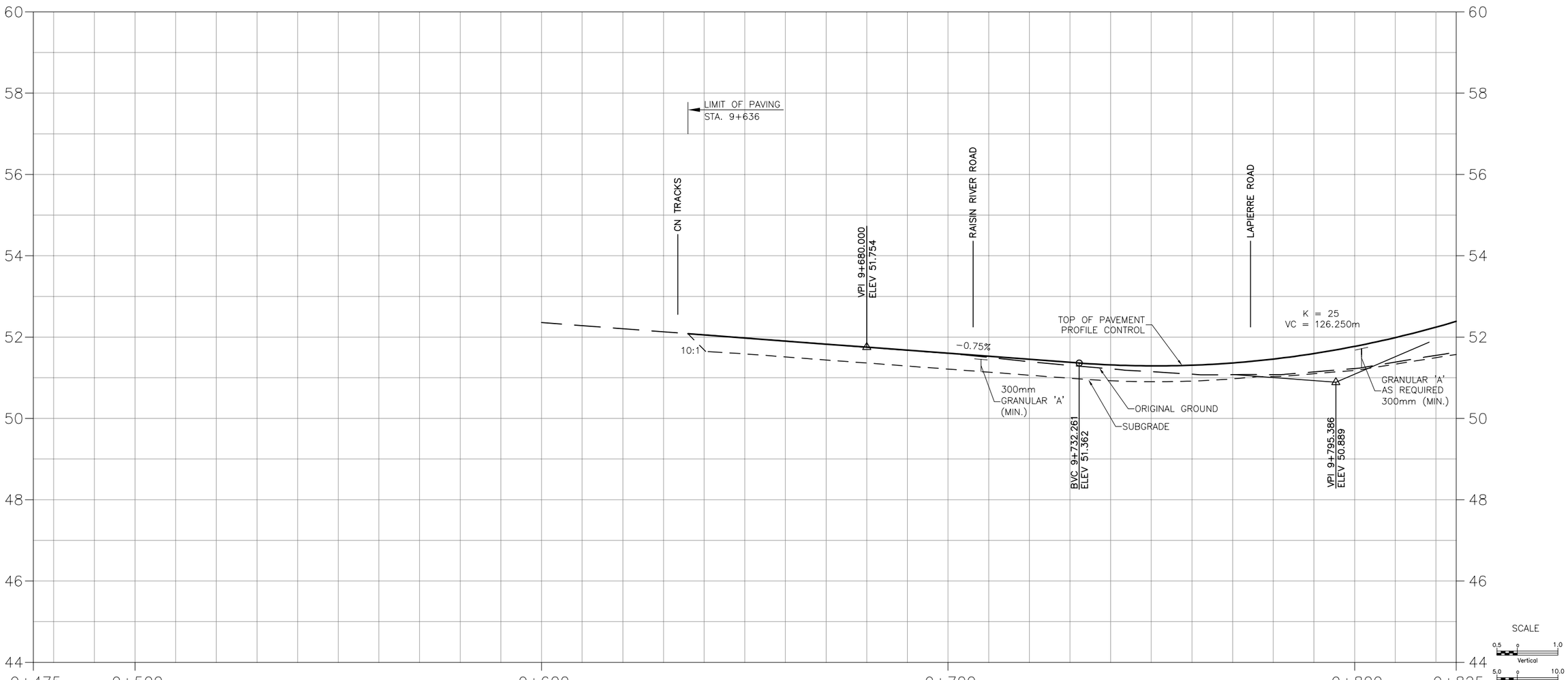
1. PAVING TIE-IN TO EXISTING RAILWAY SHALL MEET THE REQUIREMENTS OF THE TRANSPORT CANADA GRADE CROSSING STANDARDS (JANUARY 2019).
2. CONTRACTOR TO COORDINATE WITH CN RAIL FOR FLAGGING AND PAVEMENT TRANSITION WITHIN RAILWAY ROW.



RAISIN RIVER ROAD



LAPIERRE ROAD



FRASER ROAD

FILE LOCATION=D:\3416002 MTO MEGA RETAINER\ASSIGNMENT 5 - FALLOWFIELD N-EW RAMP\CURRENT\SHEETS\
DRAWING NAME: 3416002-FALLOWFIELD-SOB-P01.DWG
DRAWN BY: S.C.
MODIFIED: 17/06/19 14:15:03 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

LEGEND:

- REMOVAL ASPHALT PAVEMENT– FULL DEPTH
- REMOVAL ASPHALT PAVEMENT ON STRUCTURES
- REMOVE ASPHALT PAVEMENT ON CONCRETE SURFACES
- CLEARING AND GRUBBING
- GUIDE RAIL REMOVAL
- CURB AND GUTTER REMOVAL
- CULVERT REMOVAL

NOTE:

1. EXISTING SBGR TO BE REMOVED AND RELOCATED TO SAME STATION TO ACCOMMODATE BRIDGE DEMOLITION, GIRDER ERECTION AND CONSTRUCTION STAGING.

METRIC

PLATE No

CONT No 2025–4017
GWP No 4248–15–00

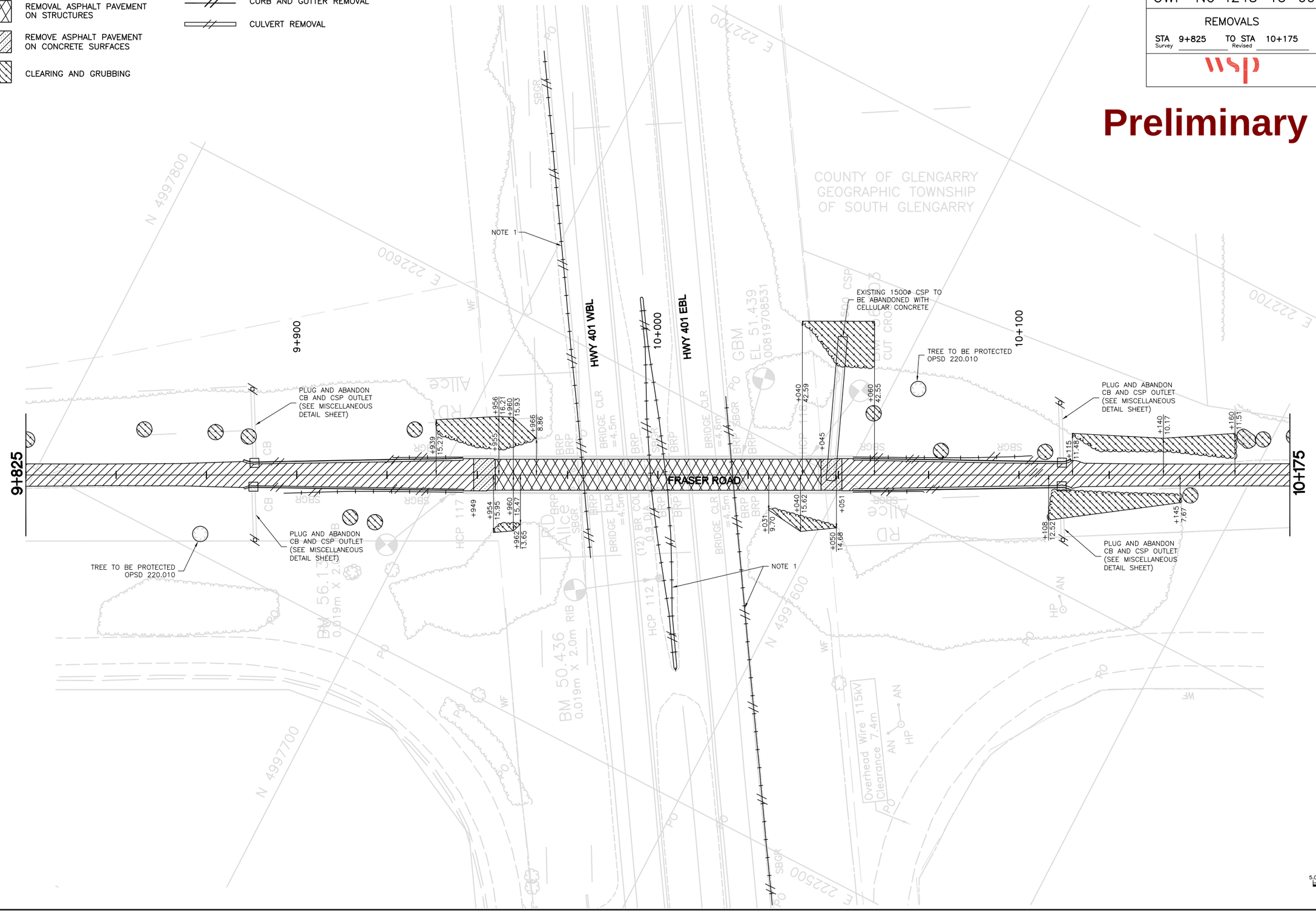
REMOVALS

STA Survey 9+825 TO STA Revised 10+175

SHEET 12

wsp

Preliminary



SCALE

5.0 0 10.0
Horizontal

FILE LOCATION-D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
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DRAWN BY: J.P. MODIFIED: 24/11/13 14:43:41 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

LEGEND:

FLOW CHECK OPSD 219.180

SEDIMENT FENCE BARRIER MTOD 219.110

150mmØ SUBDRAIN

EROSION CONTROL BLANKET

NOTE:

1. 150mm PERFORATED SUBDRAIN WITH NON PERFORATED OUTLETS INCLUDING RODENT GATE. SEE STRUCTURAL DRAWING FOR DETAILS.

METRIC

PLATE No

CONT No 2025-4017

GWP No 4248-15-00

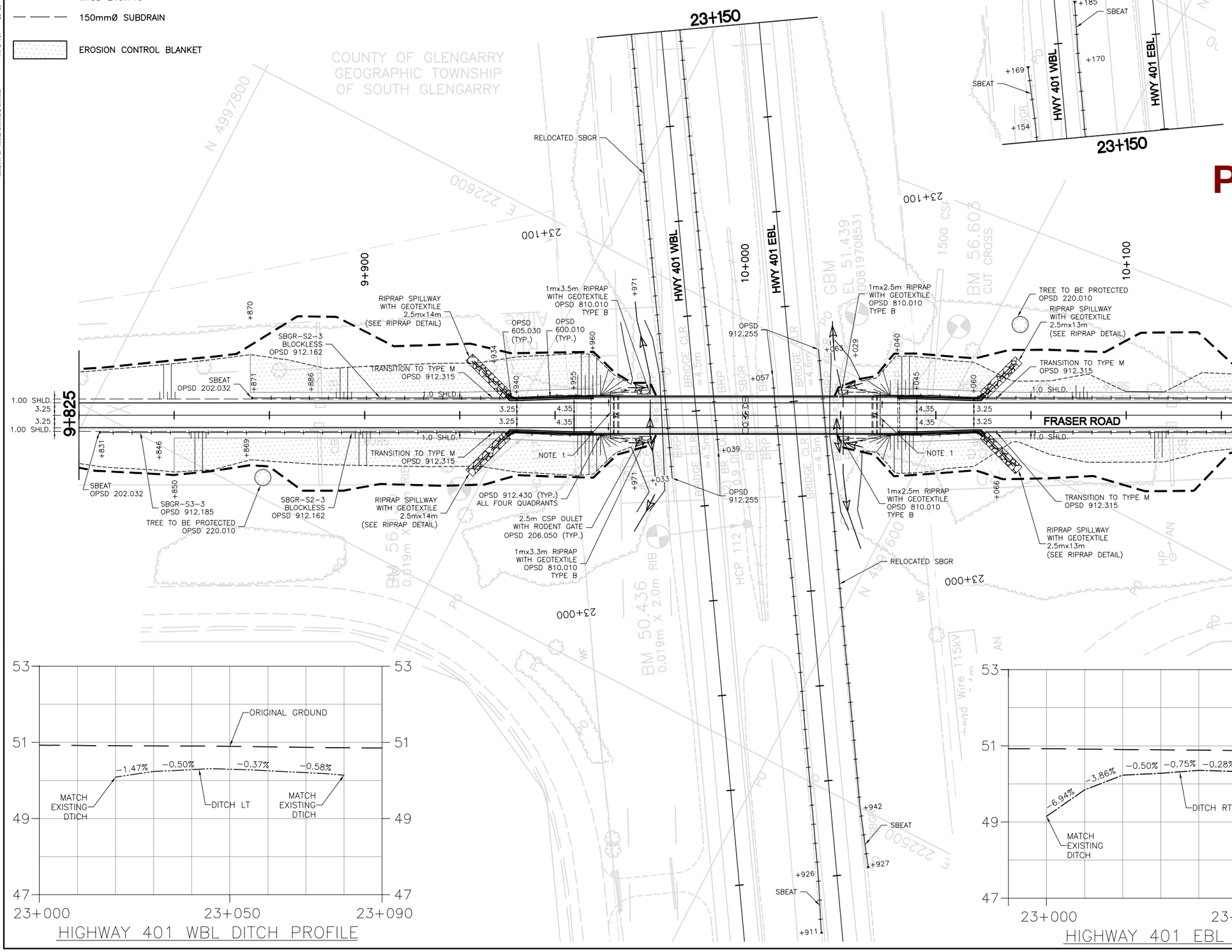
NEW CONSTRUCTION

STA Survey 9+825 TO STA Revised 10+175

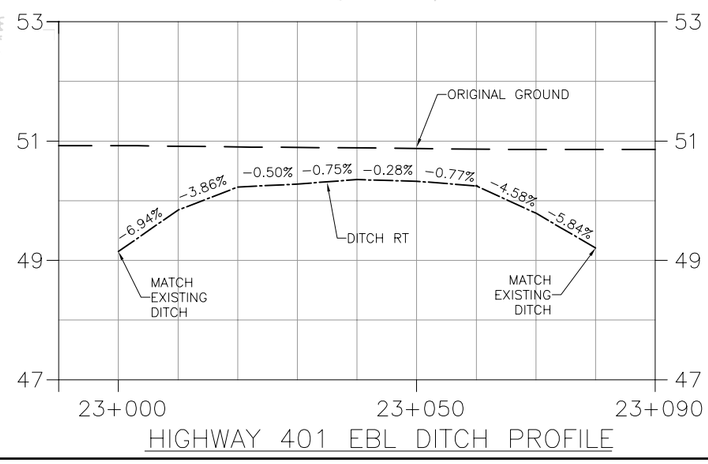
SHEET 13

wsp

Preliminary



HIGHWAY 401 WBL DITCH PROFILE



HIGHWAY 401 EBL DITCH PROFILE

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 85-05

FILE LOCATION-O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
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DRAWN BY: J.P.

METRIC

Preliminary

PLATE No

CONT No 2025-4017

GWP No 4248-15-00

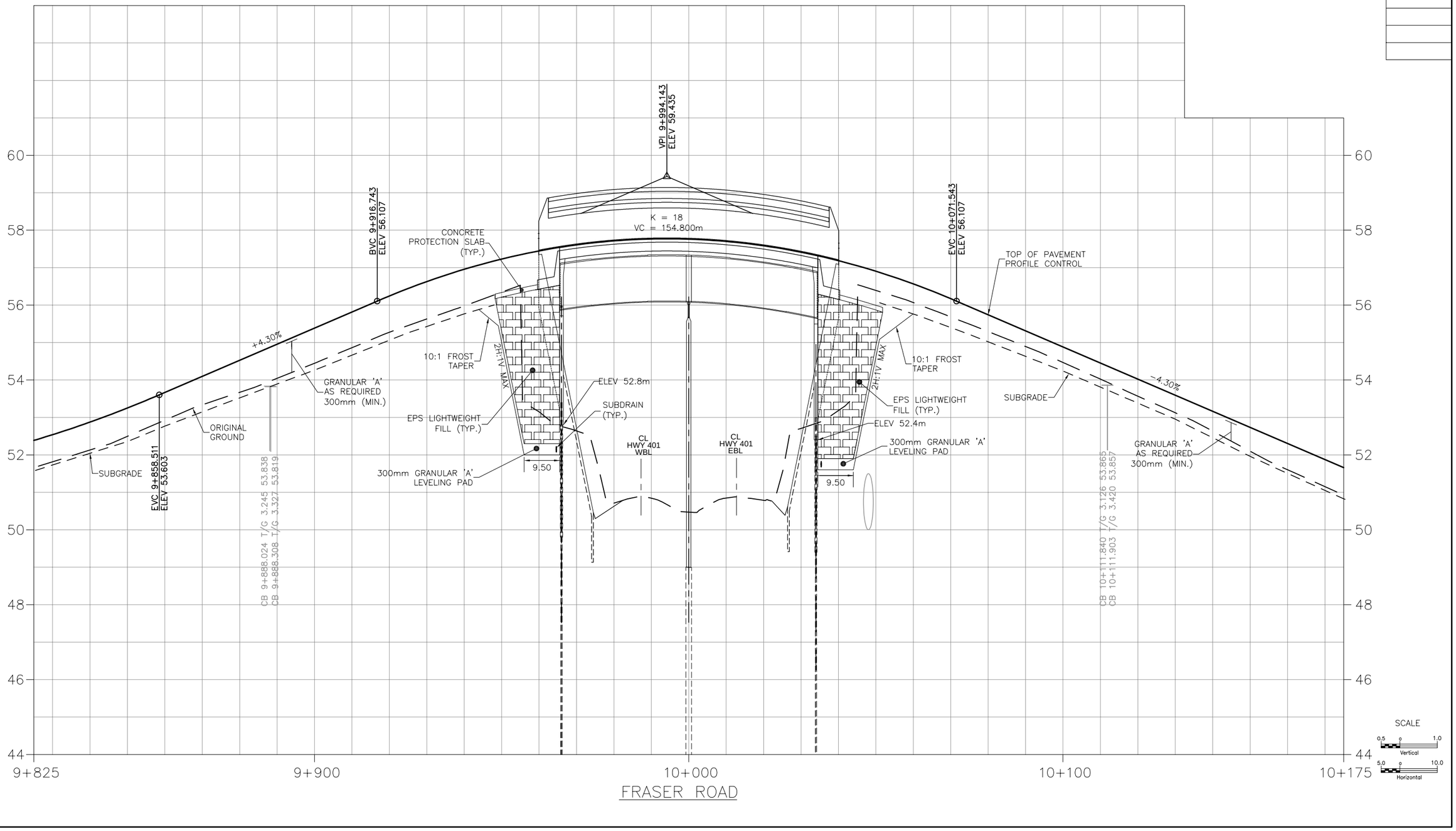
PROFILE

STA 9+825 TO STA 10+175

SHEET 14

wsp

MINISTRY OF TRANSPORTATION, ONTARIO PH-D-707 88-05



FRASER ROAD

FILE LOCATION=D:\3416002 MTO MEGA RETAINER\ASSIGNMENT 5 - FALLOWFIELD N-EW RAMP\CURRENT\SHEETS\
DRAWING NAME: 3416002-FALLOWFIELD-SOB-P01.DWG
DRAWN BY: S.C. MODIFIED: 17/06/19 14:15:03 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

REMOVALS
STA Survey 10+175 TO STA Revised 10+255

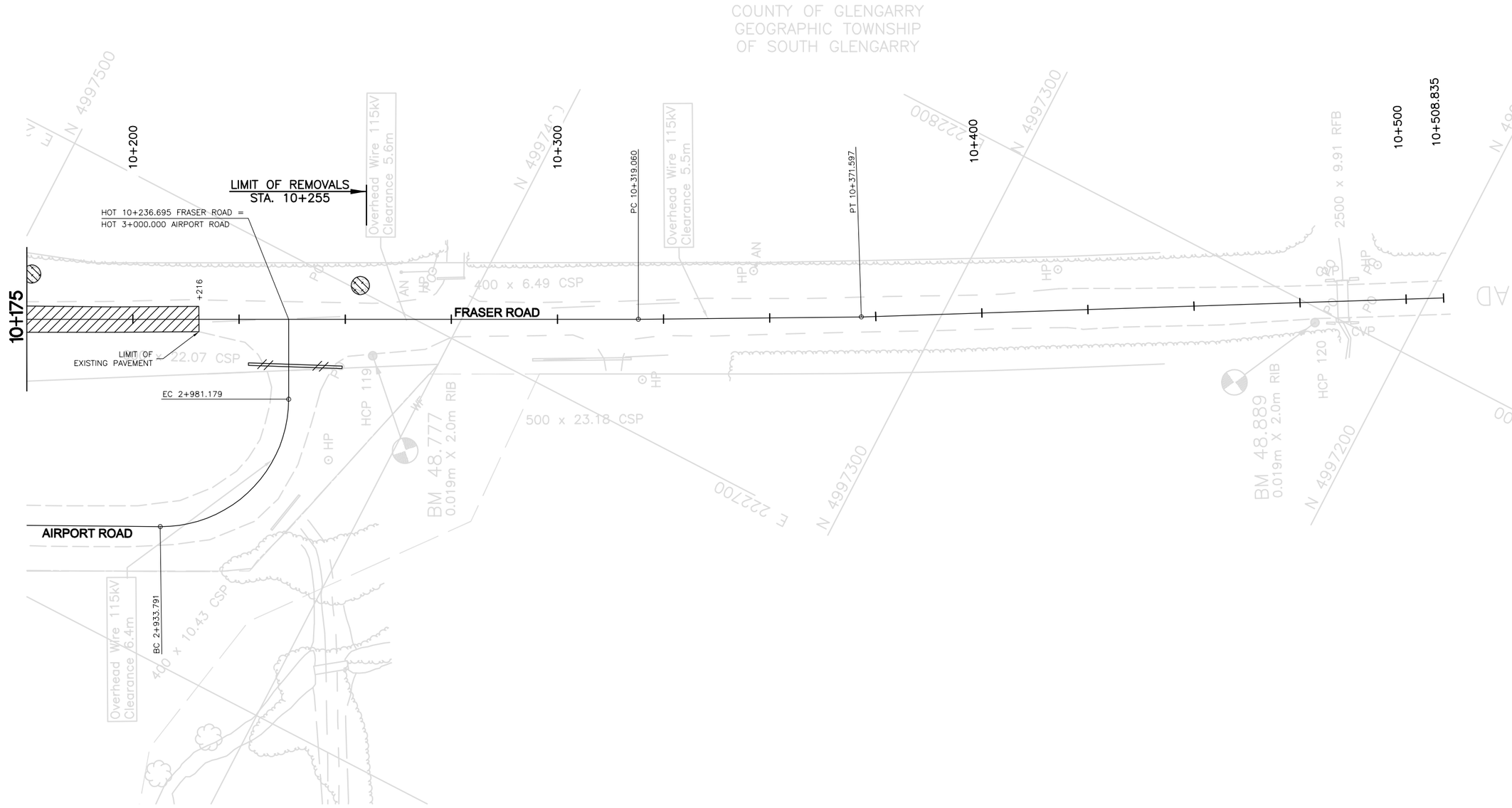
SHEET 15

wsp

Preliminary

LEGEND:

- REMOVAL ASPHALT PAVEMENT– FULL DEPTH
- REMOVAL ASPHALT PAVEMENT ON STRUCTURES
- REMOVE ASPHALT PAVEMENT ON CONCRETE SURFACES
- CLEARING AND GRUBBING
- GUIDE RAIL REMOVAL
- CURB AND GUTTER REMOVAL
- CULVERT REMOVAL



SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO
PR-D-707 85-05

FILE LOCATION-D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-R03.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:44:08 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

NEW CONSTRUCTION
STA Survey 10+175 TO STA Revised 10+310

SHEET 16

wsp

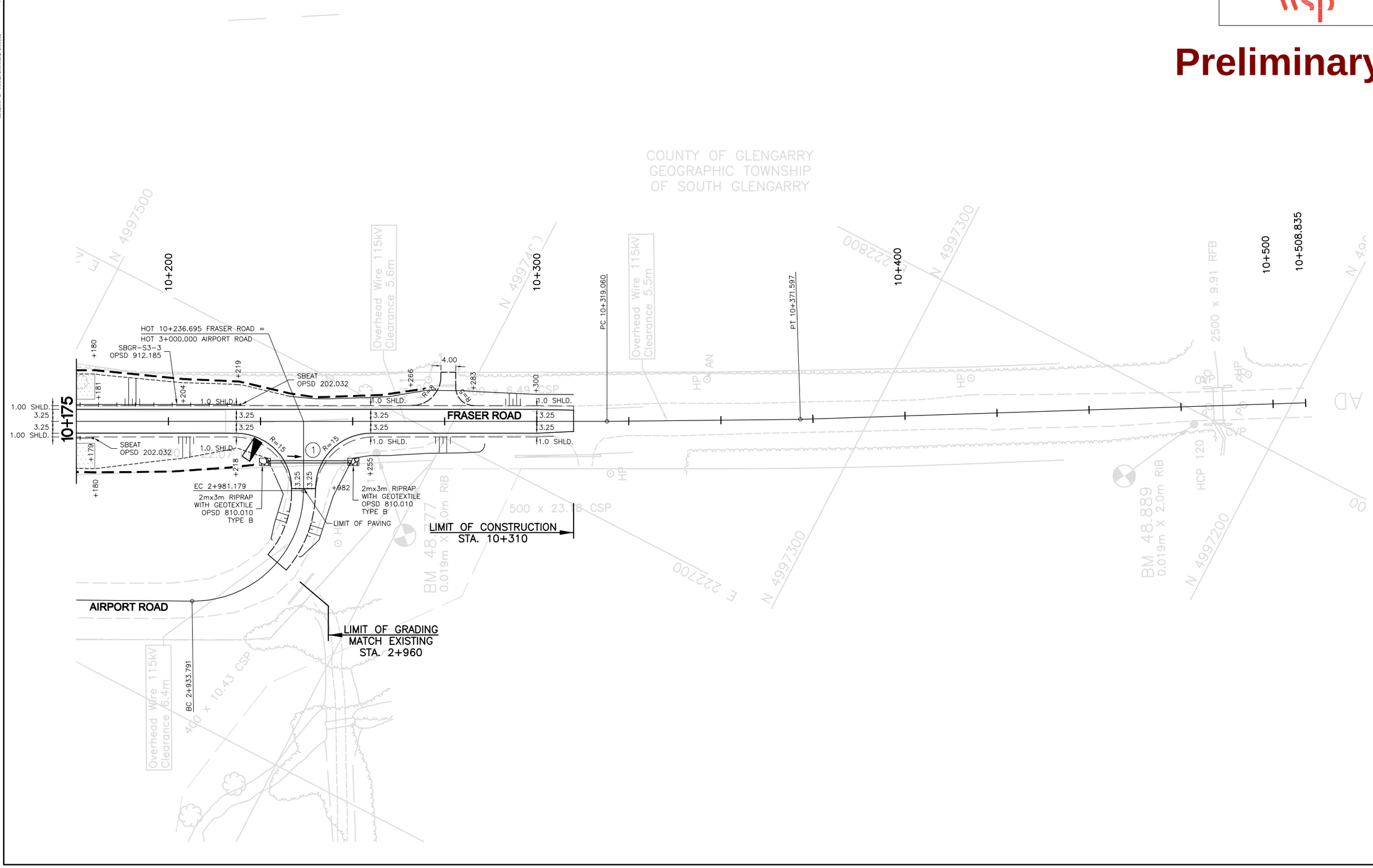
Preliminary

LEGEND:

FLOW CHECK OPSD 219.180

SEDIMENT FENCE BARRIER MTOD 219.110

EROSION CONTROL BLANKET



SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-S-707 85-05

FILE LOCATION=O:\CA00197042282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00197042282-N03.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:44:52 Revised

METRIC

NOTE:

1. REFERENCE STATIONING IDENTIFIED ON THE ENTRANCE PROFILE CORRESPONDS TO THE DISTANCE MEASURED PERPENDICULAR FROM THE FRASER ROAD ALIGNMENT.

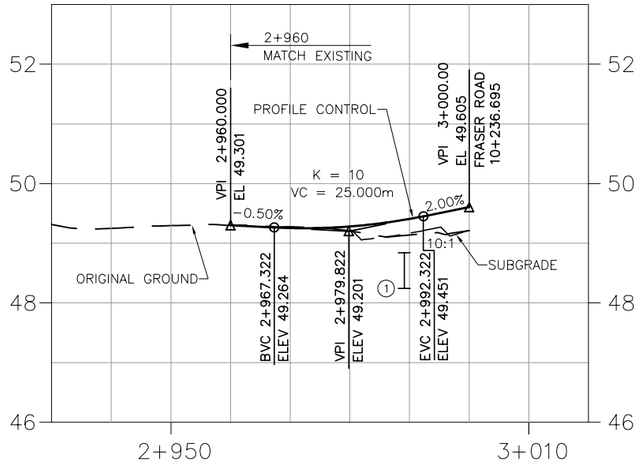
PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PROFILE
STA 10+175 TO STA 10+310

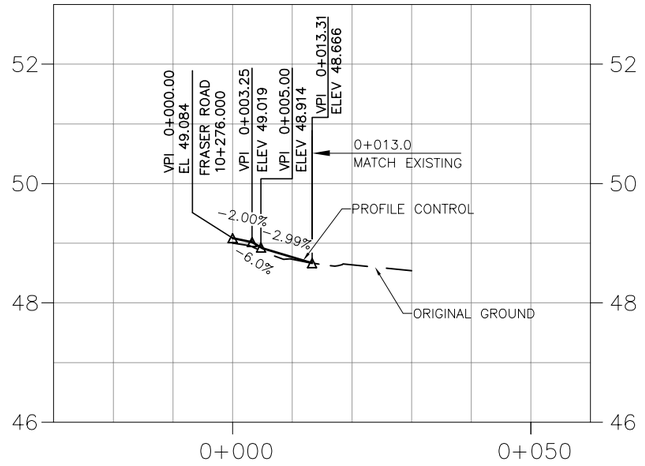
SHEET 17

wsp

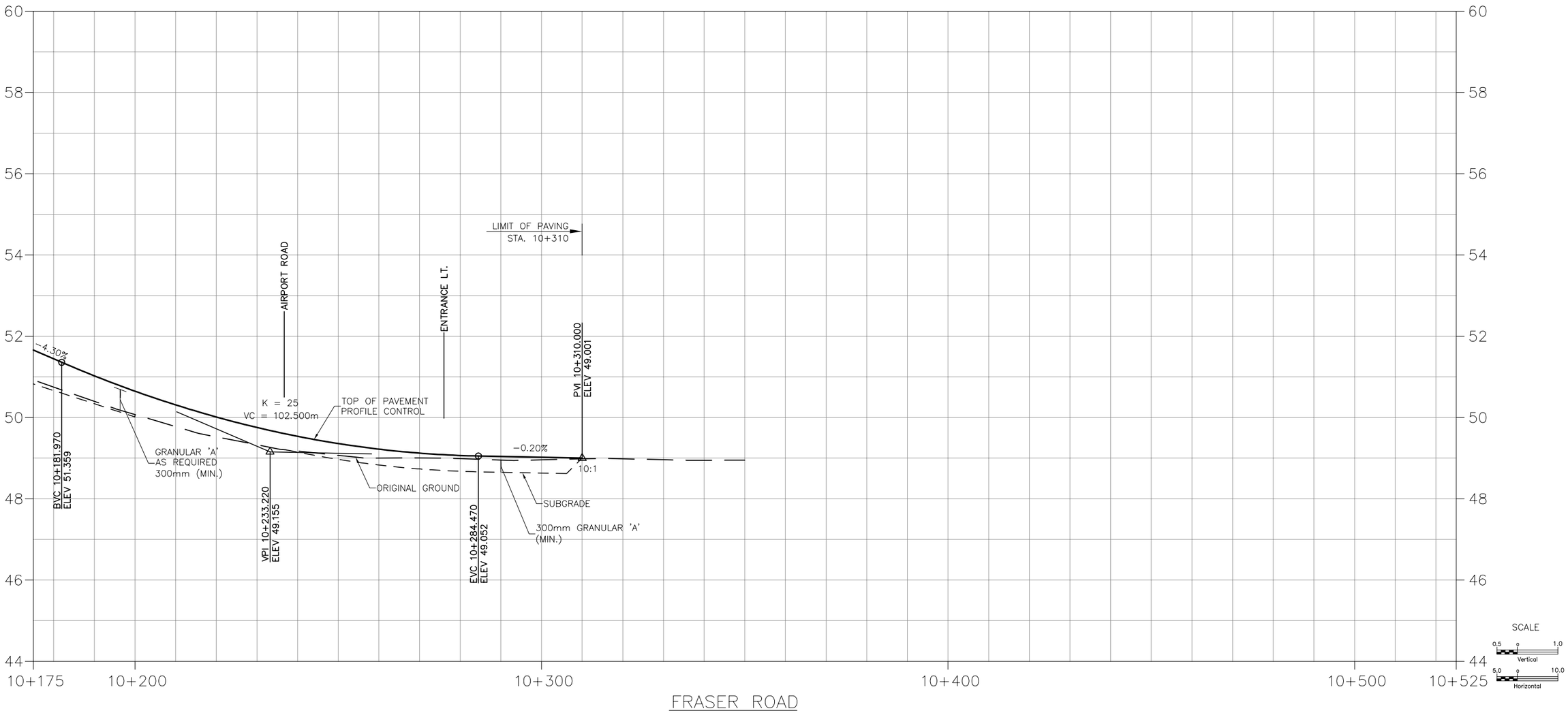
Preliminary



AIRPORT ROAD



ENTRANCE STA. 10+276



FRASER ROAD

MINISTRY OF TRANSPORTATION, ONTARIO PH-0-707 88-05

FILE LOCATION=D:\3416002 MTO MEGA RETAINER\ASSIGNMENT 5 - FALLOWFIELD N-EW RAMP\CURRENT\SHEETS\
DRAWING NAME: 3416002-FALLOWFIELD-SOB-P01.DWG
DRAWN BY: S.C. MODIFIED: 17/06/19 14:15:03 Revised

METRIC

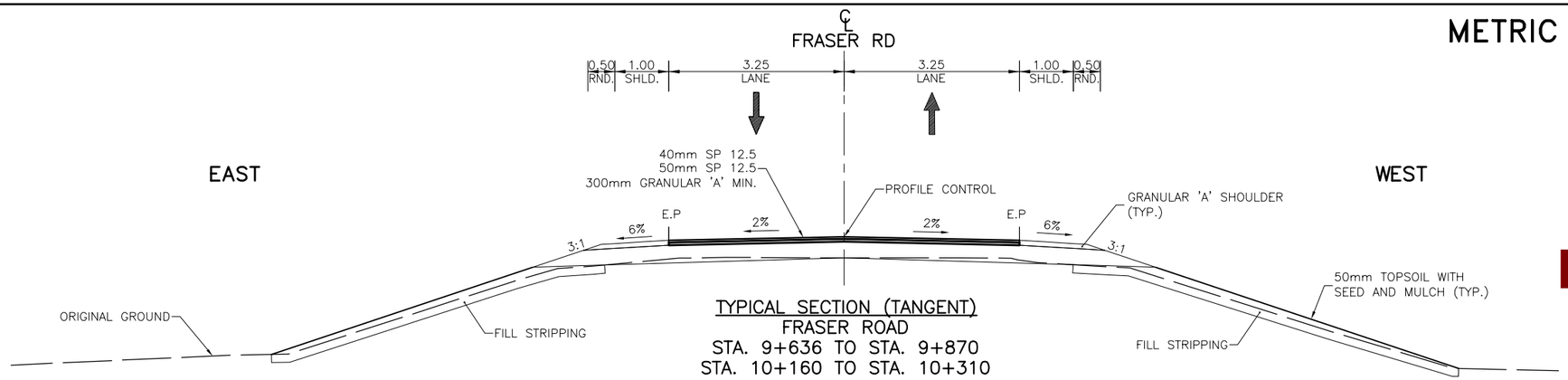
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CONT No 2025-4017
GWP No 4248-15-00

TYPICAL SECTIONS
STA Survey ____ TO STA ____ Revised

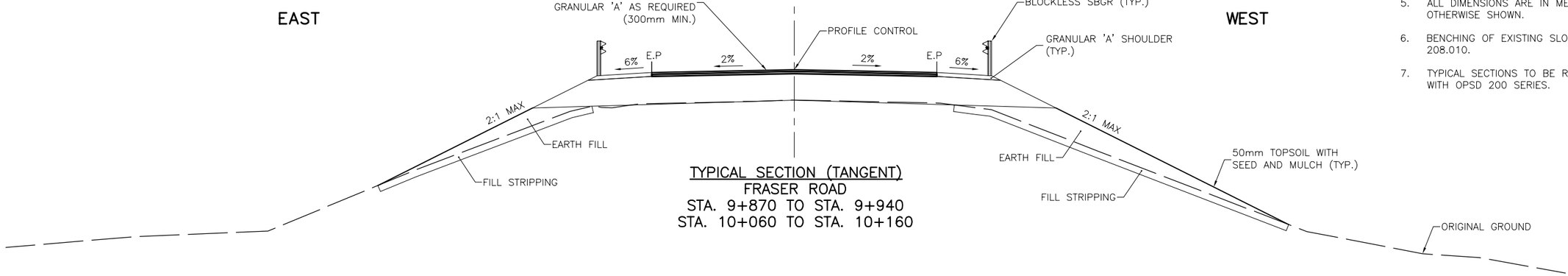
SHEET 18

wsp

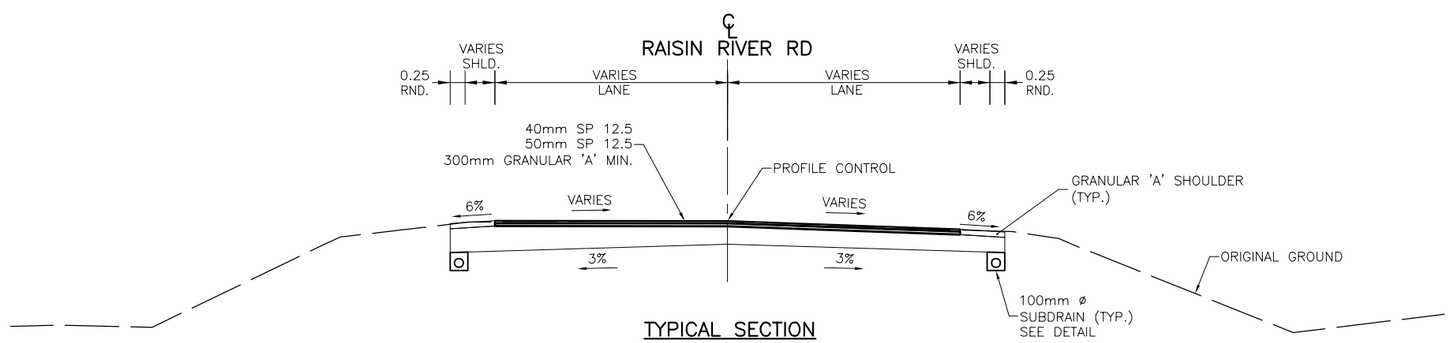
Preliminary



TYPICAL SECTION (TANGENT)
FRASER ROAD
STA. 9+636 TO STA. 9+870
STA. 10+160 TO STA. 10+310



TYPICAL SECTION (TANGENT)
FRASER ROAD
STA. 9+870 TO STA. 9+940
STA. 10+060 TO STA. 10+160



TYPICAL SECTION
RAISIN RIVER ROAD
STA. 1+003.25 TO STA. 1+021

NOTES:

1. 0.5m ROUNDING WITH NO SBGR INSTALLATION.
2. BLOCKLESS SBGR CAN BE INSTALLED WITH 0.5m ROUNDING.
3. ROUNDING WIDTHS VARY AT SBGR END TREATMENTS AS DETAILED ELSEWHERE IN CONTRACT.
4. REFER TO NEW CONSTRUCTION PLANS FOR DETAILS ON CURB AND GUTTER, AND VARYING SHOULDER WIDTHS AT STRUCTURE APPROACHES.
5. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.
6. BENCHING OF EXISTING SLOPES, AS PER OPSD 208.010.
7. TYPICAL SECTIONS TO BE READ IN CONJUNCTION WITH OPSD 200 SERIES.

N.T.S.

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 95-05

FILE LOCATION=D:\CA00119704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
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DRAWN BY: J.P. MODIFIED: 25/05/07 10:19:26 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

EXPANDED POLYSTYRENE DETAILS
STA Survey ____ TO STA Revised ____

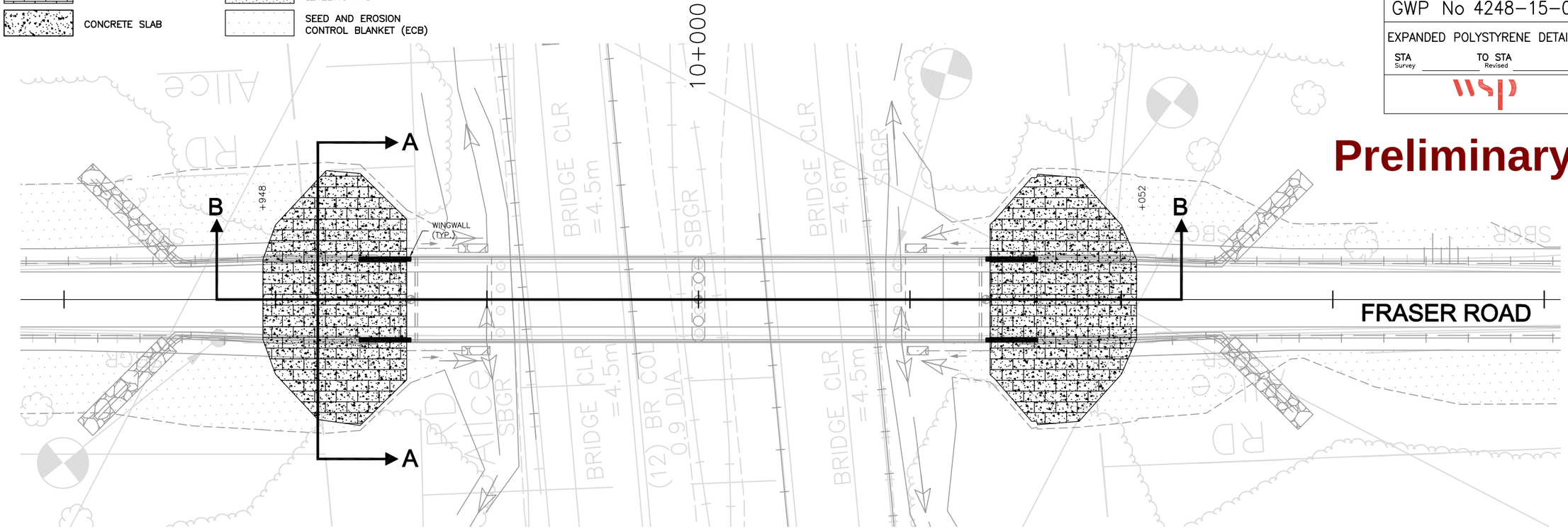
SHEET 19

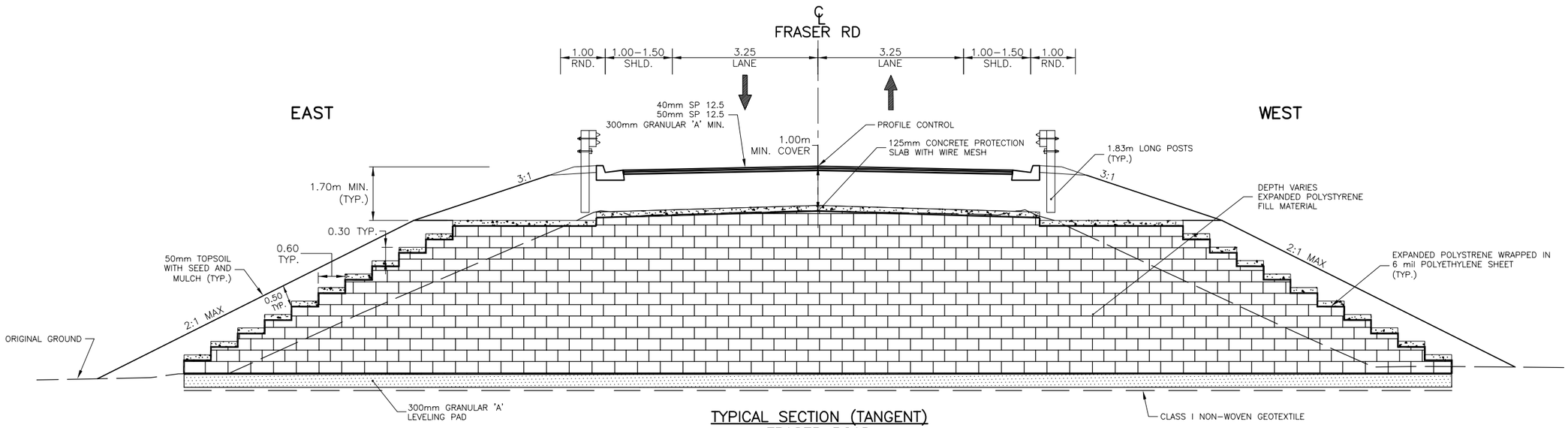
wsp

Preliminary

LEGEND

EXPANDED POLYSTYRENE
CONCRETE SLAB
GRANULAR 'A' LEVELING PAD
SEED AND EROSION CONTROL BLANKET (ECB)
150mm ø SUBDRAIN





TYPICAL SECTION (TANGENT)
FRASER ROAD
SECTION A-A

N.T.S.

FILE LOCATION-G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-MISC-01.DWG
DRAWN BY: J.P.
MODIFIED: 24/11/26 13:09:16 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

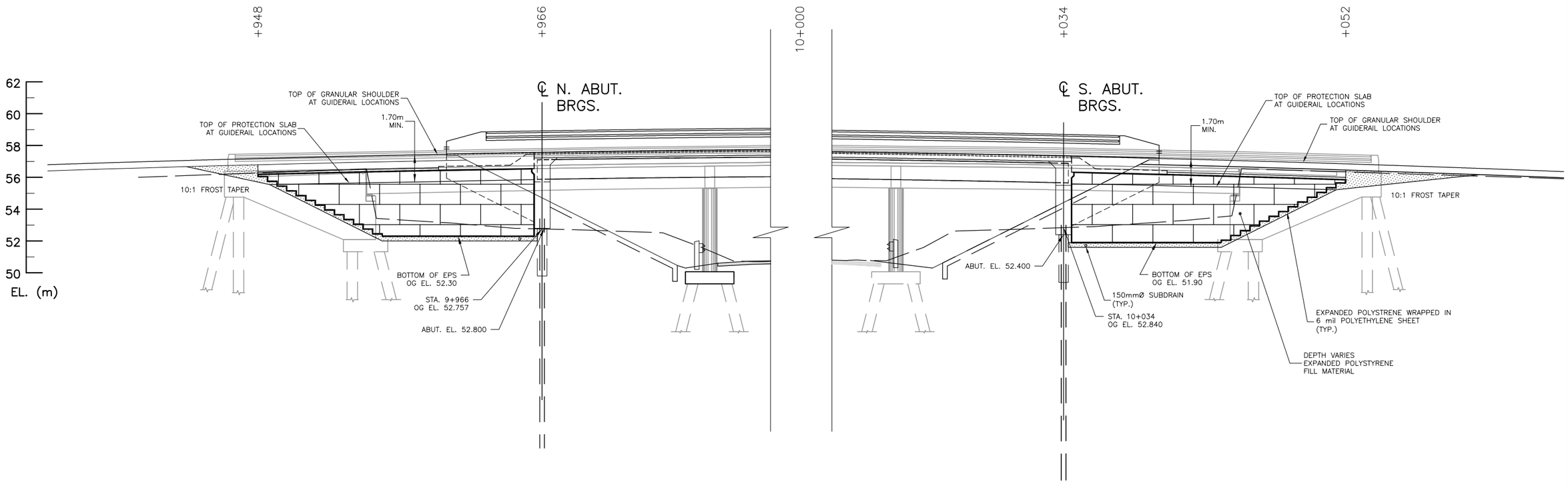
EXPANDED POLYSTYRENE DETAILS

STA Survey _____ TO STA _____ Revised _____

SHEET 20

wsp

Preliminary



SECTION B-B

N.T.S.

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

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DRAWN BY: J.P. MODIFIED: 24/11/26 13:09:16 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

MONITORING INSTRUMENTATION PLAN AND TYPICAL SECTION
Survey _____ Revised _____

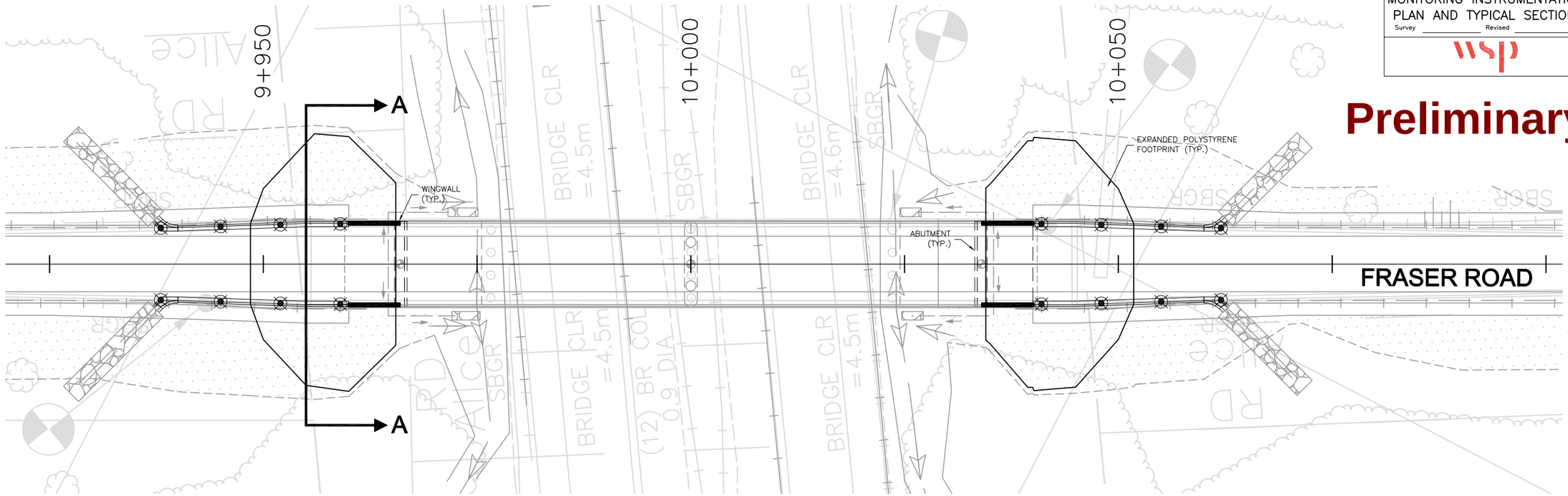
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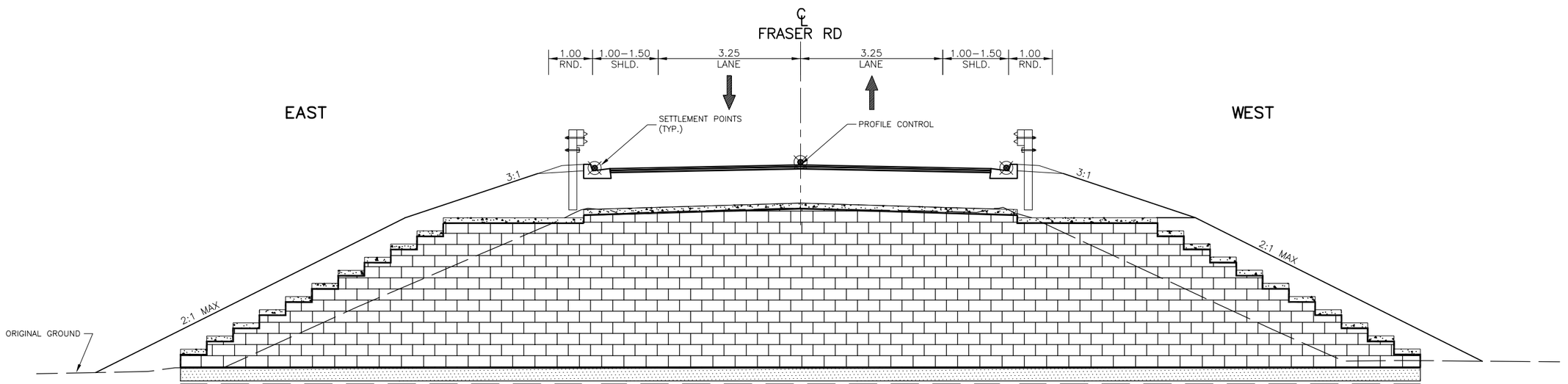
wsp

Preliminary

LEGEND

EXPANDED POLYSTYRENE
CONCRETE SLAB
GRANULAR 'A'
SEED AND EROSION CONTROL BLANKET (ECB)
150mm ø SUBDRAIN
SETTLEMENT POINT





TYPICAL SECTION (TANGENT)
FRASER ROAD
SECTION A-A

N.T.S.

MINISTRY OF TRANSPORTATION, ONTARIO
PR-D-707 86-05

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MODIFIED: 24/11/26 13:09:16
Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

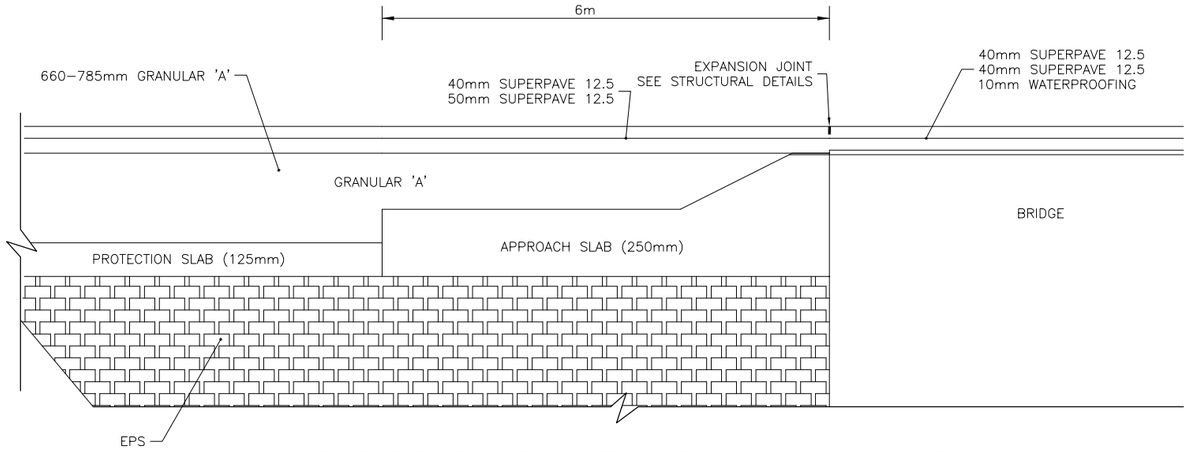
MISCELLANEOUS DETAILS

STA Survey ____ TO STA Revised ____

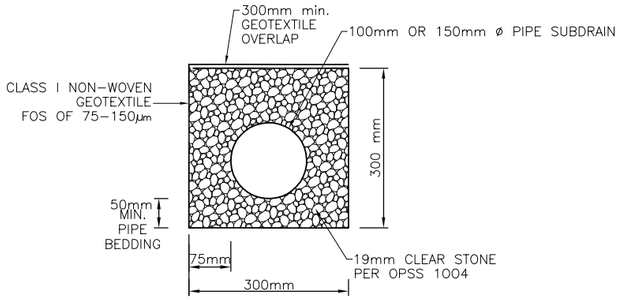
SHEET 22

wsp

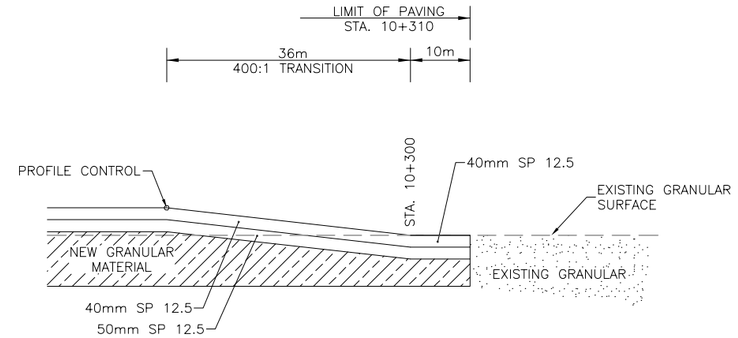
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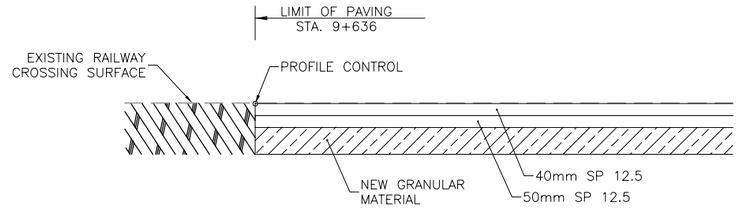
PAVEMENT TRANSITION DETAIL AT NEW APPROACH SLAB



SUBDRAIN DETAIL

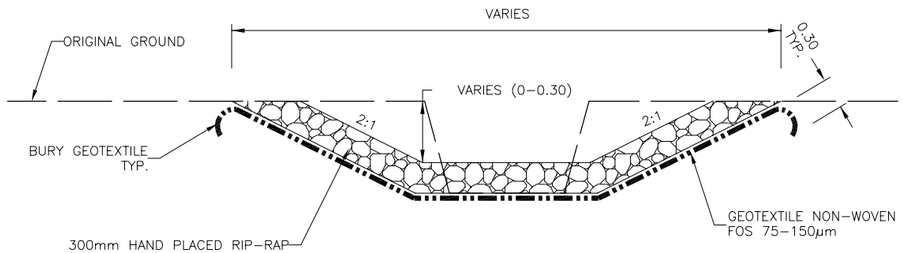


PAVEMENT TRANSITION DETAIL AT SOUTH PROJECT LIMITS

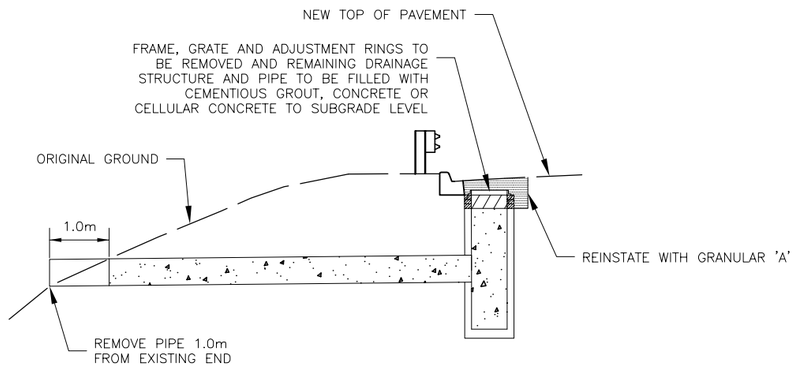


PAVEMENT TRANSITION DETAIL AT NORTH PROJECT LIMITS

NOTES:
1. SUBDRAIN PIPE CONNECTION AND OUTLET SHALL BE IN ACCORDANCE WITH OPSD 206.050.



RIP RAP DETAIL



PLUG CATCHBASINS AND SEWERS DETAIL

N.T.S.

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

FILE LOCATION-O:\CA00119704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00119704.4282-MISC-01.DWG MODIFIED: 24/11/26 13:09:16 Revised
DRAWN BY: J.P.

NOTES:

1. ACCESS RESTRICTED TO EMERGENCY SERVICES ONLY. TC-54s TO REMAIN IN PLACE AT ALL TIMES.
2. GATE TO BE LOCKED AT ALL TIMES EXCEPT DURING EMERGENCY USE.

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

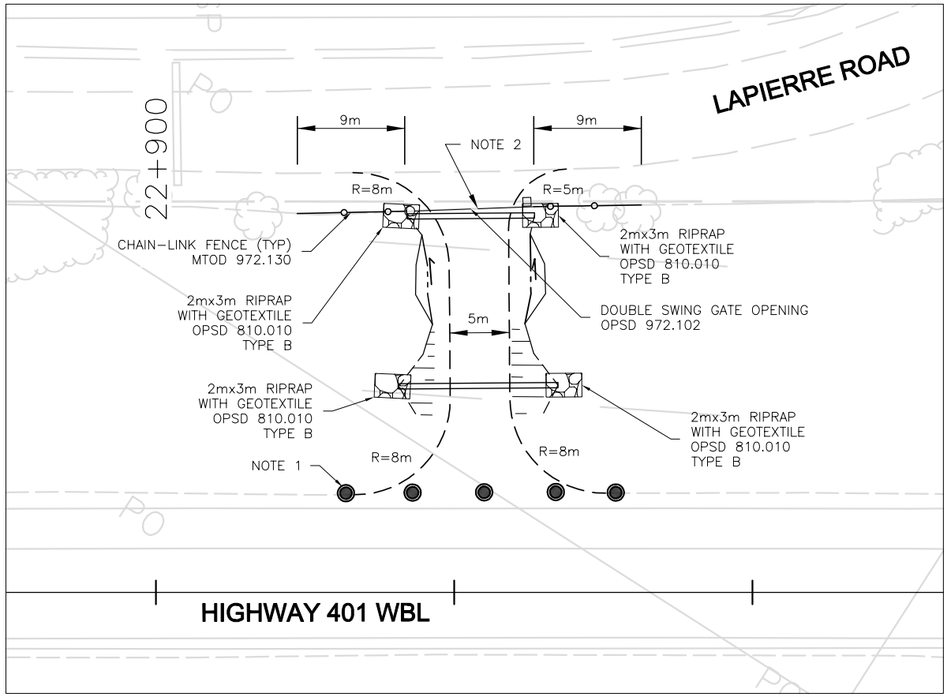
MISCELLANEOUS DETAILS

STA Survey TO STA Revised

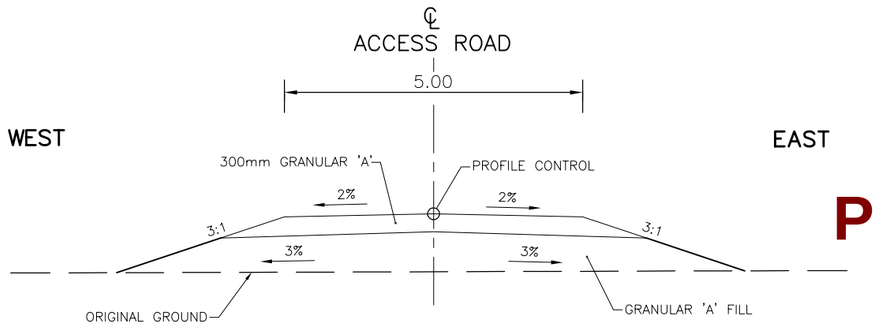
SHEET 23

wsp

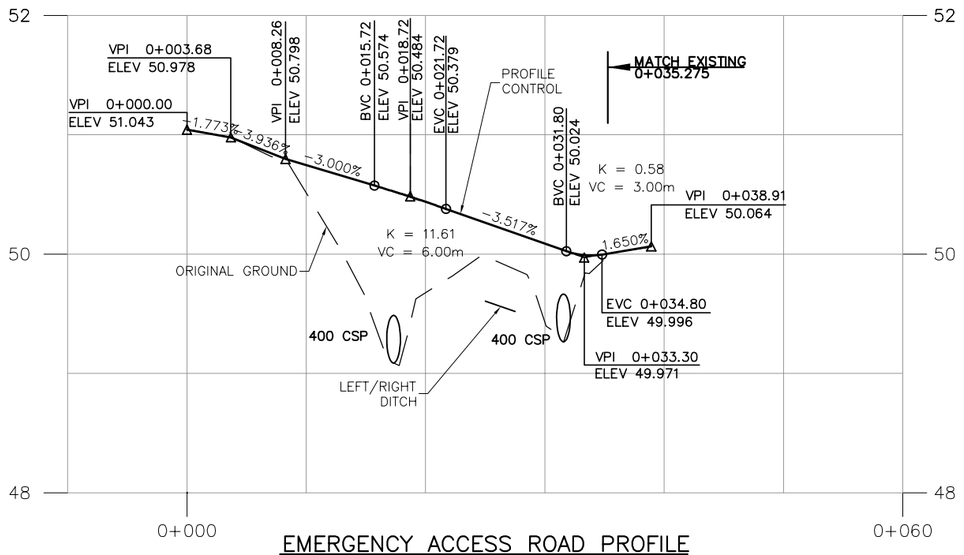
Preliminary



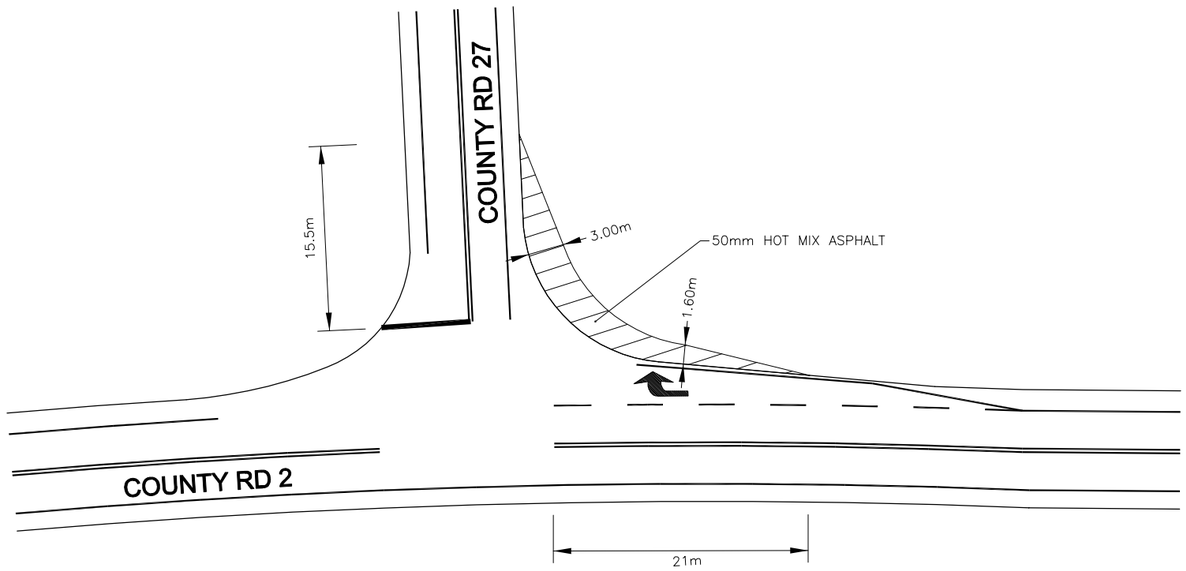
EMERGENCY ACCESS ROAD DETAIL



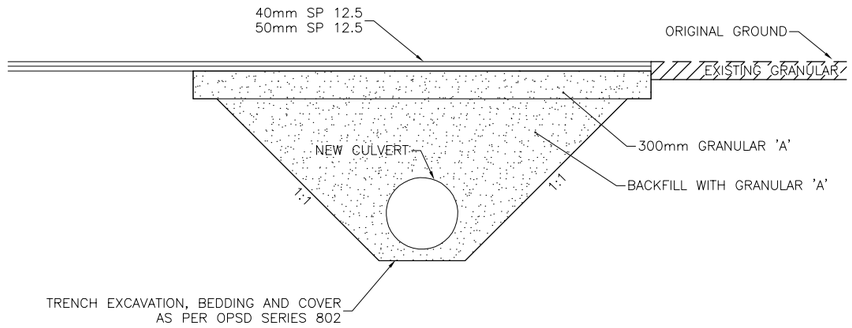
EMERGENCY ACCESS ROAD AT HIGHWAY 401 WBL
STA. 22+927.28



EMERGENCY ACCESS ROAD PROFILE



PAVEMENT WIDENING DETAIL
COUNTY RD 27 AND COUNTY RD 2 DETOUR ROUTE



CULVERT REINSTATEMENT DETAIL

N.T.S.

FILE LOCATION-D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-MISC-01.DWG
DRAWN BY: J.P.
MODIFIED: 24/11/26 13:09:16 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

STRUCTURAL EXCAVATION & BACKFILL

STA Survey ____ TO STA Revised ____

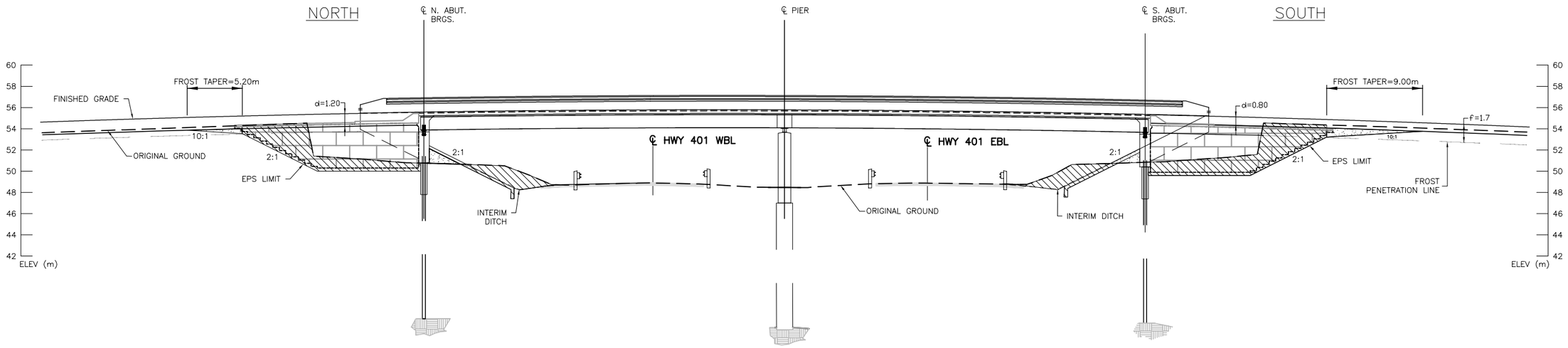
SHEET 24

wsp

Preliminary

LEGEND

- STRUCTURAL EXCAVATION
- GRANULAR A BACKFILL
- EXPANDED POLYSTYRENE LIGHTWEIGHT FILL
- NATIVE BACKFILL



N.T.S

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

FILE LOCATION-D:\CA00197704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00197704.4282-STRUC EX.DWG
DRAWN BY: J.P. MODIFIED: 24/11/14 10:08:02 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PAVEMENT MARKINGS & SIGNAGE

STA Survey 9+641 TO STA Revised 9+825

SHEET 25

wsp

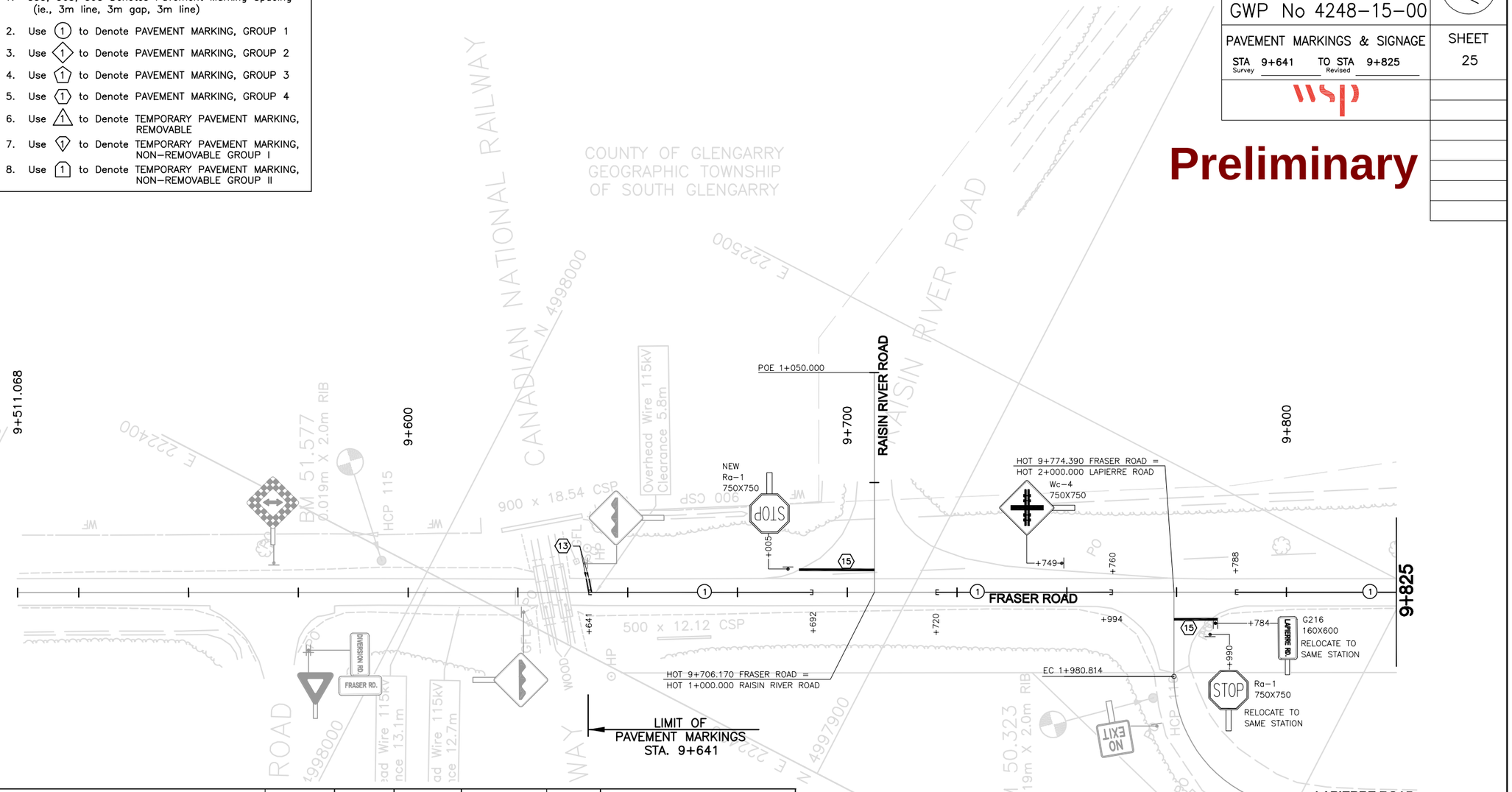
Preliminary

LEGEND

1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
13. SOILD WHITE, 30cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use (1) to Denote PAVEMENT MARKING, GROUP 4
6. Use △1 to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP I
8. Use (1) to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP II



Station	Offset from EP	Sign Number	Symbol/Message Description	Size BXH (mm)	Sign Area (sq. m)	Support Type	Sign Supplied by	Action	Comments
Fraser Road									
9+759	Lt.	Wc-4	Railway Crossing	750x750	0.56	Steel	NA	REL	TO STA. 9+749
9+784	Rt.	G216	Street Signs-Lapierrer Road	160x600	-	Steel	NA	REL	TO SAME EXISTING STA.
9+867	Lt.	Wc-4	Railway Crossing	750x750	0.56	Steel	MTO	NEW	
Raisin River Road									
1+005	Rt.	Ra-1	Stop Sign	750x750	0.56	Steel	MTO	NEW	
Lapierre Road									
1+990	Rt.	Ra-1	Stop Sign	750x750	0.56	Steel	NA	REL	TO SAME EXISTING STA.
Airport Road									
2+990	Rt.	Ra-1	Stop Sign	750x750	0.56	Steel	NA	REL	TO SAME EXISTING STA.
Highway 401 EBL									
23+040	Rt.	G220	Fraser Road	600x1200	0.72	Wood(6x6)	NA	REM	
23+040	Rt.	G220	Fraser Road	600x1200	0.72	Wood(6x6)	MTO	NEW	
Highway 401 WBL									
23+059	Lt.	G220	Fraser Road	600x1200	0.72	Wood(6x6)	NA	REM	
23+059	Lt.	G220	Fraser Road	600x1200	0.72	Wood(6x6)	MTO	NEW	

SIGN TABLE

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION=O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-N01.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:08 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PAVEMENT MARKINGS & SIGNAGE

STA Survey 9+825 TO STA Revised 10+175

SHEET 26

wsp

Preliminary

LEGEND

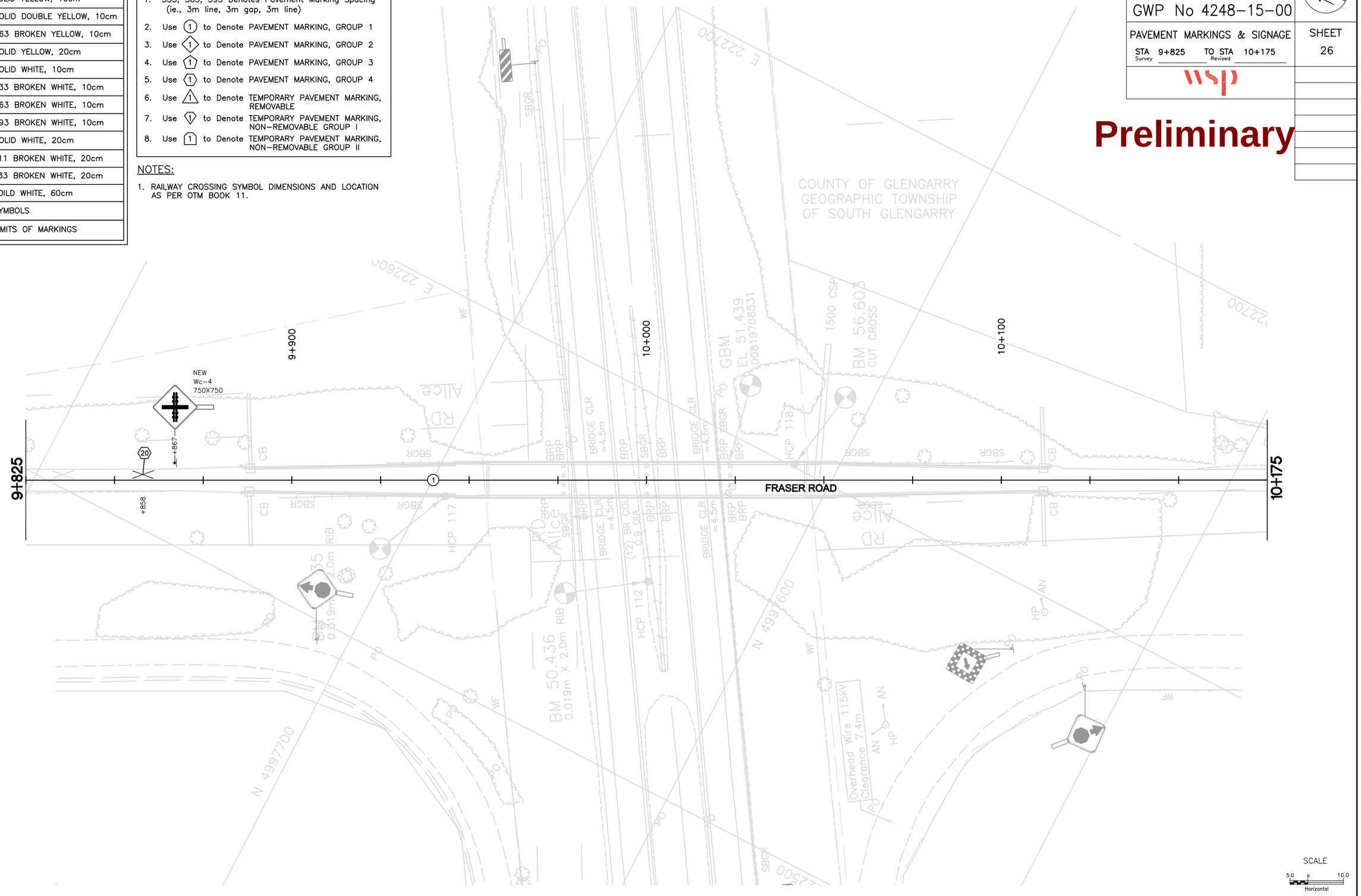
1.	SOLID YELLOW, 10cm
2.	SOLID DOUBLE YELLOW, 10cm
3.	363 BROKEN YELLOW, 10cm
4.	SOLID YELLOW, 20cm
5.	SOLID WHITE, 10cm
6.	333 BROKEN WHITE, 10cm
7.	363 BROKEN WHITE, 10cm
8.	393 BROKEN WHITE, 10cm
9.	SOLID WHITE, 20cm
10.	111 BROKEN WHITE, 20cm
11.	333 BROKEN WHITE, 20cm
15.	SOILD WHITE, 60cm
20.	SYMBOLS
] [	LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
3. Use ◇1◇ to Denote PAVEMENT MARKING, GROUP 2
4. Use ⬡1⬡ to Denote PAVEMENT MARKING, GROUP 3
5. Use ⬡1⬡ to Denote PAVEMENT MARKING, GROUP 4
6. Use △1△ to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ◇1◇ to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP I
8. Use [1] to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP II

NOTES:

1. RAILWAY CROSSING SYMBOL DIMENSIONS AND LOCATION AS PER OTM BOOK 11.



FILE LOCATION=O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

MINISTRY OF TRANSPORTATION, ONTARIO PR-S-707 88-05

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 85-05

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

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4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use (1) to Denote PAVEMENT MARKING, GROUP 4
6. Use △1 to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP I
8. Use (1) to Denote TEMPORARY PAVEMENT MARKING, NON–REMOVABLE GROUP II

METRIC

PLATE No

CONT No 2025–4017

GWP No 4248–15–00

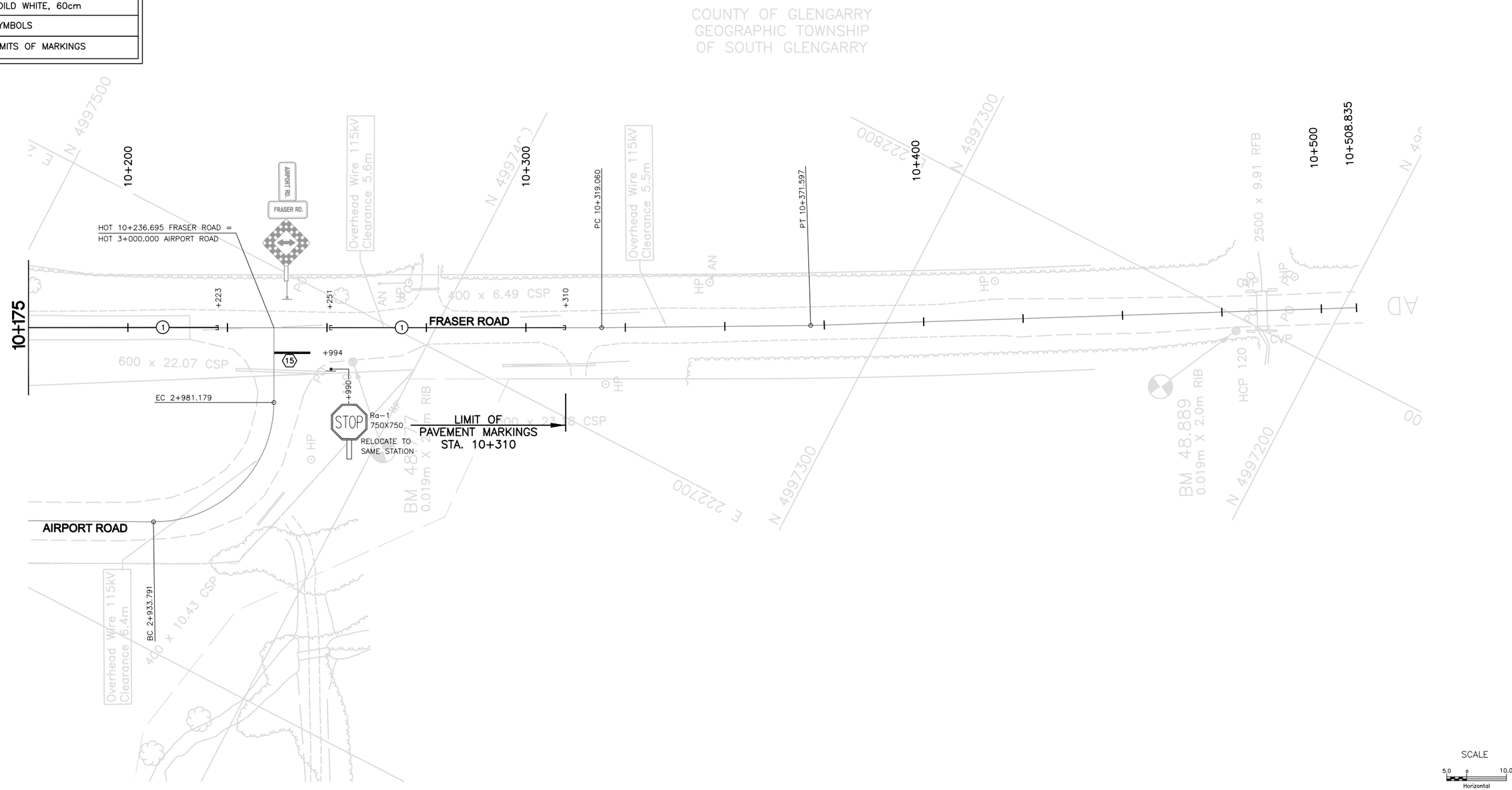
PAVEMENT MARKINGS & SIGNAGE

STA 10+175 (Survey) TO STA 10+310 (Revised)

SHEET 27

wsp

Preliminary



SCALE

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Horizontal

FILE LOCATION–D:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\

DRAWING NAME: CA0019704.4282–N03.DWG

DRAWN BY: J.P. MODIFIED: 24/11/13 14:44:52 Revised

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PAVEMENT MARKING & SIGNAGE

STA 22+554 (Survey) TO STA 22+875 (Revised)

SHEET 28

wsp

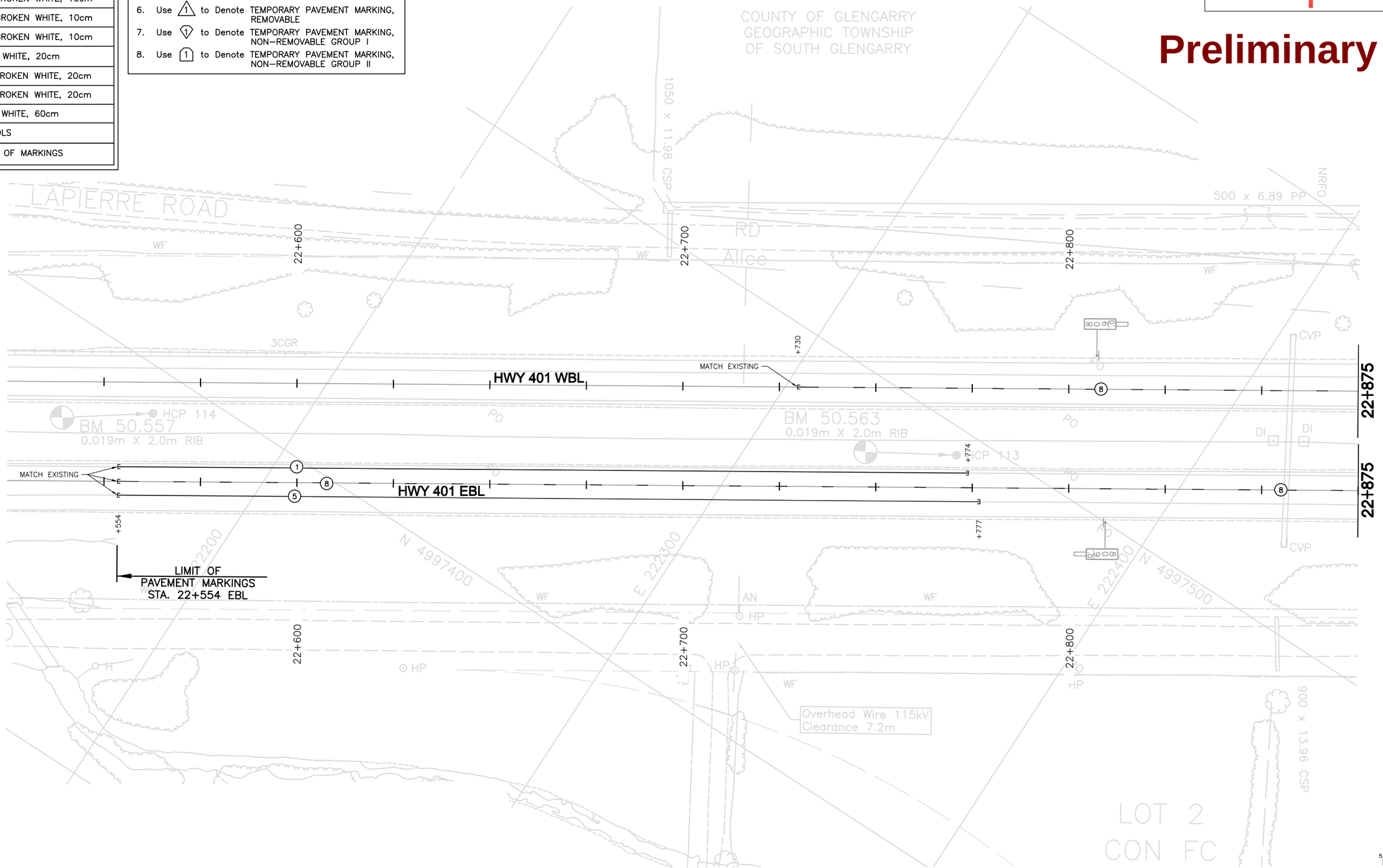
Preliminary

LEGEND

1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

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3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
5. Use ⬡1 to Denote PAVEMENT MARKING, GROUP 4
6. Use △1 to Denote TEMPORARY PAVEMENT MARKING, REMOVABLE
7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP I
8. Use [1] to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP II



SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

FILE LOCATION-D:\CA00197042282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00197042282-N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

LEGEND
1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

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2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
3. Use ◇1 to Denote PAVEMENT MARKING, GROUP 2
4. Use (1) to Denote PAVEMENT MARKING, GROUP 3
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7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP I
8. Use (1) to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP II

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

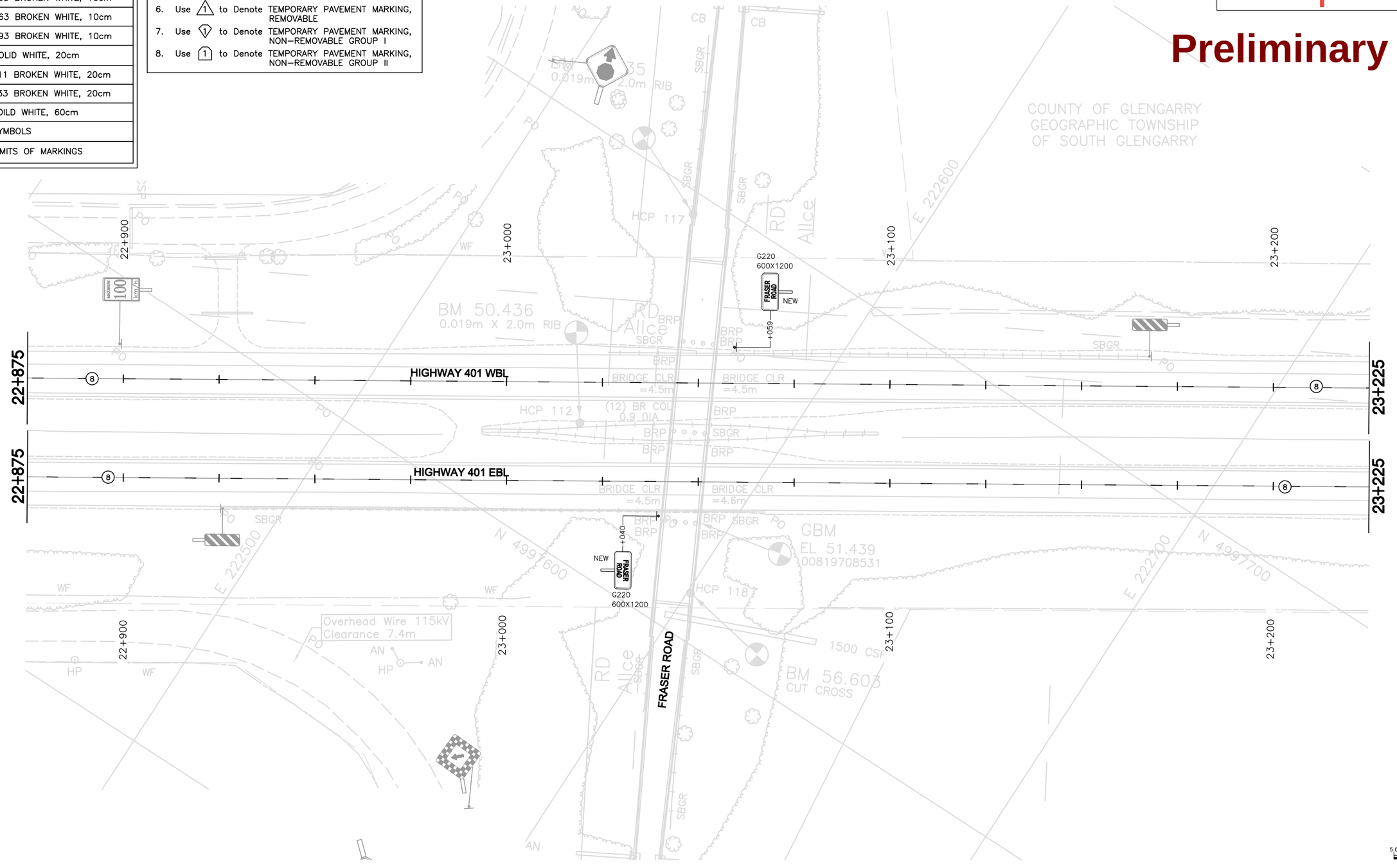
PAVEMENT MARKING & SIGNAGE

STA Survey 22+875 TO STA Revised 23+225

SHEET 29

wsp

Preliminary



SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

FILE LOCATION-O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

METRIC

PLATE No	SHEET
CONT No 2025-4017 GWP No 4248-15-00	30
PAVEMENT MARKING & SIGNAGE STA 23+225 Survey TO STA 23+542 Revised	

wsp

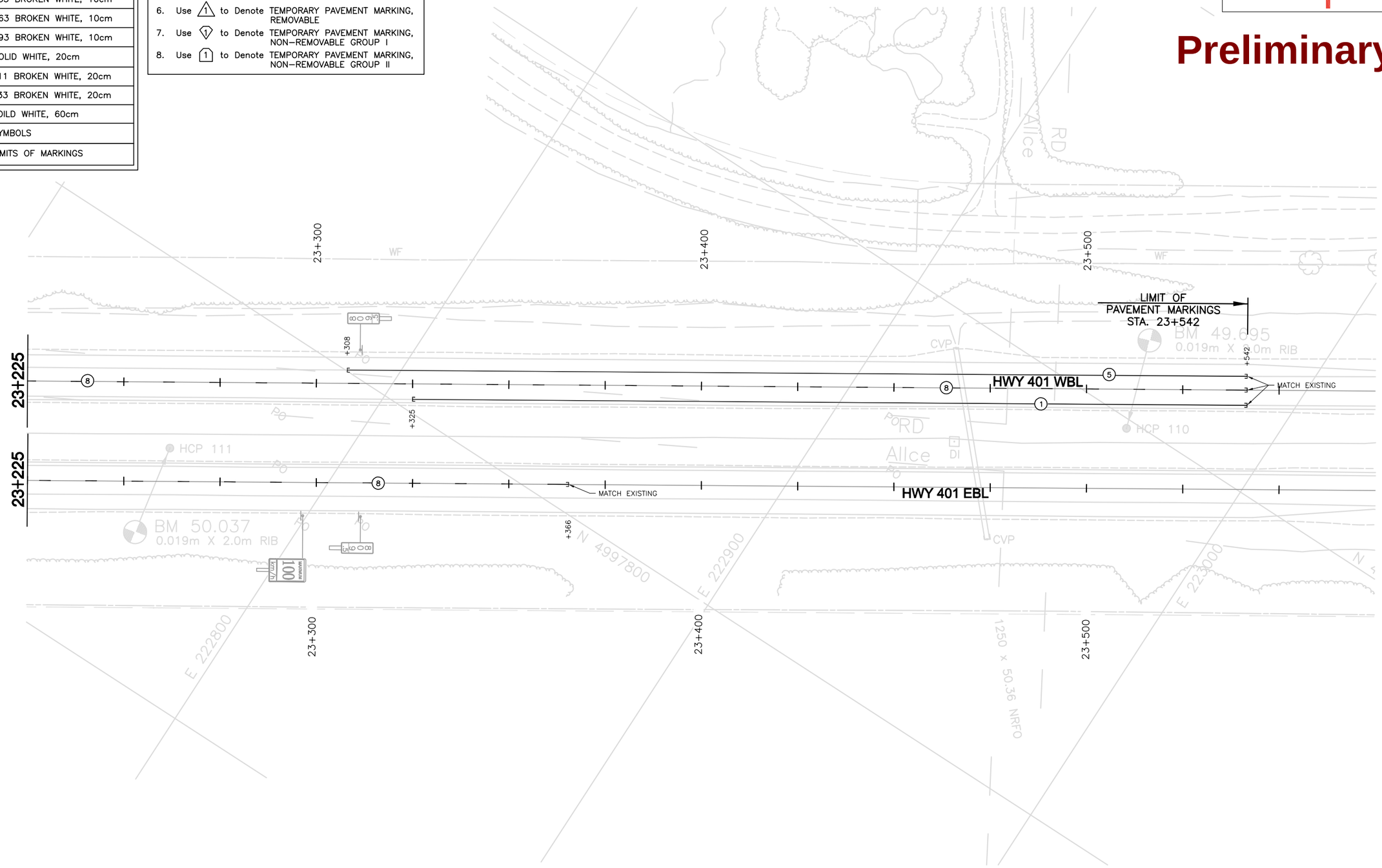
Preliminary

LEGEND

1. SOLID YELLOW, 10cm
2. SOLID DOUBLE YELLOW, 10cm
3. 363 BROKEN YELLOW, 10cm
4. SOLID YELLOW, 20cm
5. SOLID WHITE, 10cm
6. 333 BROKEN WHITE, 10cm
7. 363 BROKEN WHITE, 10cm
8. 393 BROKEN WHITE, 10cm
9. SOLID WHITE, 20cm
10. 111 BROKEN WHITE, 20cm
11. 333 BROKEN WHITE, 20cm
15. SOILD WHITE, 60cm
20. SYMBOLS
] [LIMITS OF MARKINGS

NOTES:

1. 333, 363, 393 Denotes Pavement Marking Spacing (ie., 3m line, 3m gap, 3m line)
2. Use (1) to Denote PAVEMENT MARKING, GROUP 1
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7. Use ▽1 to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP I
8. Use (1) to Denote TEMPORARY PAVEMENT MARKING, NON-REMOVABLE GROUP II



SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 86-05

FILE LOCATION-G:\CA00197042282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA00197042282-N02.DWG
DRAWN BY: J.P. MODIFIED: 24/11/13 14:45:00 Revised

Preliminary

GEOTECHNICAL SURVEY DATA G.W.P. 4248-15-00	
DATE OF SURVEY	TYPE OF SURVEY
October 2024	Power Auger – (PA), Hand Auger – (HA)

NOTES

1. Conditions and depths apply only to the date of the survey.
2. The boundaries between the strata have been established only at borehole locations.
3. Soils are described according to the MTO Soils Classification System.
4. Abbreviations for boring and test data conform to OPSD 100.060.

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION=O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-S30-BH01.DWG
DRAWN BY: J.P. MODIFIED: 25/08/21 Revised 13:13:53

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

BOREHOLE DATA

SHEET 32

wsp

Preliminary

Highway 401 Westbound

Station 22+750 to 23-350, Referenced to C/L — Report Date: March, 2025

22+750 8.70 Lt C/L D-0 In Shld

0	- 205	Asph
205	- 700	Br Gry Cr Gr(y) Sa Tr Si, Moist
700	- 1.50	Lt Br Cl(y) Si So Sa Occ Cob, Moist

22+750 18.30 Lt C/L D-0 Out Shld

0	- 210	Asph
210	- 400	Br Gry Cr Gr(y) Sa Tr Si, Moist
400	- 470	Buried Asph
470	- 670	Br Gry Cr Gr(y) Sa Tr Si, Moist
670	- 1.50	Lt Br Cl(y) Si Tr Sa Occ Cob, Moist

22+950 9.40 Lt C/L D-0 In Shld

0	- 120	Asph
120	- 460	Br Gry Cr Sa(y) Gr Tr Si, Moist*
460	- 800	Gry Cr Gr Tr Sa, Moist
800	- 1.50	Lt Br Cl(y) Si So Sa Occ Cob, Wet, Fr Wat @ 1.00

* Sample Depth =150 - 450
Passing 26.5 mm =100 %
19.0 mm =98 %
13.2 mm =86 %
9.5 mm =67 %
4.75 mm =44 %
1.18 mm =23 %
300 um =13 %
75 um =8 %
w =2 %
Accep Gran A

22+950 19.50 Lt C/L D-0 Out Shld

0	- 200	Asph
200	- 390	Br Gry Cr Gr(y) Sa Tr Si, Moist
390	- 470	Buried Asph
470	- 710	Br Gry Cr Gr(y) Sa So Si, Moist*
710	- 1.50	Br Cl(y) Si & Sa So Gr Occ Cob, Moist**

* Sample Depth =470 - 710
Passing 150 mm =100 %
26.5 mm =100 %
4.75 mm =63 %
1.18 mm =38 %
300 um =25 %
75 um =16 %
w =2 %
Unaccep Gran B,Type I
(16% passing 75um)
Accep SSM

** Sample Depth =1.00 - 1.30
Passing 4.75 mm =89 %
2.00 mm =82 %
425 um =66 %
75 um =46 %
5 um =23 %
2 um =16 %
w =12 %
WL = 23 % WP =13 % IP = 10 %
Classification =CL
Frost Susc. =LSFH
'K' Factor =0.20

23+100 5.40 Lt C/L D-200 In Shld

0	- 680	Br Gry Cr Gr(y) Sa Tr Si, Moist
680	- 1.20	Lt Br Sa(y) Si So Gr So Cl Occ Cob, Moist
1.20	- 1.50	Br Cl(y) Si Tr Sa, Moist

23+100 18.70 Lt C/L D-0 Out Shld

0	- 170	Asph
170	- 680	Br Gry Cr Gr(y) Sa Tr Si, Moist
680	- 1.50	Br Cl(y) Si Tr Sa Occ Cob, Moist

Highway 401 Westbound

Station 22+750 to 23-350, Referenced to C/L — Report Date: March, 2025

23+350 8.70 Lt C/L D-0 In Shld

0	- 210	Asph
210	- 320	Br Gry Cr Gr(y) Sa Tr Si, Moist
320	- 420	Buried Asph
420	- 850	Br Gry Cr Gr & Sa Tr Si, Moist*
850	- 1.50	Lt Br Cl(y) Si - Sa(y) Si Tr Gr Occ Cob, Moist

* Sample Depth =500 - 800
Passing 150 mm =100 %
26.5 mm =100 %
4.75 mm =52 %
1.18 mm =29 %
300 um =16 %
75 um =6 %
w =3 %
Accep Gran B, Type I

23+350 19.40 Lt C/L D-0 Out Shld

0	- 205	Asph
205	- 440	Br Gry Cr Gr(y) Sa Tr Si, Moist
440	- 510	Buried Asph
510	- 700	Br Gry Cr Gr(y) Sa Tr Si, Moist
700	- 1.50	Lt Br Cl(y) Si - Sa(y) Si Tr Gr Occ Cob, Moist*

* Sample Depth =1.20 - 1.50
Passing 4.75 mm =91 %
2.00 mm =82 %
425 um =65 %
75 um =47 %
5 um =28 %
2 um =21 %
w =12 %
Classification =CL-ML
Frost Susc. =LSFH
'K' Factor =0.20

Highway 401 Eastbound

Station 22+750 to 23-350, Referenced to C/L — Report Date: March, 2025

22+750 8.60 Rt C/L D-0 In Shld

0	- 115	Asph
115	- 750	Br Gry Cr Gr(y) Sa So Si, Moist
750	- 1.50	Br Sa(y) Si So Cl Tr Gr Occ Cob, Moist

22+750 18.30 Rt C/L D-0 Out Shld

0	- 220	Asph
220	- 720	Br Cr Gr(y) Sa So Si, Moist*
720	- 1.50	Br Sa(y) Si So Cl Tr Gr Occ Cob, Moist

* Sample Depth =400 - 700
Passing 26.5 mm =100 %
19.0 mm =100 %
13.2 mm =98 %
9.5 mm =91 %
4.75 mm =65 %
1.18 mm =38 %
300 um =24 %
75 um =16 %
w =3 %
Unaccep Gran A
(most sieve sizes too fine)
Unaccep Gran B,Type I
(16% passing 75um)

22+990 5.10 Rt C/L D-300 In Shld

0	- 540	Br Gry Cr Gr(y) Sa Tr Si, Moist
540	- 1.50	Br Blk Sa(y) Si Tr Org M, Moist

22+990 18.70 Rt C/L D-0 Out Shld

0	- 195	Asph
195	- 670	Br Gry Cr Gr(y) Sa Tr Si, Moist
670	- 1.30	Lt Br Sa(y) Si So Cl Tr Gr Occ Cob, Moist
1.30	- 1.50	Br Blk Sa(y) Si So Cl So Gr Tr Org M, Moist*

* Sample Depth =1.30 - 1.50
Passing 4.75 mm =90 %
2.00 mm =86 %
425 um =80 %
75 um =60 %
5 um =17 %
2 um =11 %
w =18 %
Plasticity =Non-plastic
Classification =ML
Frost Susc. =MSFH
'K' Factor =0.30

23+080 28.00 Rt C/L D-1.10 Culvert BH

0	- 080	Dk Bl Tps
080	- 430	Br Sa So Gr So Si Tr Cl, Moist
430	- 700	Br Blk Si Tr Cl Tr Sa Tr Org M, Moist
700	- 1.50	Br Gry Sa(y) Si So Cl, Moist

23+100 27.60 Rt C/L D-1.20 Culvert BH

0	- 120	Dk Br Tps
120	- 450	Br Blk Si Tr Cl Tr Sa Tr Org M, Moist
450	- 1.50	Br Gry Sa(y) Si So Cl, Wet*

* Sample Depth =600 - 900
w =26 %

23+150 8.30 Rt C/L D-0 In Shld

0	- 150	Asph
150	- 460	Br Gry Cr Gr W Sa Tr Si, Moist*
460	- 820	Gry Cr Gr Tr Sa, Moist
820	- 1.50	Br Blk Si(y) Sa W Gr Tr Cl Occ Cob, Wet, Fr Wat @ 1.00**

13.2 mm =92 %
9.5 mm =61 %
4.75 mm =28 %
1.18 mm =14 %
300 um =9 %
75 um =5 %
w =1 %
Unaccep Gran A
(two sieve sizes too coarse)
Accep Gran B, Type I

** Sample Depth =1.00 - 1.30
Passing 4.75 mm =79 %
2.00 mm =72 %
425 um =60 %
75 um =45 %
5 um =11 %
2 um =8 %
w =20 %
Classification =SM
Frost Susc. =LSFH
'K' Factor =0.15
* Sample Depth =150 - 450
Passing 26.5 mm =100 %
19.0 mm =100 %

23+150 18.40 Rt C/L D-0 Out Shld

0	- 210	Asph
210	- 670	Br Gry Cr Gr(y) Sa Tr Si, Moist
670	- 1.50	Lt Br Si(y) Sa W Gr Tr Cl Occ Cob, Moist

23+350 7.90 Rt C/L D-0 In Shld

0	- 185	Asph
185	- 760	Br Gry Cr Gr(y) Sa Tr Si, Moist
760	- 1.50	Lt Br Si(y) Sa W Gr Tr Cl Occ Cob

Highway 401 Eastbound

Station 22+750 to 23-350, Referenced to C/L — Report Date: March, 2025

23+350 18.20 Rt C/L D-0 Out Shld

0	- 210	Asph
210	- 730	Br Gry Cr Gr(y) Sa Tr Si, Moist
730	- 1.50	Lt Br Si(y) Sa W Gr Tr Cl Occ Cob, Moist*

* Sample Depth =1.20 - 1.50
w =6 %

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05
FILE LOCATION=G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-S30-BH01.DWG MODIFIED: 25/08/21 Revised 13:13:53
DRAWN BY: J.P.

Fraser Road

Station 9+660 to 10+290, Referenced to C/L — Report Date: March, 2025

9+660 3.90 Lt C/L D-0 NB-Shoulder

0	-	470	Br Cr Gr & Sa So Si, Moist
470	-	710	Br Sa So Si So Gr Occ Cob, Moist
710	-	1.50	Br Sa(y) Si So Cl Tr Gr, Moist

9+660 1.70 Rt C/L D-0 SB-Lane

0	-	040	Asph
040	-	450	Br Cr Gr & Sa So Si, Moist
450	-	870	Br Sa So Si So Gr Occ Cob Occ Blds, Moist
870	-	1.50	Br Sa(y) Si So Cl Tr Gr, Moist

9+660 4.10 Rt C/L D-0 SB-Shoulder

0	-	450	Br Cr Gr & Sa So Si, Moist*
450	-	670	Blds
670	-	910	Br Sa W Gr Tr Si Occ Cob, Moist
910	-	1.50	Br Sa(y) Si So Cl Tr Gr, Moist

* Sample Depth =100 - 400
Passing 26.5 mm =100 %
19.0 mm =100 %
13.2 mm =90 %
9.5 mm =78 %
4.75 mm =56 %
1.18 mm =34 %
300 um =22 %
75 um =14 %
w =3 %
Unaccep Gran A
(some sieve sizes too fine)
Unaccep Gran B,Type I
(14% passing 75um)

9+710 1.60 Rt C/L D-0 SB-Lane

0	-	050	Asph
050	-	460	Br Cr Gr(y) Sa Tr Si, Moist
460	-	900	Br Sa W Si W Gr Occ Cob, Moist*
900	-	1.50	Br Sa(y) Si Tr Cl Tr Gr, Moist

* Sample Depth =600 - 900
Passing 150 mm =100 %
26.5 mm =100 %
4.75 mm =74 %
1.18 mm =51 %
300 um =38 %
75 um =26 %
w =4 %
Unaccep Gran B,Type I
(26% passing 75um)
Unaccep SSM
(26% passing 75um)

9+750 1.70 Lt C/L D-0 NB-Lane

0	-	050	Asph
050	-	500	Br Cr Gr(y) Sa Tr Si, Moist
500	-	770	Br Sa So Si So Gr Occ Cob Occ Blds, Moist
	-	770	NFP Occ Cob Occ Blds

9+750 10.20 Lt C/L D-1.10 NB-Ditch

0	-	120	Dk Br Tps
120	-	420	Br Sa(y) Si So Gr Occ Cob, Moist
420	-	1.50	Lt Br Sa(y) Si So Cl, Moist

9+750 10.50 Rt C/L D-1.30 SB-Ditch

0	-	120	Dk Br Tps
120	-	300	Dk Br Sa(y) Si So Gr Occ Cob, Moist
300	-	1.50	Lt Br Sa(y) Si Tr Cl, Moist

9+805 3.20 Lt C/L D-0 NB-Shoulder

0	-	440	Br Cr Gr(y) Sa Tr Si, Moist
440	-	830	Br Sa So Gr So Si, Moist
830	-	1.10	Lt Br Sa W Si So Gr So Cl Occ Cob Occ Blds, Moist*
	-	1.10	NFP Occ Cob Occ Blds

* Sample Depth =1.10 - 1.10
Passing 4.75 mm =81 %
2.00 mm =67 %
425 um =52 %
75 um =36 %
5 um =17 %
2 um =11 %
w =6 %
Classification =SM
Frost Susc. =LSFH
'K' Factor =0.10

9+805 13.30 Lt C/L D-1.60 NB-Ditch

0	-	130	Dk Br Tps
130	-	390	Dk Br Si(y) Sa W Gr Occ Cob, Moist
390	-	1.50	Dk Br Cl(y) Si Tr Sa, Moist

Fraser Road

Station 9+660 to 10+290, Referenced to C/L — Report Date: March, 2025

9+805 1.80 Rt C/L D-0 SB-Lane

0	-	045	Asph
045	-	440	Br Cr Gr(y) Sa Tr Si, Moist
440	-	790	Br Sa So Si So Gr, Moist
790	-	1.60	Lt Br Sa(y) Si So Cl Tr Gr Occ Cob, Moist
1.60	-	2.40	Dk Br Si W Sa So Cl, Moist*
2.40	-	3.00	Br Si(y) Cl Tr Sa, Moist

* Sample Depth =2.00 - 2.30
Passing 4.75 mm =100 %
2.00 mm =99 %
425 um =99 %
75 um =75 %
5 um =12 %
2 um =11 %
w =24 %
Classification =ML
Frost Susc. =HSFH
'K' Factor =0.45

9+805 9.40 Rt C/L D-1.80 SB-Ditch

0	-	070	Dk Br Tps
070	-	390	Dk Br Si(y) Sa W Gr Occ Cob, Moist
390	-	1.50	Lt Br Si(y) Cl Tr Sa, Moist

9+860 16.60 Lt C/L D-3.20 NB-Ditch

0	-	120	Dk Br Tps
120	-	410	Dk Br Si(y) Sa W Gr Occ Cob, Moist
410	-	1.50	Dk Br Si(y) Cl Tr Sa, Moist

9+860 1.50 Rt C/L D-0 SB-Lane

0	-	160	Asph
160	-	440	Br Cr Sa & Gr So Si, Moist*
440	-	760	Br Sa So Gr So Si, Moist
760	-	1.50	Lt Br Sa(y) Si So Cl Tr Gr Occ Cob Occ Blds, Moist**
	-	1.50	NFP Occ Cob Occ Blds

* Sample Depth =160 - 440
Passing 26.5 mm =100 %
19.0 mm =100 %
13.2 mm =98 %
9.5 mm =83 %
4.75 mm =58 %
1.18 mm =33 %
300 um =21 %
75 um =12 %
w =3 %
Unaccep Gran A
(most sieve sizes too fine)
Unaccep Gran B,Type I
(12% passing 75um)

** Sample Depth =1.50 - 1.50
w =5 %

9+860 18.00 Rt C/L D-3.60 SB-Ditch

0	-	110	Dk Br Tps
110	-	370	Dk Br Si(y) Sa W Gr Occ Cob, Moist
370	-	1.50	Dk Br Cl W Si Tr Sa, Moist

10+130 16.50 Lt C/L D-4.30 NB-Ditch

0	-	190	Dk Br Tps
190	-	500	Lt Br Sa(y) Si, Moist
500	-	1.50	Br Cl W Si Tr Sa, Moist

10+130 1.60 Rt C/L D-0 SB-Lane

0	-	170	Asph
170	-	500	Br Cr Gr(y) Sa Tr Si, Moist
500	-	800	Br Sa So Si So Gr, Moist
800	-	1.80	Lt Br Si(y) Sa So Cl Tr Gr Occ Cob, Moist*
	-	1.80	NFP Occ Cob Occ Blds

* Sample Depth =1.80 - 1.80
Passing 4.75 mm =94 %
2.00 mm =82 %
425 um =70 %
75 um =46 %
5 um =23 %
2 um =16 %
w =9 %
Classification =SM
Frost Susc. =LSFH
'K' Factor =0.15

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION=O:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-S30-BH01.DWG
DRAWN BY: J.P. MODIFIED: 25/08/21 Revised 13:13:53

Fraser Road

Station 9+660 to 10+290, Referenced to C/L — Report Date: March, 2025

10+130 13.80 Rt C/L D-4.10 SB-Ditch

0	-	230	Dk Br Tps
230	-	570	Lt Br Sa(y) Si, Moist
570	-	1.50	Br Si(y) Cl Tr Sa, Moist

10+190 13.50 Lt C/L D-2.10 NB-Ditch

0	-	170	Dk Br Tps
170	-	630	Lt Br Sa(y) Si, Moist
630	-	1.50	Br Si(y) Cl Tr Sa, Moist

10+190 12.60 Rt C/L D-2.00 SB-Ditch

0	-	190	Dk Br Tps
190	-	540	Lt Br Sa(y) Si, Moist
540	-	1.50	Br Cl & Si Tr Sa, Wet*

* Sample Depth =700 - 1.00
Passing 4.75 mm =100 %
2.00 mm =100 %
425 um =100 %
75 um =97 %
5 um =69 %
2 um =57 %
w =40 %
WL = 64 % WP =25 % IP = 39 %
Classification =CH
Frost Susc. =LSFH
'K' Factor =0.20

10+200 3.50 Lt C/L D-0 NB-Shoulder

0	-	420	Br Cr Sa(y) Gr So Si, Moist*
420	-	810	Br Sa Tr Si Tr Gr, Moist
810	-	1.50	Lt Br Sa(y) Si Tr Cl Tr Gr Occ Cob, Moist

* Sample Depth =100 - 400
Passing 26.5 mm =100 %
19.0 mm =98 %
13.2 mm =88 %
9.5 mm =72 %
4.75 mm =46 %
1.18 mm =29 %
300 um =20 %
75 um =14 %
w =4 %
Unaccep Gran A
(14% passing 75um)
Unaccep Gran B,Type I
(14% passing 75um)

10+200 1.70 Rt C/L D-0 SB-Lane

0	-	060	Asph
060	-	470	Br Cr Sa(y) Gr So Si, Moist
470	-	750	Br Sa So Si So Gr, Moist
750	-	1.90	Lt Br Sa(y) Si Tr Cl Tr Gr Occ Cob Occ Blds, Moist
1.90	-	2.20	Dk Br Sa(y) Si So Cl, Moist
2.20	-	3.00	Br Cl W Si So Sa Tr Gr, Wet, Fr Wat @ 2.50*

* Sample Depth =2.30 - 2.60
Passing 4.75 mm =99 %
2.00 mm =87 %
425 um =85 %
75 um =83 %
5 um =71 %
2 um =63 %
w =59 %
WL = 76 % WP =25 % IP = 51 %
Classification =CH
Frost Susc. =LSFH
'K' Factor =0.15

10+200 3.50 Rt C/L D-0 SB-Shoulder

0	-	450	Br Cr Sa(y) Gr So Si, Moist
450	-	790	Br Sa So Si So Gr, Moist
790	-	1.50	Lt Br Sa(y) Si So Cl Tr Gr Occ Cob, Moist

10+245 6.40 Lt C/L D-800 NB-Ditch

0	-	170	Dk Br Tps
170	-	550	Lt Br Sa(y) Si, Moist
550	-	1.50	Br Si(y) Cl Tr Sa, Moist

10+260 1.70 Lt C/L D-0 NB-Lane

0	-	480	Br Cr Gr(y) Sa Tr Si, Moist
480	-	900	Dk Br Sa W Si W Gr Occ Cob, Moist*
900	-	1.50	Br Si(y) Cl Tr Sa, Moist

* Sample Depth =500 - 800
Passing 150 mm =100 %
26.5 mm =100 %
4.75 mm =78 %
1.18 mm =52 %
300 um =39 %
75 um =29 %
w =6 %
Unaccep Gran A
(29% passing 75um)
Unaccep SSM
(29% passing 75um)

10+290 1.80 Lt C/L D-0 NB-Lane

0	-	490	Br Cr Gr(y) Sa Tr Si, Moist
490	-	820	Br Sa So Gr So Si, Moist
820	-	1.50	Br Si(y) Cl Tr Sa, Moist

Fraser Road

Station 9+660 to 10+290, Referenced to C/L — Report Date: March, 2025

10+290 6.50 Lt C/L D-900 NB-Ditch

0	-	170	Dk Br Tps
170	-	400	Lt Br Sa(y) Si, Moist
400	-	1.50	Br Si(y) Cl Tr Sa, Moist

10+290 7.20 Rt C/L D-800 SB-Ditch

0	-	210	Dk Br Tps
210	-	500	Lt Br Sa(y) Si, Moist
500	-	1.50	Br Si(y) Cl Tr Sa, Moist

Raisin River Road

Station 10+000 to 10+000, Referenced to C/L — Report Date: March, 2025

10+000 12.20 Lt C/L D-1.80 WB-Ditch

0	-	110	Dk Br Tps
110	-	470	Dk Br Sa(y) Si So Gr, Moist
470	-	1.50	Br Cl(y) Si Tr Sa, Moist

10+000 4.30 Rt C/L D-0 EB-Lane

0	-	090	Asph
090	-	460	Br Cr Gr(y) Sa Tr Si, Moist
460	-	850	Br Sa So Si So Gr Occ Cob Occ Blds, Moist
850	-	1.50	Dk Br Sa(y) Si So Cl Tr Gr, Moist

10+000 12.70 Rt C/L D-2.00 EB-Ditch

0	-	050	Dk Br Tps
050	-	320	Dk Br Sa(y) Si Tr Gr, Moist
320	-	1.50	Lt Br Cl(y) Si Tr Sa, Moist

Lapierre Road

Station 10+000 to 10+000, Referenced to C/L — Report Date: March, 2025

10+000 9.20 Lt C/L D-700 WB-Ditch

0	-	100	Dk Br Tps
100	-	360	Dk Br Sa(y) Si Tr Gr, Moist
360	-	1.50	Lt Br Cl(y) Si Tr Sa, Moist

10+000 1.70 Rt C/L D-0 EB-Lane

0	-	050	Asph
050	-	450	Br Cr Sa & Gr So Si, Moist*
450	-	780	Br Sa So Si So Gr Occ Cob, Moist
780	-	1.50	Br Cl(y) Si Tr Sa Tr Gr, Moist

* Sample Depth =150 - 450
Passing 26.5 mm =100 %
19.0 mm =100 %
13.2 mm =94 %
9.5 mm =81 %
4.75 mm =59 %
1.18 mm =36 %
300 um =22 %
75 um =14 %
w =3 %
Unaccep Gran A
(some sieve sizes too fine)
Unaccep Gran B,Type I
(14% passing 75um)

10+000 8.30 Rt C/L D-600 EB-Ditch

0	-	080	Dk Br Tps
080	-	330	Dk Br Si(y) Sa Tr Gr, Moist
330	-	1.50	Lt Br Cl(y) Si Tr Sa, Moist

Airport Road

Station 10+000 to 10+000, Referenced to C/L — Report Date: March, 2025

10+000 8.70 Lt C/L D-400 WB-Ditch

0	-	240	Dk Br Tps
240	-	600	Lt Br Sa(y) Si, Moist
600	-	1.50	Br Cl(y) Si Tr Sa, Moist

10+000 2.80 Rt C/L D-0 EB-Lane

0	-	480	Br Blk Cr Gr(y) Sa Tr Si, Moist
480	-	960	Lt Br Gr(y) Sa So Si, Moist*
960	-	1.50	Lt Br Sa(y) Si W Cl, Moist

* Sample Depth =500 - 800
Passing 150 mm =100 %
26.5 mm =100 %
4.75 mm =62 %
1.18 mm =39 %
300 um =26 %
75 um =18 %
w =3 %
Unaccep Gran B,Type I
(18% passing 75um)
Accep SSM

10+000 11.60 Rt C/L D-700 EB-Ditch

0	-	230	Dk Br Tps
230	-	550	Lt Br Sa(y) Si, Moist
550	-	1.50	Br Cl(y) Si Tr Sa, Moist

METRIC

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

BOREHOLE DATA

SHEET 34

wsp

Preliminary

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05
FILE LOCATION=G:\CA0019704.4282 HWY 401 FRASER ROAD UNDERPASS\CURRENT\SHEETS\
DRAWING NAME: CA0019704.4282-S30-BH01.DWG Revised 13:13:53
DRAWN BY: J.P. MODIFIED: 25/08/21

METRIC

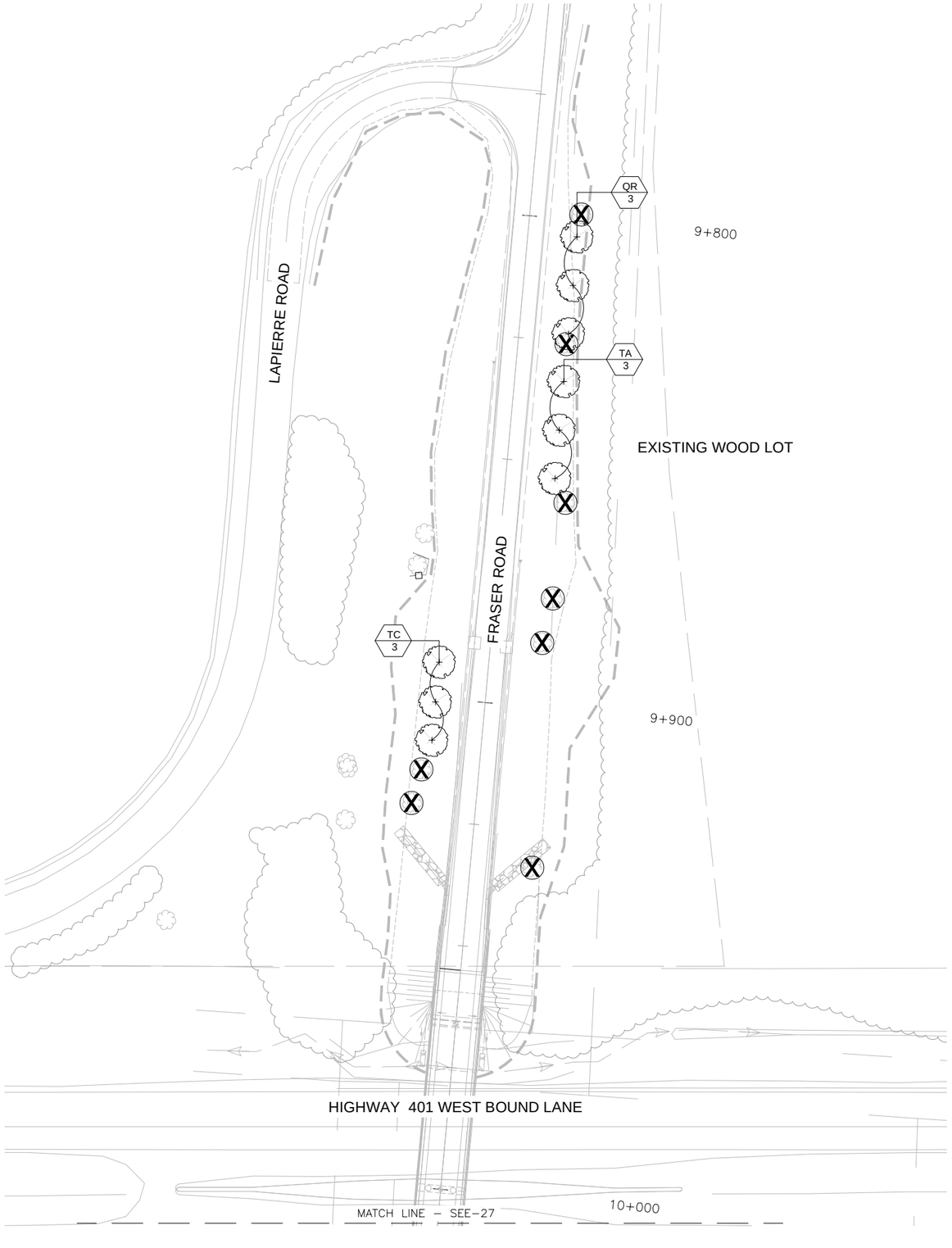
Preliminary

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

LANDSCAPE_PLAN_1

STA Survey 9+775 TO STA Revised 10+000

SHEET 35



LEGEND:

- XX / X — PLANT KEY WITH SPECIES / QTY.
- DECIDUOUS TREE
- EXISTING TREE TO BE REMOVED, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREE REMOVED PRIOR TO CONSTRUCTION, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREES
- LIMIT OF DISTURBANCE
- TREE PROTECTION FENCE, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREE GROUPING TO BE REMOVED, REFER TO TREE PRESERVATIONS PLANS (TP-1, TP-2)

NOTES:

1. THIS DRAWING IS FOR LANDSCAPE TREE PLANTING PURPOSES ONLY. FOR ALL OTHER WORKS INCLUDING, BUT NOT LIMITED TO GRADING, STRUCTURAL, ELECTRICAL AND LAYOUT, REFER TO ENGINEERING DRAWINGS.
2. REFER TO ENGINEERING DRAWINGS FOR ALL SEDIMENT AND EROSION CONTROL MEASURES.
3. REFER TO ENGINEERING DRAWINGS FOR ALL REMOVALS, INCLUDING EXISTING PLANT MATERIAL.
4. REFER TO SHEET 37 FOR PLANTING NOTES.
5. LOCATION OF UTILITIES ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF THE UTILITIES IS NOT GUARANTEED. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION OF ALL UTILITIES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. CONTRACTOR SHALL LOCATE ALL UTILITIES (ABOVE AND BELOW GRADE) PRIOR TO COMMENCEMENT OF WORK AND ENSURE PLANTING LOCATIONS, MATERIAL AND THAT TECHNIQUES ARE COMPLIANT WITH ALL RELEVANT UTILITY AUTHORITIES.
6. FOR TREE PRESERVATION (TP-1, TP-2) PLANS REFER TO ARBORIST REPORT MINISTRY OF TRANSPORTATION –EAST REGION, AGREEMENT #4023-E-003-WORK ITEM #3 GWP 4228-15-00 – FRASER ROAD UNDERPASS (SITE NO. 31X-0230/B0) REPLACEMENT, FEBRUARY 28, 2025.

PLANT LIST

Key	Qty.	Botanical Name	Common Name	Size	Condition	Spacing	Remarks
Trees							
QR	3	Quercus rubra	Red Oak	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant
TA	3	Tilia americana	Basswood	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant
TC	3	Tilia cordata	Little leaf linden	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant

Note: Plant Quantities Indicated on the Planting Plan will Supercede the Quantities Listed Above.

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION-D:\040019704.4282 HWY 401 FRASER ROAD UNDERPASS\RECEIVED FROM LANDSCAPE\2025-08-25\CAD\
DRAWING NAME: S35-HWY 401 FRASER ROAD UNDERPASS_LANDSCAPE PLAN 1.DWG
DRAWN BY: J.P. MODIFIED: 26/01/21 09:34:27 Revised

METRIC

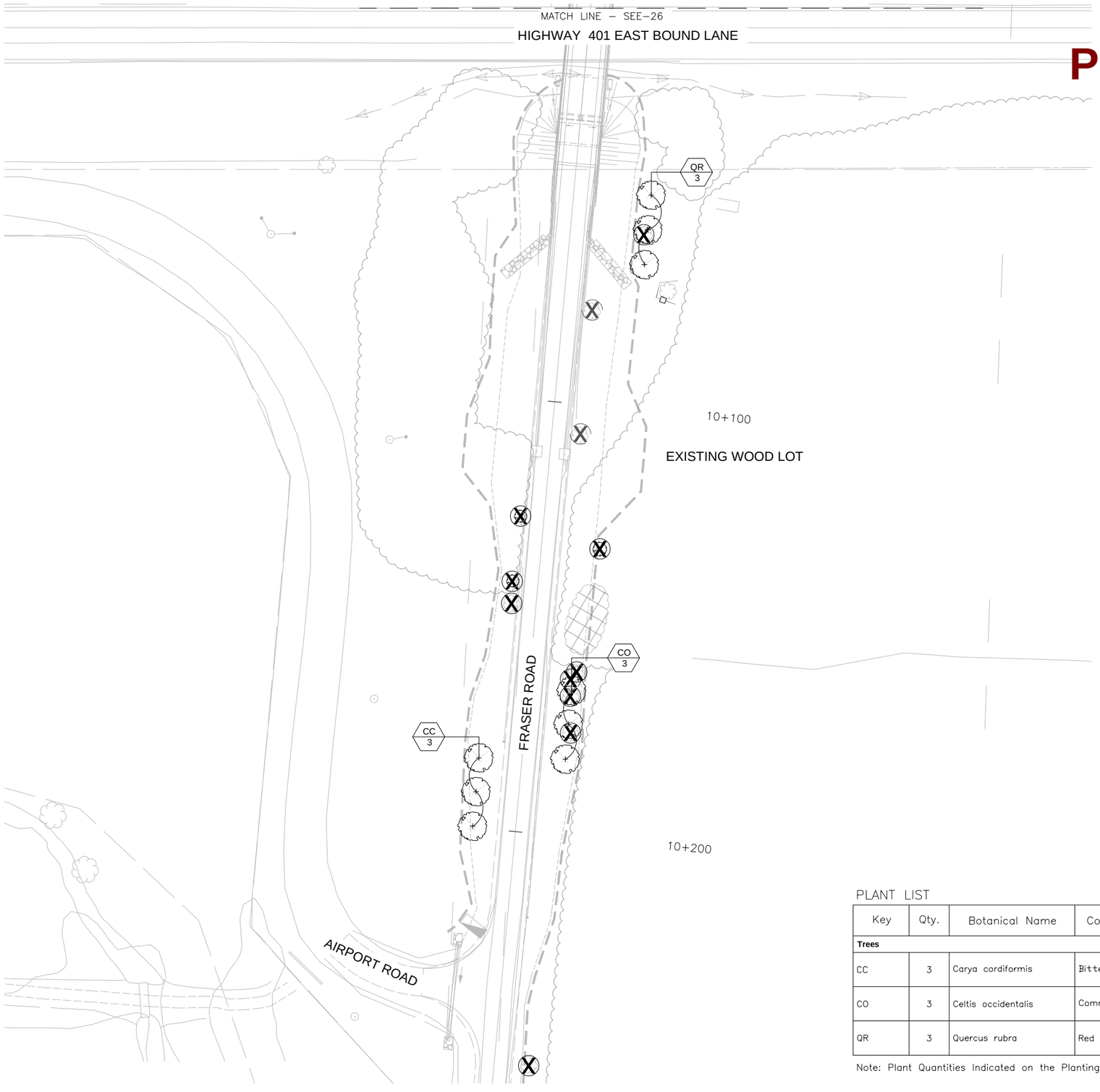
Preliminary

PLATE No
CONT No 2025-4017
GWP No 4248-15-00

LANDSCAPE_PLAN_2

STA Survey 10+050 TO STA Revised 10+250

SHEET 36



LEGEND:

- XX / X — PLANT KEY WITH SPECIES / QTY.
- DECIDUOUS TREE
- EXISTING TREE TO BE REMOVED, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREE REMOVED PRIOR TO CONSTRUCTION, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREES
- LIMIT OF DISTURBANCE
- TREE PROTECTION FENCE, REFER TO TREE PRESERVATION PLANS (TP-1, TP-2)
- EXISTING TREE GROUPING TO BE REMOVED, REFER TO TREE PRESERVATIONS PLANS (TP-1, TP-2)

NOTES:

1. THIS DRAWING IS FOR LANDSCAPE TREE PLANTING PURPOSES ONLY. FOR ALL OTHER WORKS INCLUDING, BUT NOT LIMITED TO GRADING, STRUCTURAL, ELECTRICAL AND LAYOUT, REFER TO ENGINEERING DRAWINGS.
2. REFER TO ENGINEERING DRAWINGS FOR ALL SEDIMENT AND EROSION CONTROL MEASURES.
3. REFER TO ENGINEERING DRAWINGS FOR ALL REMOVALS, INCLUDING EXISTING PLANT MATERIAL.
4. REFER TO SHEET 37 FOR PLANTING NOTES.
5. LOCATION OF UTILITIES ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF THE UTILITIES IS NOT GUARANTEED. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE LOCATION OF ALL UTILITIES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. CONTRACTOR SHALL LOCATE ALL UTILITIES (ABOVE AND BELOW GRADE) PRIOR TO COMMENCEMENT OF WORK AND ENSURE PLANTING LOCATIONS, MATERIAL AND THAT TECHNIQUES ARE COMPLIANT WITH ALL RELEVANT UTILITY AUTHORITIES.
6. FOR TREE PRESERVATION (TP-1, TP-2) PLANS REFER TO ARBORIST REPORT MINISTRY OF TRANSPORTATION –EAST REGION, AGREEMENT #4023-E-003-WORK ITEM #3 GWP 4228-15-00 – FRASER ROAD UNDERPASS (SITE NO. 31X-0230/B0) REPLACEMENT, FEBRUARY 28, 2025.

PLANT LIST

Key	Qty.	Botanical Name	Common Name	Size	Condition	Spacing	Remarks
Trees							
CC	3	Carya cordiformis	Bitternut Hickory	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant
CO	3	Celtis occidentalis	Common Hackberry	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant
QR	3	Quercus rubra	Red Oak	50mm cal	B&B	As shown	Native, Salt Tolerant, Drought Tolerant

Note: Plant Quantities Indicated on the Planting Plan will Supercede the Quantities Listed Above.

SCALE
5.0 0 10.0
Horizontal

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION=O:\CA0019704-4282 HWY 401 FRASER ROAD UNDERPASS\RECEIVED FROM LANDSCAPE\2025-08-25\CAD\
DRAWING NAME: S36-HWY 401 FRASER ROAD UNDERPASS_LANDSCAPE PLAN 2.DWG
DRAWN BY: J.P. MODIFIED: 26/01/21 09:37:35 Revised

METRIC

PLATE No

CONT No 2025-4017

GWP No 4248-15-00

LANDSCAPE_NOTES

STA Survey _____ TO STA Revised _____

SHEET 37

wsp

PLANTING NOTES

GENERAL NOTES

1. AS AN INSTRUMENT OF SERVICE, THIS DRAWING IS THE PROPERTY OF THE LANDSCAPE ARCHITECT. THIS DRAWING MUST BE RETURNED UPON REQUEST, AND MAY NOT BE REPRODUCED WITHOUT WRITTEN CONSENT OF THE LANDSCAPE ARCHITECT.
2. ALL DISCREPANCIES OR AMBIGUITY IN THE DRAWINGS, SPECIFICATIONS OR DETAILS ARE TO BE REPORTED TO THE LANDSCAPE ARCHITECT IMMEDIATELY FOR CLARIFICATION.
3. THIS DRAWING FORMS PART OF A SET AND MAY NOT BE SEPARATED. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THE SET AND ALL SPECIFICATIONS INCLUDED IN THE CONTRACT DOCUMENTS.
4. THE CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING SITE FEATURES UNLESS IDENTIFIED FOR REMOVAL OR DEMOLITION, INCLUDING ALL SURVEY BARS, STAKES AND MONUMENTS. CONTRACTOR IS TO MAKE GOOD ANY DAMAGE.
5. THE CONTRACTOR IS RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH LIMITS OF CONSTRUCTION PRIOR TO THE COMMENCEMENT OF ANY WORK ON THE SITE. THE CONTRACTOR IS TO CONTACT LANDSCAPE ARCHITECT IN UNCERTAINTY.
6. THE CONTRACTOR IS RESPONSIBLE FOR LOCATION AND STAKING OF ALL UTILITIES PRIOR TO WORK COMMENCING ON THE SITE. CONTRACTOR IS NOT TO PLANT DIRECTLY ABOVE UNDERGROUND UTILITIES AND SHALL LOCATE PLANT MATERIAL IN ACCORDANCE WITH UTILITY OFFSET REQUIREMENTS.
7. THE CONTRACTOR TO VISIT THE SITE TO CONFIRM ALL SITE CONDITIONS PRIOR TO SUBMITTING BIDS. AMBIGUITY OR DISCREPANCY TO BE REPORTED TO THE LANDSCAPE ARCHITECT FOR CLARIFICATION.
8. DRAWINGS MAY BE SCALED FOR APPROXIMATE LAYOUT. ALL MEASUREMENTS ARE METRES (METRIC) UNLESS NOTED OTHERWISE. LAYOUT OF PLANT MATERIALS TO BE STAKED BY CONTRACTOR, REVIEWED BY LANDSCAPE ARCHITECT, AND APPROVED BY THE CONTRACT ADMINISTRATOR PRIOR TO PLANTING.
9. THE CONTRACTOR SHALL SUPPLY ALL MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE WORK SHOWN ON THESE DRAWINGS. ANY DISCREPANCIES BETWEEN QUANTITIES ILLUSTRATED ON THE PLAN AND THE PLANT LIST SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT FOR DIRECTION.
10. THE CONTRACTOR MUST REMOVE ALL DEBRIS, GARBAGE AND SURPLUS MATERIALS FROM THE SITE AT THE END OF EACH DAY. THE SITE IS TO BE KEPT CLEAN AND USEABLE AT ALL TIMES.
11. UPON FINAL COMPLETION OF THE PROJECT, ALL WORKMANSHIP AND MATERIALS ARE TO BE GUARANTEED FOR ONE (1) FULL YEAR, UNLESS NOTED OTHERWISE. ALL WORKMANSHIP IS TO BE COMPLETED TO THE STANDARDS OF THE ONTARIO LANDSCAPE CONTRACTORS ASSOCIATION.
12. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS STAMPED AND SIGNED BY THE LANDSCAPE ARCHITECT. THE CONTRACTOR IS NOT TO PROCEED IN UNCERTAINTY.
13. ANY EXISTING SIGNAGE REQUIRING RELOCATION DUE TO CONSTRUCTION ACTIVITIES SHOULD BE STORED AND REINSTALLED AS PER INSTRUCTIONS FROM CONTRACT ADMINISTRATOR.

ENVIRONMENTAL NOTES

1. THERE WILL BE NO WORKS PERMITTED BEYOND THE LIMIT OF CONSTRUCTION BOUNDARY UNDER ANY CIRCUMSTANCES (SEE ENGINEERING DRAWINGS FOR EXTENT OF DISTURBANCE AND CONSTRUCTION LIMIT). EQUIPMENT USE ON STEEP SLOPES (GREATER THAN 3:1) AND IN WET (SEEPAGE) AREAS WILL BE HELD TO THE MINIMUM NECESSARY TO COMPLETE NECESSARY RESTORATION WORKS.
2. CONTRACTOR TO ENSURE THAT ALL THE REASONABLE MEASURES ARE TAKEN TO LIMIT GROUND DISTURBANCE CAUSED BY HEAVY EQUIPMENT USAGE, AND EROSION AND SEDIMENT CONTROLS WILL BE INSTITUTED ON DISTURBED AREAS IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL DRAWINGS. NO SUBSURFACE GROUND-DISTURBING EQUIPMENT WILL BE USED BY CONSTRUCTION FORCES EXCEPT ON ACCESS ROADS.
3. CONTRACTOR TO COMPLETE EMBANKMENT RESTORATION WORKS IN SUCH A MANNER SO AS TO AVOID ANY UNNECESSARY DAMAGE OR DESTRUCTION, SCARRING, OR DEFACING OF THE NATURAL VEGETATION AND ENVIRONS IN THE VICINITY OF THE WORK.
4. ALL DISTURBED AREAS WILL BE STABILIZED AND RESTORED UPON COMPLETION OF WORKS TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR. ALL DISTURBED AREAS TO BE FINE GRADED AND SEEDED PROMPTLY AFTER DISTURBANCE.
5. ALL CONSTRUCTION ACTIVITIES WITHIN THE LIMIT OF CONSTRUCTION SHALL BE EXECUTED IN SUCH A MANNER SO AS TO PREVENT THE ENTRY OF CHEMICALS, PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO NATURAL AREAS.
6. THE CONTRACTOR WILL BE RESPONSIBLE FOR DAILY INSPECTION, CLEANUP, AND PROPER LABELING, STORAGE, AND DISPOSAL OF ALL REFUSE AND DEBRIS PRODUCED BY OPERATIONS AND EMPLOYEES. SUITABLE REFUSE COLLECTING FACILITIES WILL BE REQUIRED. ONLY THOSE DISPOSAL AREAS DESIGNATED BY THE OWNER/ CONTRACT ADMINISTRATOR SHALL BE USED. DISPOSAL CONTAINERS SUCH AS DUMPSTERS OR ROLL-OFF CONTAINERS SHALL BE OBTAINED FROM A PROPER WASTE DISPOSAL CONTRACTOR.
7. SOLID, SPECIAL, CONSTRUCTION/DEMOLITION, AS WELL AS SCRAP ARE PART OF THE POTENTIAL REFUSE GENERATED AND MUST BE PROPERLY MANAGED WITH EMPHASIS ON REUSE, RECYCLE, OR POSSIBLE GIVE AWAY, AS APPROPRIATE, BEFORE THEY ARE HANDLED AS WASTE.
8. CONTRACTOR TO ENSURE THAT ALL EQUIPMENT IN OPERATION ON THE SITE IS IN GOOD WORKING CONDITION, AND SHALL MAINTAIN AND OPERATE EQUIPMENT TO LIMIT VEHICLE EXHAUST EMISSIONS. CORRECTIVE ADJUSTMENTS OR REPAIRS SHALL BE DONE ON EQUIPMENT AND VEHICLES THAT SHOW EXCESSIVE EMISSIONS OF EXHAUST AND/OR PARTICULATE MATTER DUE TO POOR ENGINE ADJUSTMENTS OR OTHER INEFFICIENT OPERATING CONDITIONS.
9. CONTRACTOR SHALL VISIT SITE PRIOR TO THE START OF CONSTRUCTION AND PHOTOGRAPH EXISTING CONDITIONS. CONTRACTOR TO NOTE ANY OVERHANGING BRANCHES THAT WILL REQUIRE PRUNING TO PERMIT VEHICULAR ACCESS AND ADVISE LANDSCAPE ARCHITECT/CONTRACT ADMINISTRATOR. ALL PRUNING SHALL BE AS PER CURRENT ISA (INTERNATIONAL SOCIETY OF ARBORICULTURE) STANDARDS. AREAS OF DISTURBANCE TO BE KEPT AT A MINIMUM.

MAINTENANCE

1. ALL TREES AND SHRUBS PLANTED SHALL BE UNDER WARRANTY FOR A PERIOD OF 24 MONTHS (2 YEARS) COMMENCING ON THE DATE OF APPROVED SUBSTANTIAL COMPLETION. THE CONTRACTOR SHALL SUBMIT IN WRITING APPROPRIATE DOCUMENTATION TO THE CONTRACT ADMINISTRATOR REQUESTING REVIEW AND APPROVAL OF SUBSTANTIAL COMPLETION OF LANDSCAPE WORKS. ALL PLANT MATERIAL SHALL BE MAINTAINED SO THAT THEY REMAIN IN THE SAME QUALITY AND REQUIREMENTS PRESCRIBED FOR THE ORIGINAL MATERIAL. PLANTS WHICH HAVE DIED DURING THE PERIOD OF WARRANTY SHALL BE REPLACED AT NO COST TO THE OWNER, AS SOON AS POSSIBLE, CONSISTENT WITH THE ALLOWABLE PLANTING SEASON. DEAD PLANT MATERIAL REPLACED UNDER WARRANTY SHALL BE REMOVED FROM THE CONTRACT SITE AT THE CONTRACTOR'S EXPENSE. PLANT MATERIAL REPLACED UNDER WARRANTY SHALL CONFORM TO ALL SPECIFICATIONS OF THE ORIGINAL CONTRACT INCLUDING THE WARRANTY FROM THE DATE OF REPLACEMENT PLANTING.
2. THE CONTRACTOR SHALL PROVIDE MAINTENANCE IMMEDIATELY AFTER THE PLANTS ARE INSTALLED AND CONTINUE THROUGHOUT THE ENTIRE WARRANTY PERIOD. MAINTENANCE REQUIREMENTS SHALL INCLUDE ALL PROCEDURES CONSISTENT WITH PROPER HORTICULTURAL PRACTICES TO ENSURE NORMAL, VIGOROUS AND HEALTHY GROWTH OF ALL MATERIAL PLANTED INCLUDING THE SEED. MAINTENANCE SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   A) CULTIVATION AND WEED CONTROL OF PLANTING BEDS AND TREE PITS (NO PESTICIDES OR HERBICIDES IN ACCORDANCE WITH MUNICIPAL BY-LAWS AND PROVINCIAL LEGISLATION).
   B) WATER A MINIMUM OF ONCE A WEEK WITH A ROOT PROBE FOR THE FIRST FOUR WEEKS, WHEN REQUIRED THEREAFTER AND IN SUFFICIENT QUANTITIES TO SATURATE THE ROOT SYSTEM AND TO ENSURE SUFFICIENT MOISTURE FOR VIGOROUS PLANT MATERIAL GROWTH. ENSURE ADEQUATE MOISTURE IN THE ROOTBALL AT TIME OF FIRST FROST.
   C) PRUNING, INCLUDING THE REMOVAL AND DISPOSAL OF DEAD OR BROKEN BRANCHES.
   D) KEEP ALL ACCESSORIES IN GOOD CONDITION AND PROPERLY ADJUSTED. REPAIR OR REPLACE ACCESSORIES AS REQUIRED AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. AT THE TIME OF FINAL WARRANTY ACCEPTANCE, ALL MATERIAL MUST BE IN A HEALTHY AND VIGOROUS CONDITION. BEDS AND TREE PITS MUST BE FRESHLY CULTIVATED AND FREE OF WEEDS, RUBBISH AND DEBRIS. ALL STAKES, WIRES, HOSE AND OTHER ACCESSORIES MUST BE REMOVED UPON FINAL ACCEPTANCE, EXCEPT FOR PLANT MATERIAL UNDER WARRANTY.

Preliminary

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

FILE LOCATION=D:\CAD\19704.4282 HWY 401 FRASER ROAD UNDERPASS\RECEIVED FROM LANDSCAPE\2025-08-25\CAD\
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DRAWN BY: J.P.

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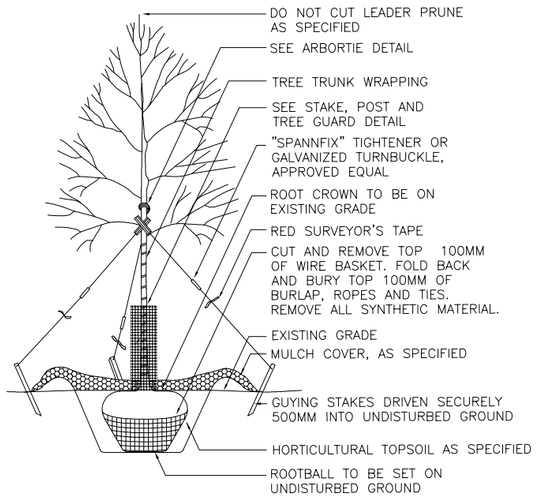
PLATE No
CONT No 2025-4017
GWP No 4248-15-00

PLANTING_DETAILS_1

STA Survey _____ TO STA _____ Revised

SHEET 38

Preliminary

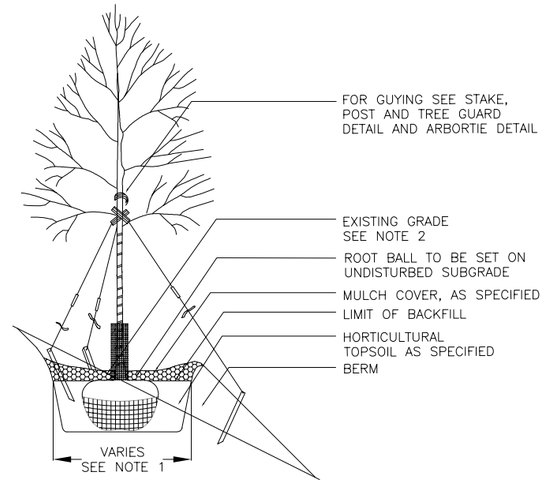


NOTES:

1 PIT SIZE DETERMINED BY TYPE OF MATERIAL TO BE PLANTED. PIT SHALL BE MINIMUM 3X (TIMES) WIDTH OF ROOTBALL.

2 MAXIMUM SLOPE ON WHICH PIT CAN BE EXCAVATED IS 2H:1V.

DECIDUOUS TREE
50MM CALIPER

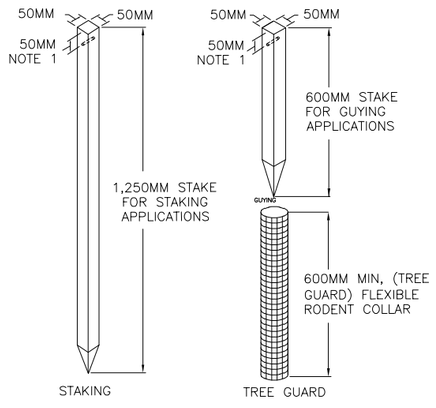


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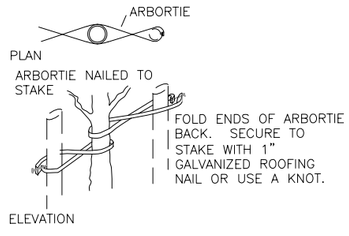
SLOPED PIT AND SAUCER DETAIL
50MM CALIPER



NOTE:

1. DRILL HOLE HORIZONTALLY TO ACCOMMODATE SUPPORT WIRE.

STAKE, POST AND TREE GUARD DETAIL



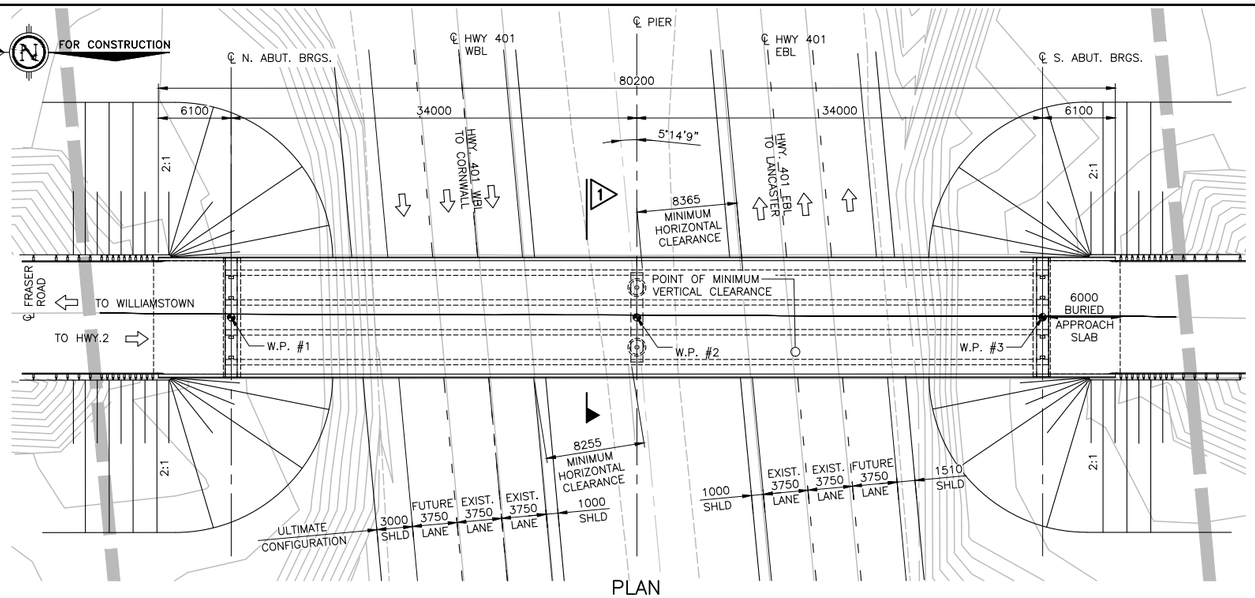
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MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05

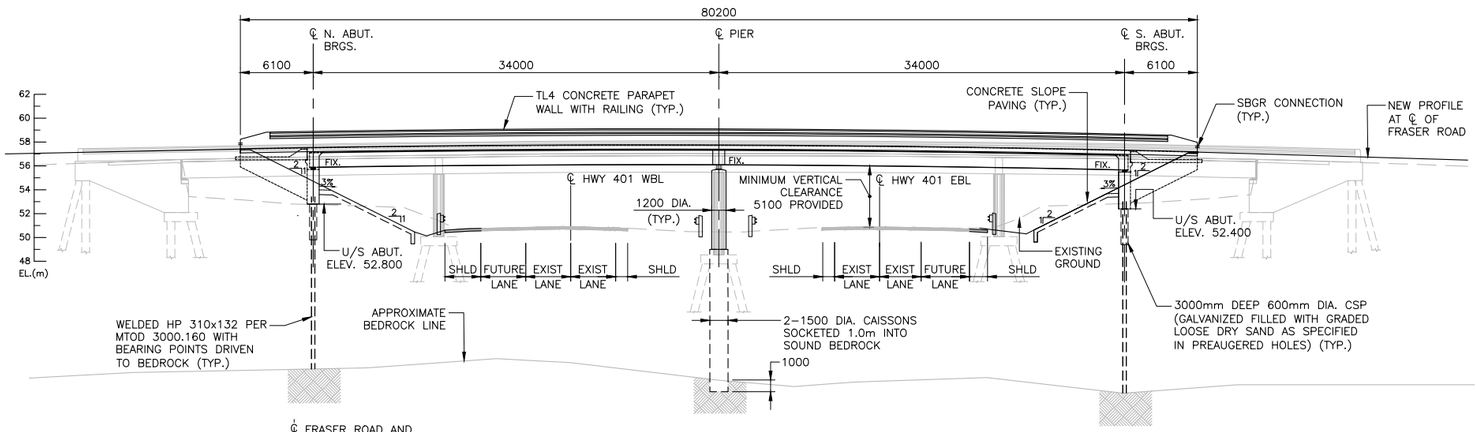
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DRAWN BY: J.P. MODIFIED: 26/01/21 09:44:35 Revised _____

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05
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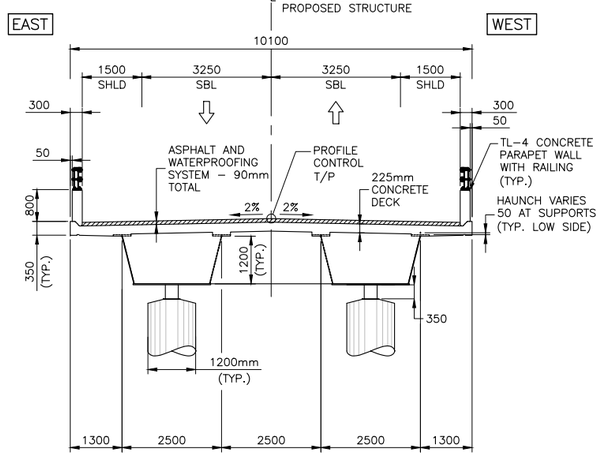
FOR CONSTRUCTION



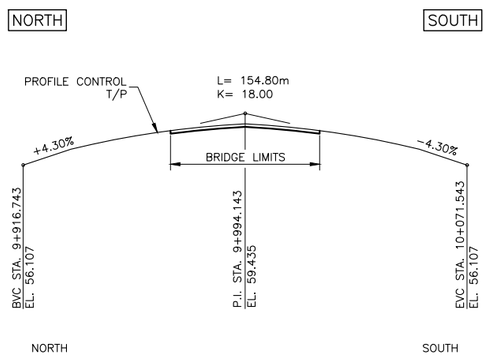
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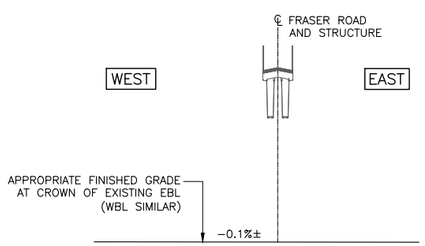
WEST ELEVATION
SCALE 1:250



1 PIER SECTION
SCALE 1:75



PROFILE OF FRASER RD.
N.T.S.



PROFILE OF HWY 401
N.T.S.

DRAFT

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

WORKING POINTS

W.P.	STATION	NORTHING	EASTING	T/P EL.
#1	9+966	4997676.597	222562.028	57.551
#2	10+000	4997646.397	222577.647	57.762
#3	10+034	4997616.197	222593.266	57.330

LIST OF DRAWINGS

S1. GENERAL ARRANGEMENT
S2. BOREHOLE AND SOIL STRATA 1
S3. BOREHOLE AND SOIL STRATA 2
S4. BOREHOLE AND SOIL STRATA 3
S5. BOREHOLE AND SOIL STRATA 4
S6. REMOVALS
S7. FOUNDATIONS
S8. ABUTMENTS
S9. WINGWALLS
S10. PIER
S11. STRUCTURAL STEEL I
S12. STRUCTURAL STEEL II
S13. STRUCTURAL STEEL III
S14. STRUCTURAL STEEL IV
S15. DECK DETAILS
S16. DECK REINFORCEMENT I
S17. DECK REINFORCEMENT II
S18. PARAPET WALL SS - OPTION A (SS110-82)
S19. PARAPET WALL GFRP - OPTION B (SS110-83)
S20. RAILING ON PARAPET (SS110-85)
S21. 6000mm BURRIED APPROACH SLAB
S22. DETAILS OF CONCRETE SLOPE PAVING
S23. STANDARD DETAILS

APPLICABLE STANDARD DRAWINGS:

OPSD 912.430	GUARDRAIL SYSTEM, STEEL BEAM STRUCTURE CONNECTION
OPSD 3101.150	WALLS, ABUTMENT, BACKFILL, MINIMUM GRANULAR REQUIREMENT
OPSD 3370.100	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
OPSD 3370.101	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2MM WIDE AND CONSTRUCTION JOINTS
OPSD 3390.150	FALSEWORK CLEARANCE TO TRAFFIC LANES
OPSD 3419.100	BARRIERS AND RAILINGS, STEEL BEAM, GUIDE RAIL AND CHANNEL ANCHORAGE
MTOD 3941.210	FIGURES IN CONCRETE, SITE NUMBER AND DATE, LAYOUT
MTOD 3000.160	FABRICATED EQUIVALENT STEEL H-PILES

LIST OF ABBREVIATION:

F.F	FRONT FACE
B.F.	BACK FACE
E.F.	EACH FACE
ABUT.	ABUTMENT
BRGS.	BEARINGS
DWG.	DRAWINGS
EA.	EACH
W.P.	WORKING POINT
EQ.	EQUAL
SP.	SPACED
I.F.	INSIDE FACE
O.F.	OUTSIDE FACE
EL.	ELEVATION
T/P	TOP OF PAVEMENT

Ontario Ministry of Transportation

CONT 2025-4017
GWP 4248-15-00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
GENERAL ARRANGEMENT

SHEET 39

GENERAL NOTES:

1. CLASS OF CONCRETE

SPECIFIED 28-DAY COMPRESSIVE STRENGTH 30 MPa

CLEAR COVER TO REINFORCING STEEL

FOOTING		100±25
DECK	TOP	70±20
	BOTTOM	40±10
PIER COLUMNS, SHAFTS, AND CAPS		70±10
REMAINDER UNLESS SPECIFIED OTHERWISE		70±20

2. REINFORCING STEEL

REINFORCING STEEL SHALL BE GRADE 500W.

UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES FOR REINFORCING STEEL BARS SHALL BE CLASS B.

STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.

GLASS FIBRE REINFORCED POLYMER REINFORCING BARS SHALL BE GRADE III, AND THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.

BARS MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.

BARS MARKS WITH PREFIX 'G' DENOTE GRADE III GLASS FIBRE REINFORCED POLYMER BARS.

BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS112-1, UNLESS INDICATED OTHERWISE. HOOKS AND BENDS FOR GFRP BARS SHALL HAVE A MINIMUM BEND-RADIUS-TO-BAR-DIAMETER RATIO (r/d) OF 4.0.

3. CONSTRUCTION NOTES

BACKFILL SHALL NOT BE PLACED BEHIND THE ABUTMENTS UNTIL THE DECK SLAB IS IN PLACE AND REACHED 70% OF ITS DESIGN STRENGTH.

BACKFILL PLACED BEHIND NEW ABUTMENTS SHALL BE EXPANDED POLYSTYRENE (EPS) LIGHTWEIGHT FILL.

BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500 mm.

THE CONTRACTOR SHALL SUPPLY TEMPORARY LATERAL BRACING AND VERTICAL SUPPORTS FOR THE ABUTMENTS AND WINGWALLS. FORMWORK, LATERAL BRACING AND VERTICAL SUPPORTS SHALL NOT BE REMOVED UNTIL DECK CONCRETE (CONCRETE IN DECK ENDS, DECK POUR AT PIER CAP AND ABUTMENT DIAPHRAGMS) HAS REACHED 25MPa, UNLESS OTHERWISE ACCOMMODATED BY TEMPORARY BRACING AND SUPPORTS APPROVED BY THE DESIGN ENGINEER.

THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF ALL TEMPORARY STRUCTURES, PROTECTION SYSTEMS, CONSTRUCTION PLATFORMS AND DEBRIS CONTAINMENT SYSTEMS.

THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESS FROM THE TOP OF BEARING ELEVATIONS. IF THE ACTUAL BEARING THICKNESS ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.

UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING UTILITIES DURING ALL STAGES OF THE WORK.

ALL ELEVATIONS ARE TO GEODETIC DATUM.

Preliminary

REVISIONS			
	DATE	BY	DESCRIPTION

DESIGN	TF	CHK	JW	CODE	CSA-S6-19	LOAD	CL-625-ONT	DATE	JAN 2026
DRAWN	ND	CHK	TF	SITE	31X-0230/B0			DWG	S1

MINISTRY OF TRANSPORTATION, ONTARIO

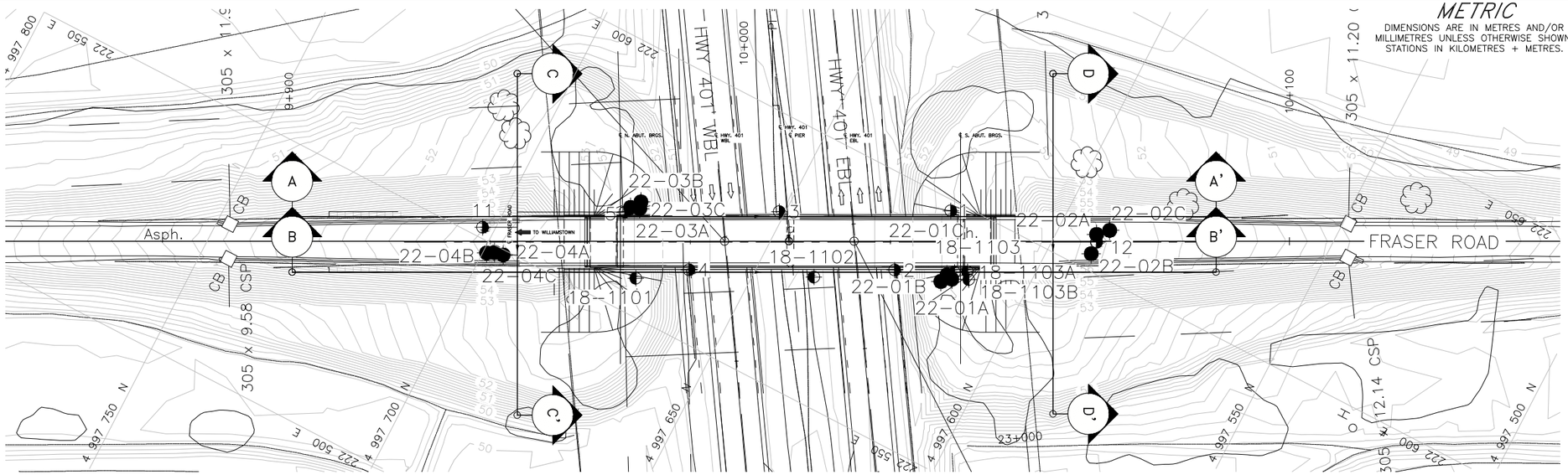
CONT No.
WP No. 4290-15-01

REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD
BOREHOLE LOCATIONS AND SOIL STRATA

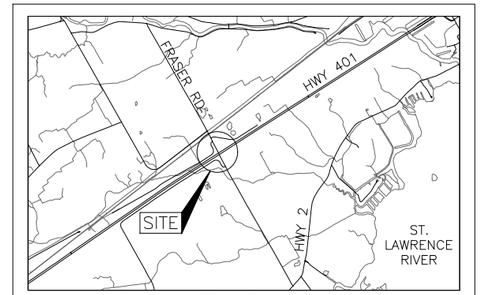
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METRIC
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STATIONS IN KILOMETRES + METRES.

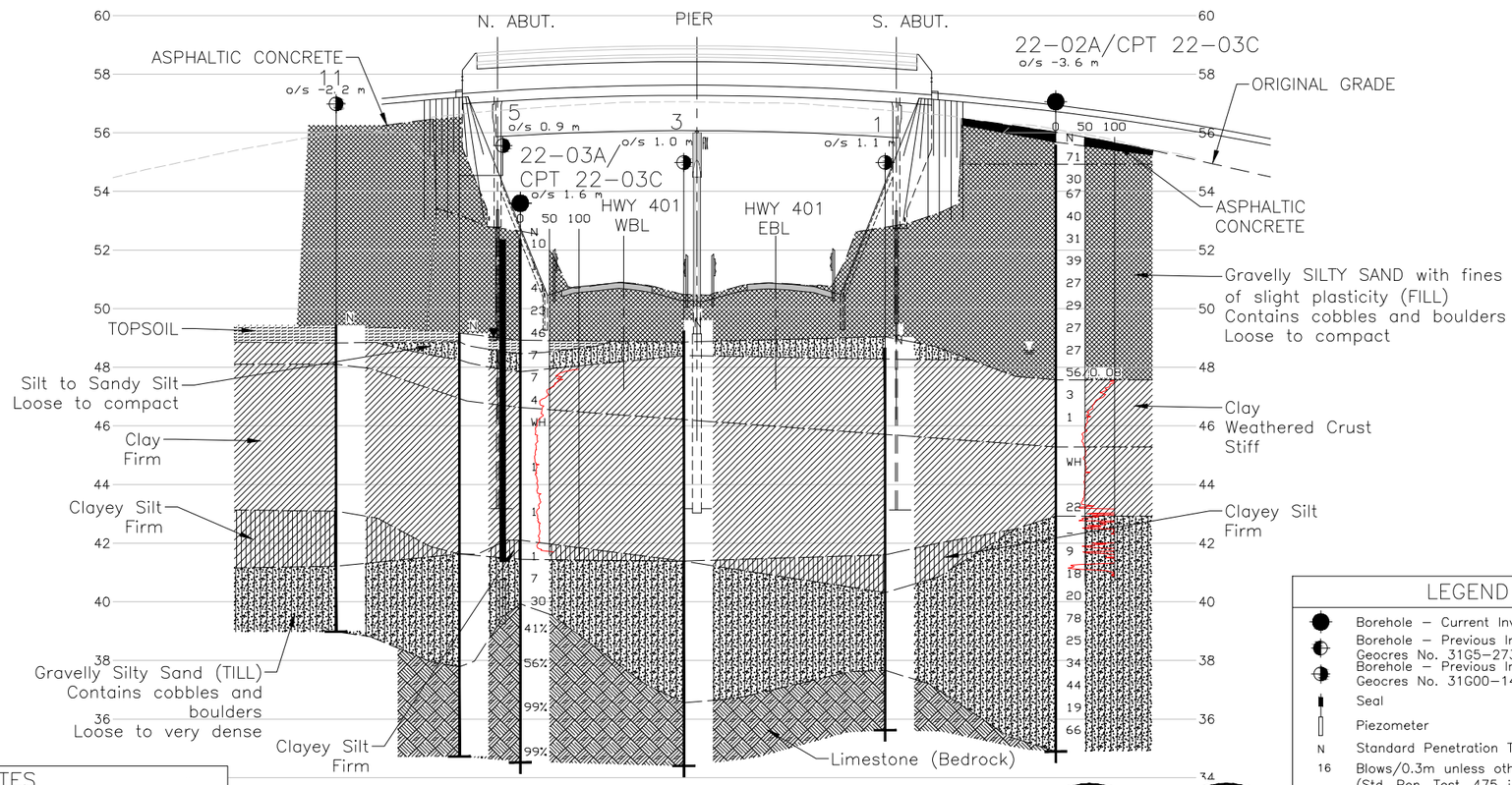


PLAN
SCALE
10 0 10 20 m



KEY PLAN
SCALE
1 0 1 2 km

Preliminary



CROSS-SECTIONS A-A'

HORIZONTAL SCALE
10 0 10 20 m
2.5 0 2.5 5

VERTICAL SCALE
2 0 2 4 m

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01B	52.9	4997616.0	222584.5
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02B	56.0	4997591.9	222603.3
22-02C	55.8	4997590.7	222609.1
22-03A	52.7	4997676.2	222569.8
22-03B	52.7	4997676.6	222571.1
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04B	55.9	4997699.3	222547.9
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
18-1102	50.6	4997639.0	222573.6
18-1103	53.0	4997614.4	222587.4
18-1103A	53.1	4997612.2	222588.7
18-1103B	52.9	4997611.2	222587.4
1	49.0	4997620.7	222598.0
2	50.6	4997625.3	222582.3
3	49.6	4997651.1	222582.1
4	50.6	4997661.8	222563.5
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0
12	49.1	4997592.0	222605.8

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

NOTES

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

LICENSED PROFESSIONAL ENGINEER K.T.C. POWER 100130652 Apr. 19, 2024 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.P. DITTRICH Apr.19, 2024 PROVINCE OF ONTARIO

NO.	DATE	BY	REVISION
.	.	.	.

Geocres No. 31G-291

HWY. 401	PROJECT NO. 22513877A		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 1

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\FraserRoad\99_PROJ\22513877\05_PROD\0001_Foundations\22513877-0001-BD-0001.dwg

MINISTRY OF TRANSPORTATION, ONTARIO

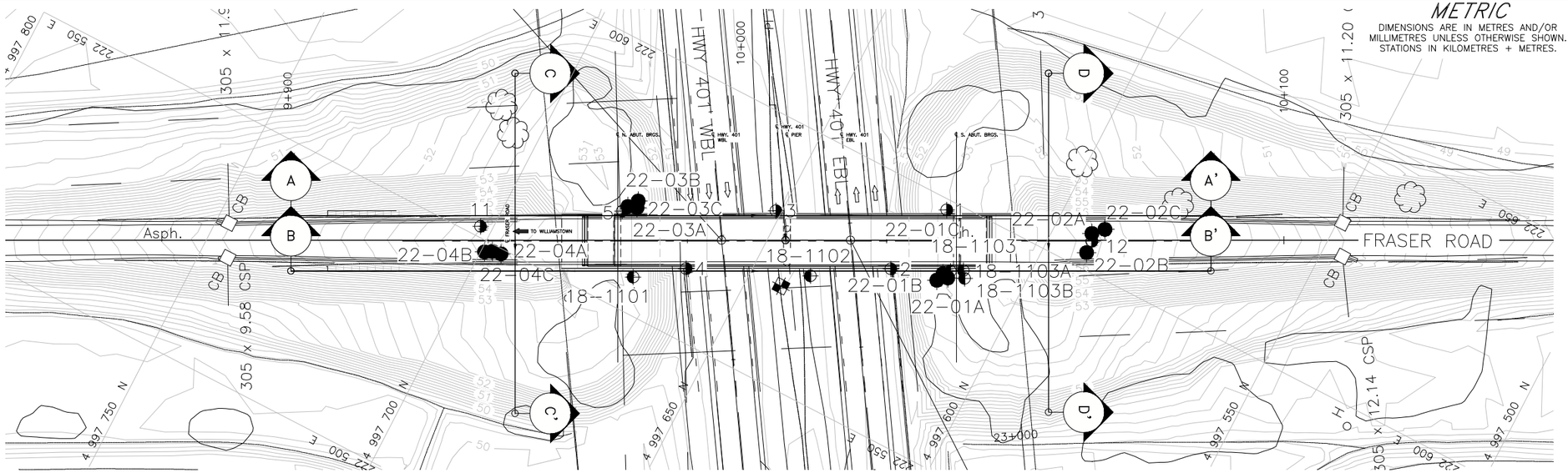
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WP No. 4290-15-01

REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD
BOREHOLE LOCATIONS AND SOIL STRATA

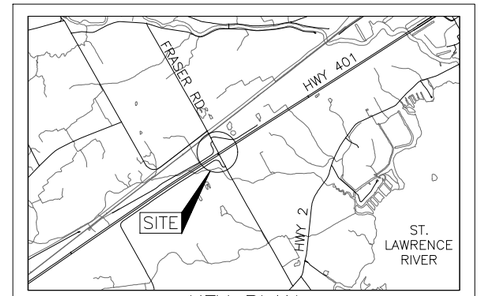
SHEET 41

wsp

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.

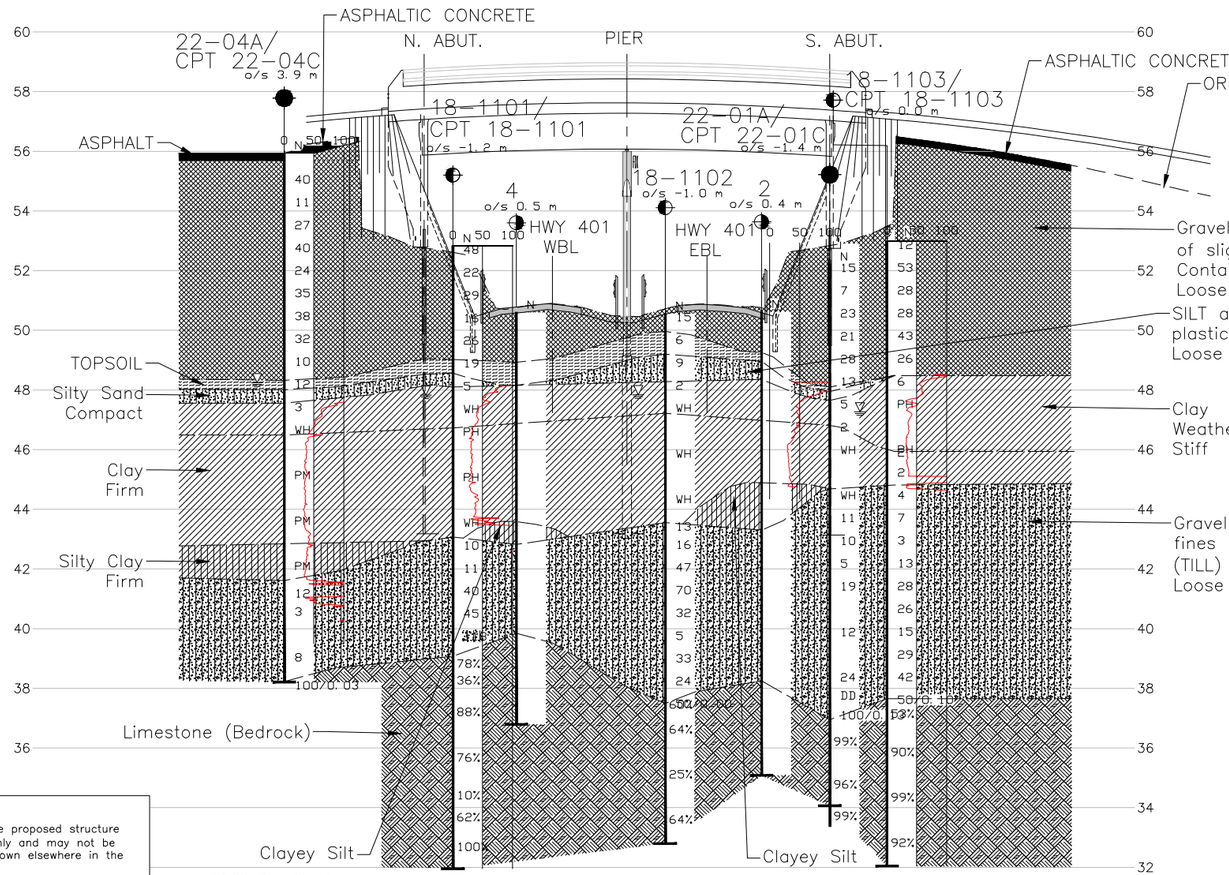


PLAN
SCALE
10 0 10 20 m



KEY PLAN
SCALE
1 0 1 2 km

Preliminary



HORIZONTAL SCALE
10 0 10 20 m
2.5 0 2.5

VERTICAL SCALE
2 0 2 4 m

CROSS-SECTIONS B-B'

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)			
No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01B	52.9	4997616.0	222584.5
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02B	56.0	4997591.9	222603.3
22-02C	55.8	4997590.7	222609.1
22-03A	52.7	4997676.2	222569.8
22-03B	52.7	4997676.6	222571.1
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04B	55.9	4997699.3	222547.9
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
18-1102	50.6	4997639.0	222573.6
18-1103	53.0	4997614.4	222587.4
18-1103A	53.1	4997612.2	222588.7
18-1103B	52.9	4997611.2	222587.4
1	49.0	4997620.7	222598.0
2	50.6	4997625.3	222582.3
3	49.6	4997651.1	222582.1
4	50.6	4997661.8	222563.5
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0
12	49.1	4997592.0	222605.8

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

NOTES

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

The boundaries between soil strata have been established only at borehole locations. Between boreholes the boundaries are assumed from geological evidence.

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

NO.	DATE	BY	REVISION
.	.	.	.

Geocres No. 31G-291

HWY. 401		PROJECT NO. 22513877A	DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 21-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 2

LICENSED PROFESSIONAL ENGINEER K.T.C. POWER 100130652 Apr. 19, 2024 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J.P. DITTRICH Apr.19, 2024 PROVINCE OF ONTARIO

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\YraserRoad\09_PROJ\225138771\40_PROD\0001_Foundations\225138771-0001-BD-0002.dwg

MINISTRY OF TRANSPORTATION, ONTARIO

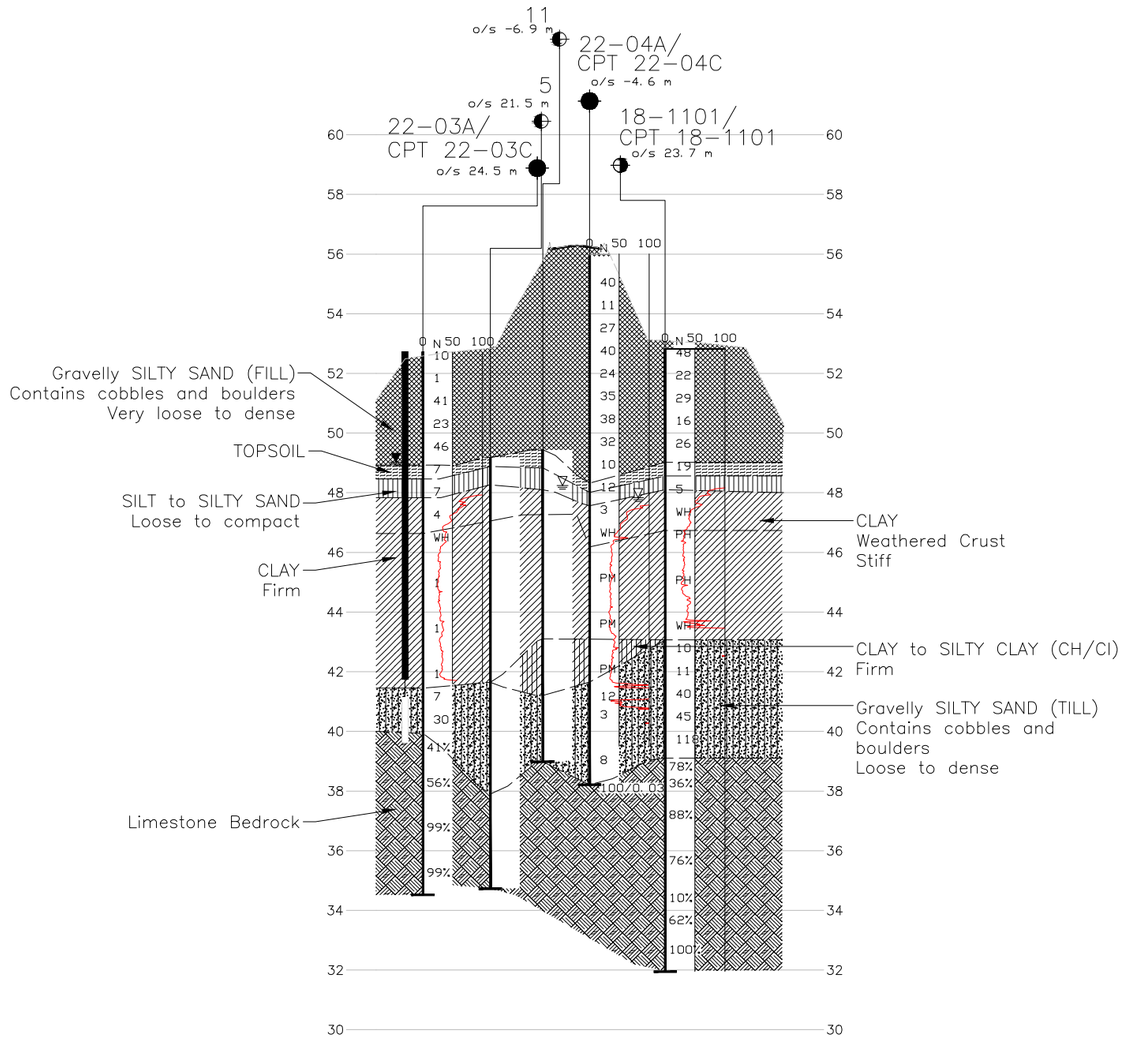
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STATIONS IN KILOMETRES + METRES.

Preliminary

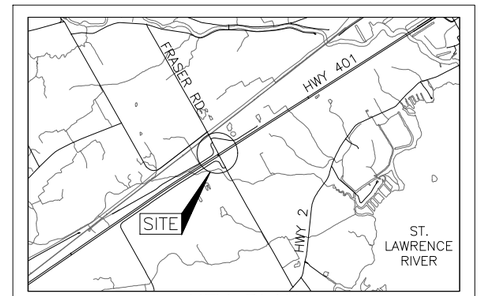
CONT No.
WP No. 4290-15-01

REPLACEMENT OF HIGHWAY 401 UNDERPASS AT FRASER RD
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET 42



CROSS-SECTIONS C-C'- NORTH EMBANKMENT



KEY PLAN
SCALE
1 0 1 2 km

LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N Standard Penetration Test Value
- 16 Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)

No.	ELEVATION	NORTHING	EASTING
22-03A	52.7	4997676.2	222569.8
22-03C	52.7	4997677.9	222569.2
22-04A	55.9	4997698.0	222548.7
22-04C	56.0	4997696.2	222549.0
18-1101	52.8	4997670.5	222557.1
5	49.2	4997678.5	222567.8
11	49.4	4997702.4	222552.0





NOTES

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HORIZONTAL SCALE
10 0 10 20 m

VERTICAL SCALE
2 0 2 4 m

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

NO.	DATE	BY	REVISION
.	.	.	.

Geocres No. 31G-291

HWY. 401	PROJECT NO. 22513877		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 3

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\FraserRoad\09_PROJ\22513877\45_PROD\0001_Foundations\22513877-0001-BD-0003.dwg

MINISTRY OF TRANSPORTATION, ONTARIO

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.
STATIONS IN KILOMETRES + METRES.

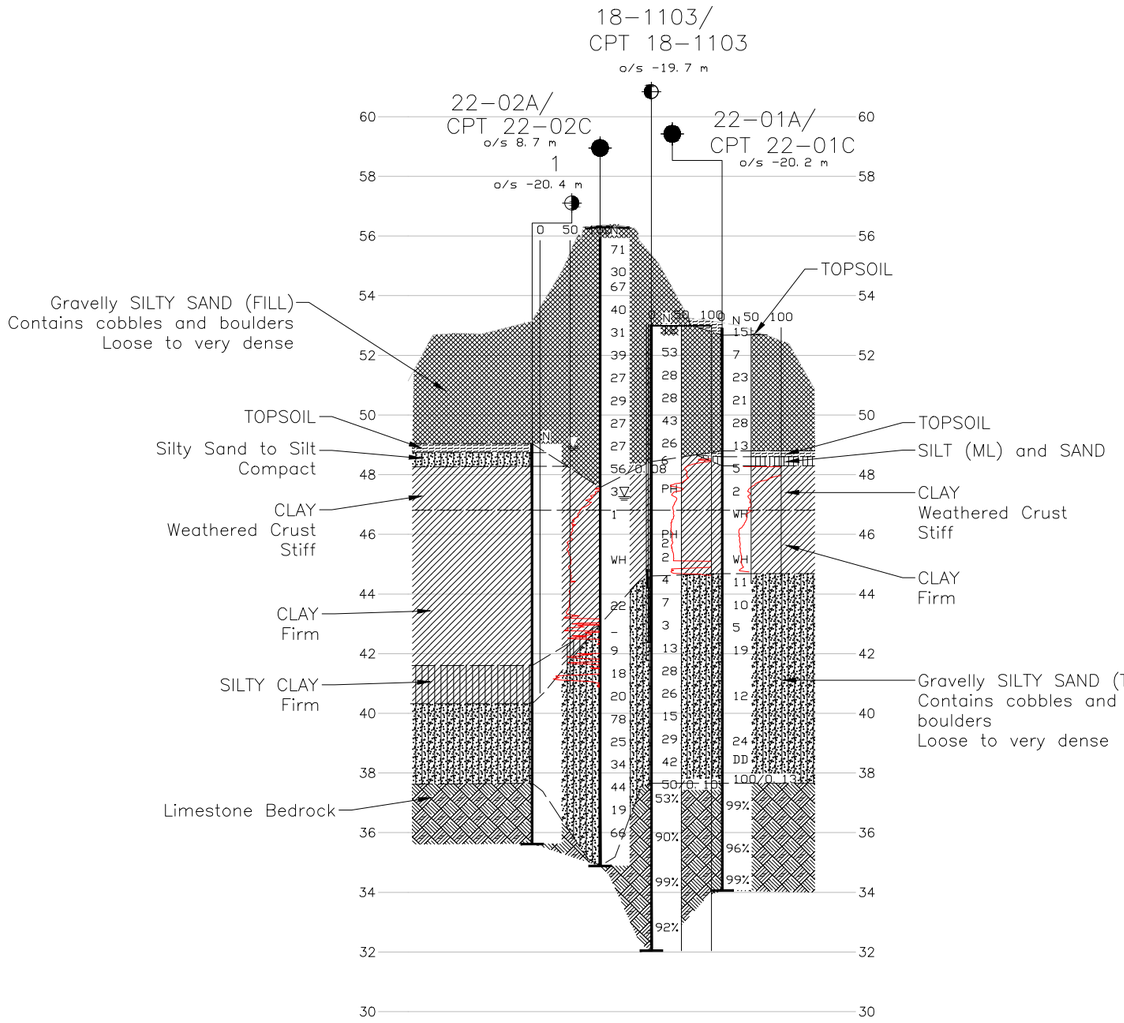
Preliminary

CONT No.
WP No. 4290-15-01

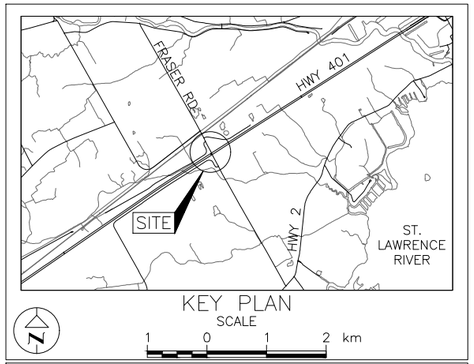
REPLACEMENT OF HIGHWAY 401
UNDERPASS AT FRASER RD
SOIL STRATA

SHEET
43

wsp



CROSS-SECTIONS D-D'-SOUTH EMBANKMENT



LEGEND

- Borehole – Current Investigation
- Borehole – Previous Investigation Geocres No. 31G5-273
- Borehole – Previous Investigation Geocres No. 31G00-142
- Seal
- Piezometer
- N — Standard Penetration Test Value
- 16 — Blows/0.3m unless otherwise stated (Std. Pen. Test, 475 j/blow)
- 100% — Rock Quality Designation (RQD)
- WL in piezometer, measured on March. 7, 2023
- WL upon completion of drilling
- CPTU Results

BOREHOLE CO-ORDINATES (NAD 83 MTM ZONE 8)

No.	ELEVATION	NORTHING	EASTING
22-01A	52.9	4997614.3	222585.9
22-01C	52.9	4997615.5	222586.2
22-02A	56.0	4997592.7	222607.2
22-02C	55.8	4997590.7	222609.1
18-1103	53.0	4997614.4	222587.4
1	49.0	4997620.7	222598.0

LICENSED PROFESSIONAL ENGINEER
K.T.C. POWER
100130652
Apr. 19, 2024
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.P. DITTRICH
Apr.19, 2024
PROVINCE OF ONTARIO

NOTES

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HORIZONTAL SCALE
10 0 10 20 m

VERTICAL SCALE
2 0 2 4 m

REFERENCE

Base plans provided in digital format by Dillon, drawing file no. WP 4328-11-01 – Hwy 401 Charlottenbugh, received JULY 04, 2018.
GA provided in digital format by MTO, drawing file no. 188202-09-GA – Fraser Rd, received January 23, 2023.

Structural Site Location: Latitude: 44.114025 Longitude: -74.554989

NO.	DATE	BY	REVISION
.	.	.	.

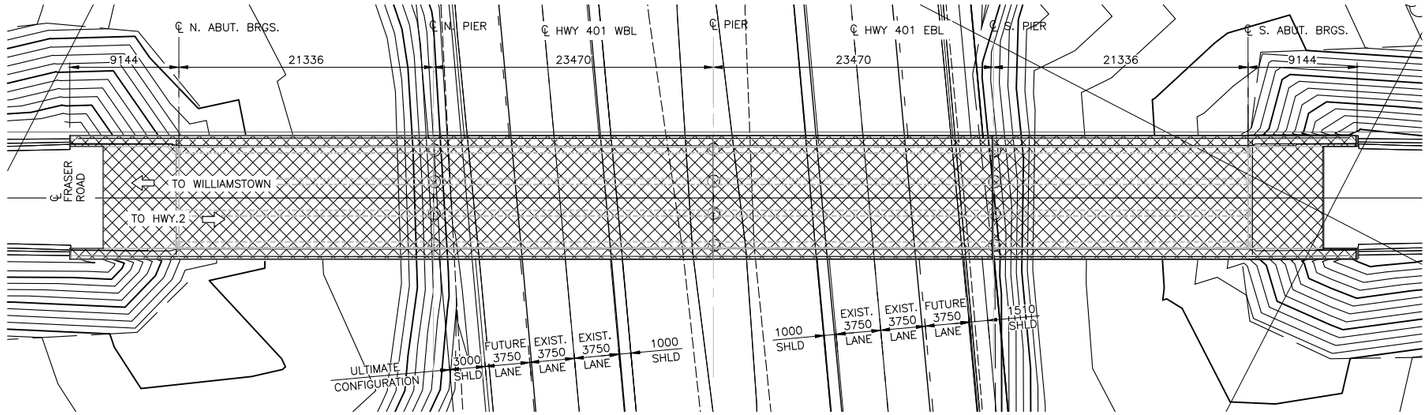
Geocres No. 31G-291

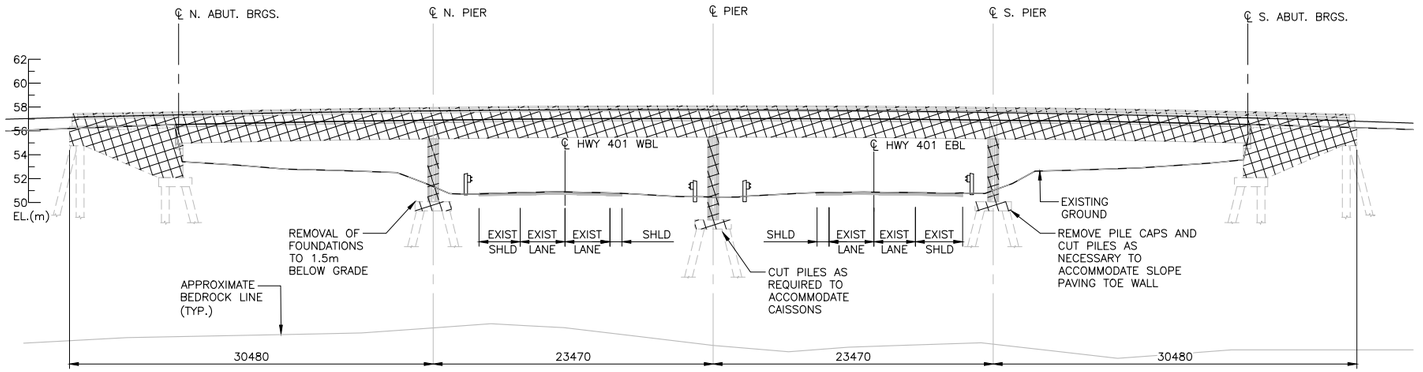
HWY. 401	PROJECT NO. 22513877		DIST. EASTERN
SUBM'D. KG	CHKD. KCP	DATE: 4/18/2024	SITE: 31-230
DRAWN: ZS/SA	CHKD. JPD	APPD. JPD	DWG. 4

PLOT DATE: April 19, 2024
FILENAME: S:\Clients\MTO\TraserRoad\09_PROJ\22513877\40_PROD\0001_Foundations\22513877-0001-BD-0004.dwg

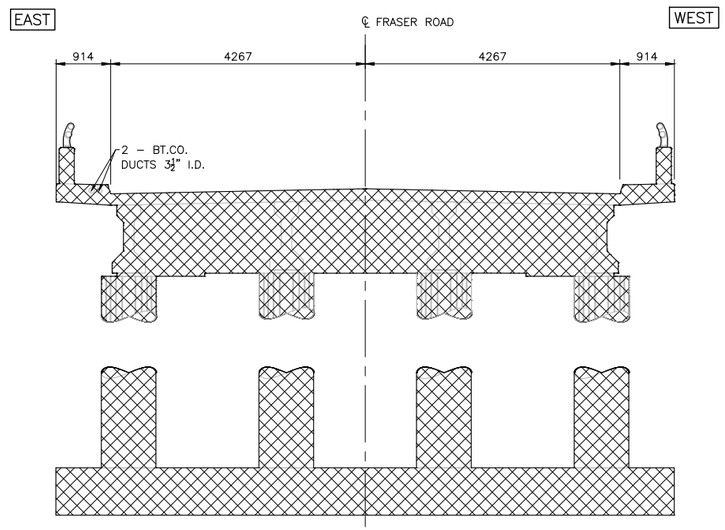
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

FOR CONSTRUCTION





WEST ELEVATION



1 PIER SECTION
SCALE 1:50

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Preliminary

Ontario Ministry of Transportation

CONT	2025–4017
GWP	4248–15–00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
REMOVALS

SHEET 44

GENERAL NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. ALL EXISTING CONDITIONS SHOWN ON THIS DRAWING HAVE BEEN TAKEN FROM THE ORIGINAL CONTRACT DRAWINGS AND PREVIOUS REHABILITATION DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS SHOWN ON THIS DRAWING PRIOR TO ANY FABRICATION OR CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR.
3. SEE ROADWAY DRAWINGS FOR REINSTATEMENT OF EMBANKMENTS FOLLOWING REMOVAL OF STRUCTURE.

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE DESIGN OF ALL REQUIRED TEMPORARY SUPPORT SYSTEMS, PROTECTION SYSTEMS, TEMPORARY BRACING AND THE DEBRIS CONTAINMENT SYSTEMS FOR COMPLETION OF THE WORK. INFORMATION SHOWN ON THIS DRAWING IS SCHEMATIC ONLY AND SHALL ONLY BE USED FOR GENERAL GUIDANCE IN DEVELOPING A DETAILED DEMOLITION PLAN.
2. THE CONTRACTOR SHALL CONDUCT AN INSPECTION AND VERIFY ALL DIMENSIONS, DETAILS AND ELEVATION OF THE EXISTING STRUCTURE THAT ARE RELEVANT TO THE WORK PRIOR TO COMMENCEMENT OF THE WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR AND THE PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
3. FOR ADDITIONAL INFORMATION OF THE EXISTING STRUCTURE SEE ORIGINAL DRAWINGS.
4. STRUCTURE REMOVAL/DEMOLITION SHALL NOT PROCEED UNTIL HWY. 401 DETOUR IS IN PLACE AND TRAFFIC LANES BELOW HAVE BEEN CLOSED. STAGING AND LANE CLOSURE REQUIREMENTS SHALL BE AS SPECIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS. SEE SPECIFICATIONS FOR RESTRICTIONS ON ADVANCE REMOVAL WORK.
5. THE CONTRACTOR SHALL ENSURE STABILITY OF THE EXISTING STRUCTURE DURING ALL STAGES OF REMOVAL/DEMOLITION.
6. THE CONTRACTOR SHALL REFER TO THE ORIGINAL BRIDGE DRAWINGS AND ENSURE STABILITY OF THE BRIDGE IN BOTH THE TRANSVERSE AND LONGITUDINAL DIRECTION DURING ALL STAGES OF DEMOLITION AND PROVIDE BRACING AS REQUIRED.
7. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF UTILITIES AND SERVICES DURING ALL STAGES OF REMOVAL AND CONSTRUCTION. ANY DAMAGE TO UTILITIES CAUSED BY THE CONTRACTOR SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
8. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING ASPHALT, ROADWAY FEATURES AND VEGETATION NOT IDENTIFIED FOR REMOVAL DURING ALL STAGES OF THE WORK. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
9. HAZARDOUS MATERIALS ARE PRESENT IN THE FOLLOWING:
   - LEAD IN THE BRIDGE RAILING FINISH, ROADWAY PAINTS AND BEARINGS.
   - SILICA IN ASPHALT, CONCRETE AND GRANULAR MATERIAL.
10. PROTECTION SYSTEMS SHALL MEET THE REQUIREMENTS FOR PERFORMANCE LEVEL 2. THE CONTRACTOR SHALL DESIGN PROTECTION SYSTEMS TO PERMIT REMOVAL OF EXISTING PIER AND FOUNDATIONS, DEWATERING, CONSTRUCTION OF NEW PIER AND FOUNDATIONS, BACKFILLING OPERATIONS AND AS REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE REQUIRED LENGTH AND DEPTH OF ALL PROTECTION SYSTEMS.

LEGEND:

REMOVALS

DRAFT

REVISIONS

DATE	BY	DESCRIPTION

DESIGN	TF	CHK	JW	CODE	CSA–S6–19	LOAD	CL–625–ONT
DRAWN	ND	CHK	TF	SITE	31X–0230/B0	DWG	S6

DATE JAN 2026

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE – GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT – 90% SHEETSET\REMOVALS.DWG
MODIFIED: 2026-01-22 16:18

FOR CONSTRUCTION

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DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

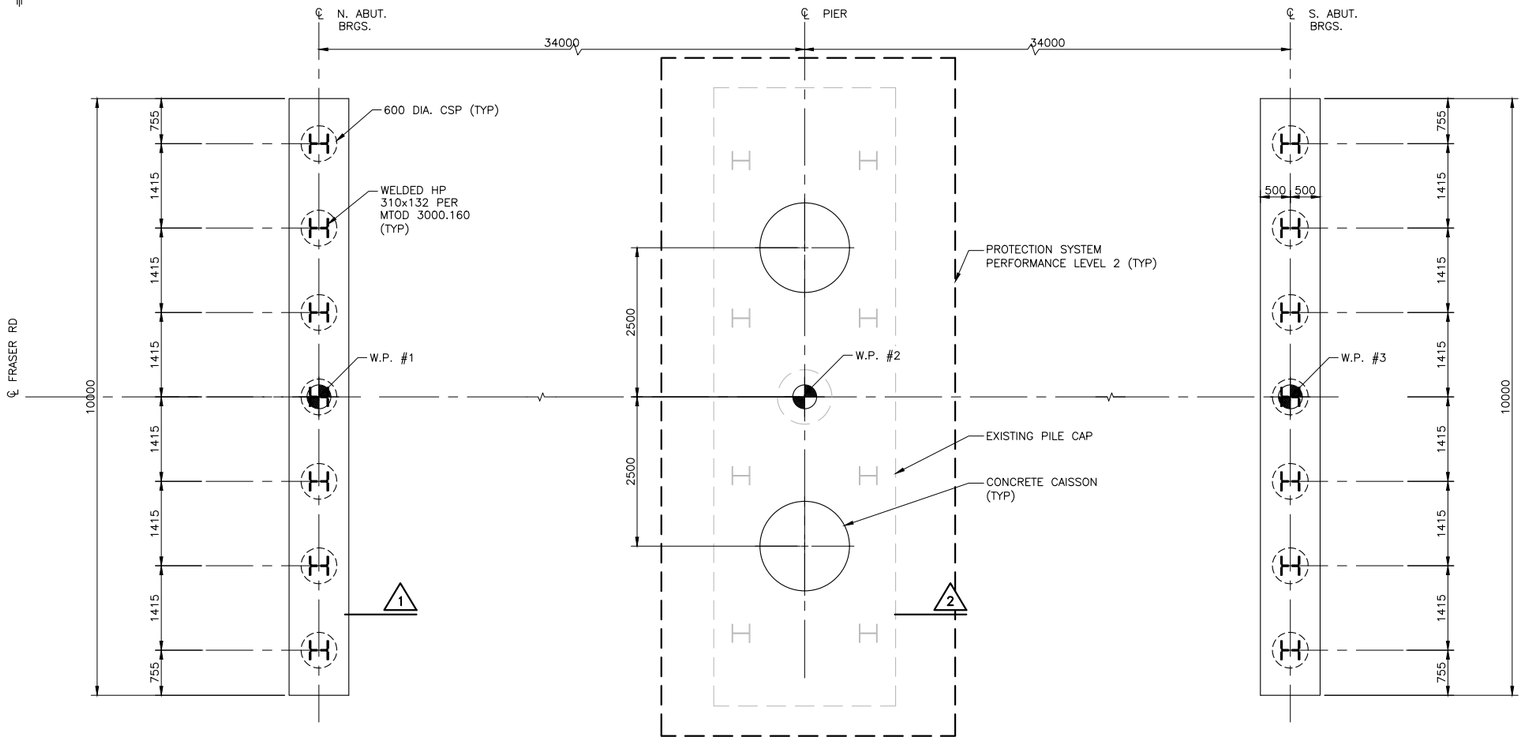
Preliminary

Ontario Ministry of Transportation

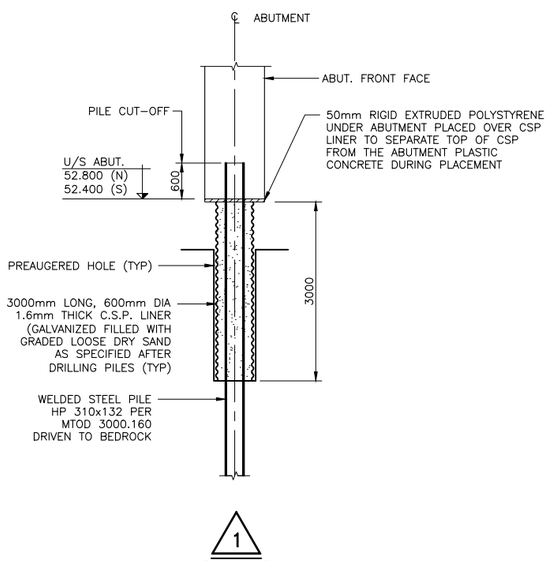
CONT	2025–4017
GWP	4248–15–00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
FOUNDATIONS

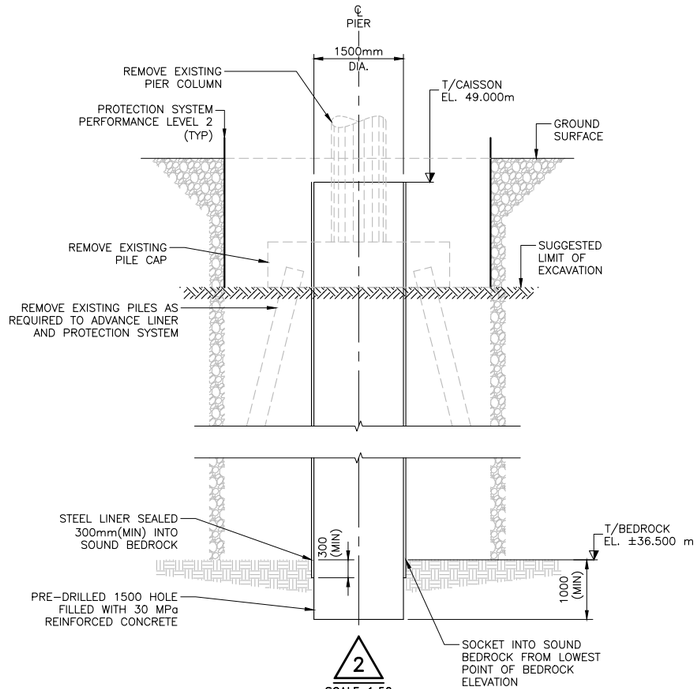
SHEET 45



PLAN – FOUNDATION LAYOUT
SCALE 1:50



SCALE 1:50



SCALE 1:50

NOTES:

1. REFER TO GENERAL NOTES ON DWG S1.
2. STEEL H–PILES SHALL CONFORM TO CSA G40.21/G40.21 GRADE 350W.
3. PILE SPACING IS MEASURED AT UNDERSIDE OF THE FOOTINGS.
4. PILE LENGTHS SHOWN ARE THE THEORETICL LENGTHS BELOW CUT–OFF.
5. THE PILE DRIVING EQUIPMENT SHALL BE APPROPRIATE FOR THE DRIVING CONDITIONS.
6. PILES SHALL BE FITTED WITH APF HARD BITE POINT, STANDARD MODEL, OR APPROVED EQUAL AND DRIVEN TO BEDORCK IN ACCORDANCE WITH OPSS 903.
7. PILE SPLICES SHALL BE PER OPSD 3000.150.
8. FACTORED GEOTECHNICAL RESISTANCE PER PILE: 3900 KN (ULS).
9. PILE DESIGN DATA PER PILE: MAX FACTORED LOADS: ULS 950 kN, SLS 700 kN.
10. CAISSON CONCRETE SHALL BE PLACED WITHIN 6 HOURS OF SOCKET INSPECTION OR SHALL BE RE–INSPECTED.
11. CAISSON LENGTHS ARE THEORETICAL LENGTHS. CONTRACTOR SHALL HAVE ADDITIONAL LENGTH OF REINFORCEMENT CAGE AVAILABLE ON SITE TO SUIT ACTUAL LENGTH OF CAISSONS
12. FACTORED GEOTECHNICAL RESISTANCE FOR ROCK SOCKETED PIER CAISSONS: 16500 kN PER CAISSON.
13. THE CONTRACTOR SHALL PERFORM FIELD MEASUREMENTS TO VERIFY THE LOCATION AND BATTER OF THE EXISTING ABUTMENT PILES FOLLOWING REMOVAL OF THE EXISTING FOOTING AT EACH ABUTMENT AND EXCAVATION TO THE LIMITS SPECIFIED. THE CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES OR CONFLICTS WITH THE PLACEMENT OF THE PROPOSED PILES AND CSP'S, IN ADDITION TO ANY PROPOSED ADJUSTMENTS WITHIN THE SPECIFIED TOLERANCES AND SUBMIT THE TO CONTRACT ADMINISTRATOR (REFER TO CONTRACT SPECIFICATIONS).
14. PROTECTION SYSTEMS SHALL MEET THE REQUIREMENTS FOR PERFORMANCE LEVEL 2. THE CONTRACTOR SHALL DESIGN PROTECTION SYSTEMS TO PERMIT REMOVAL OF EXISTING PIER AND FOUNDATIONS, DEWATERING, CONSTRUCTION OF NEW PIER AND FOUNDATIONS, BACKFILLING OPERATIONS AND AS REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE REQUIRED LENGTH AND DEPTH OF ALL PROTECTION SYSTEMS.

HP 310x132 PILE DATA

LOCATION	BATTER	NO REQ'D	CUT–OFF ELEV.	LENGTH (m)
NORTH	VERTICAL	7	53.400	14
SOUTH	VERTICAL	7	53.000	16

DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	

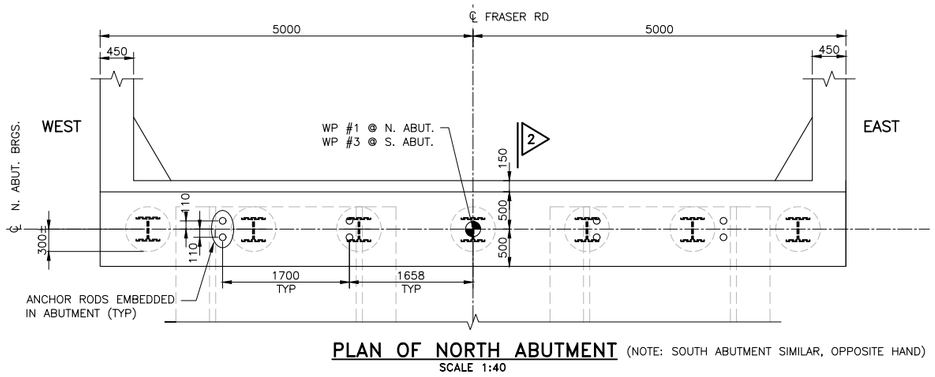
DESIGN	TF	CHK	JW	CODE	CSA–S6–19	LOAD	CL–625–ONT	DATE	JAN 2026
DRAWN	ND	CHK	TF	SITE	31X–0230/B0			DWG	S7

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MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

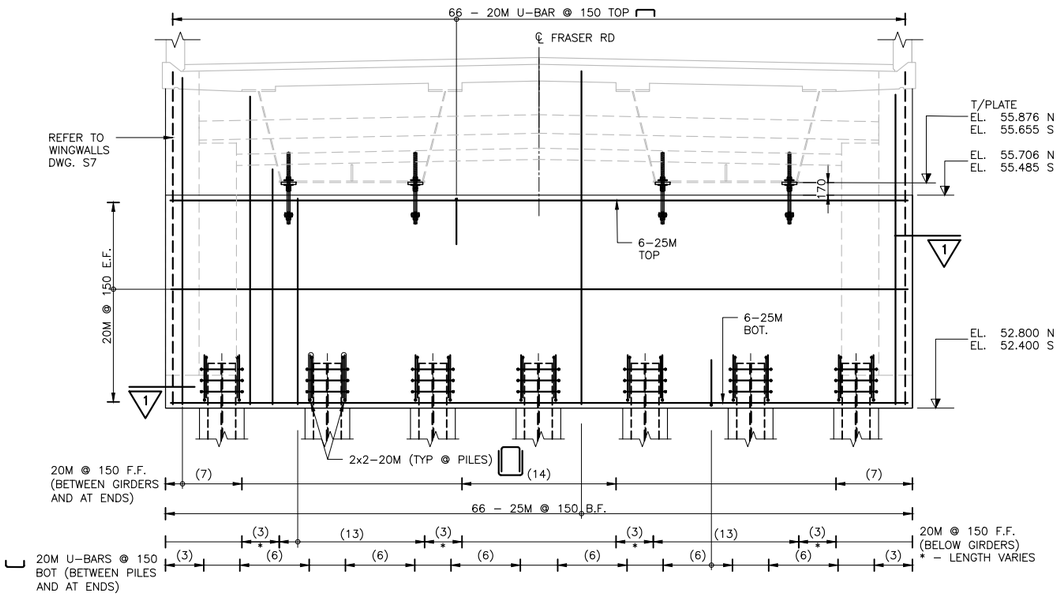
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90R SHEETSET\ABUTMENT.DWG
MODIFIED: 2026-01-23 15:43



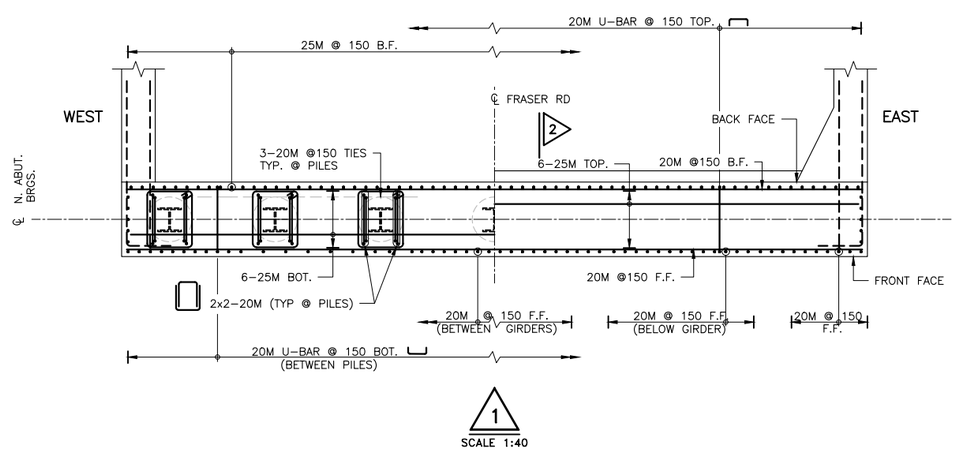
PLAN OF NORTH ABUTMENT (NOTE: SOUTH ABUTMENT SIMILAR, OPPOSITE HAND)

SCALE 1:40



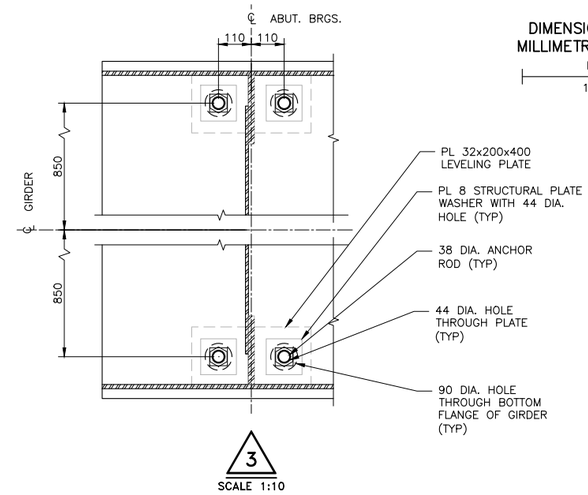
ELEVATION

SCALE 1:40



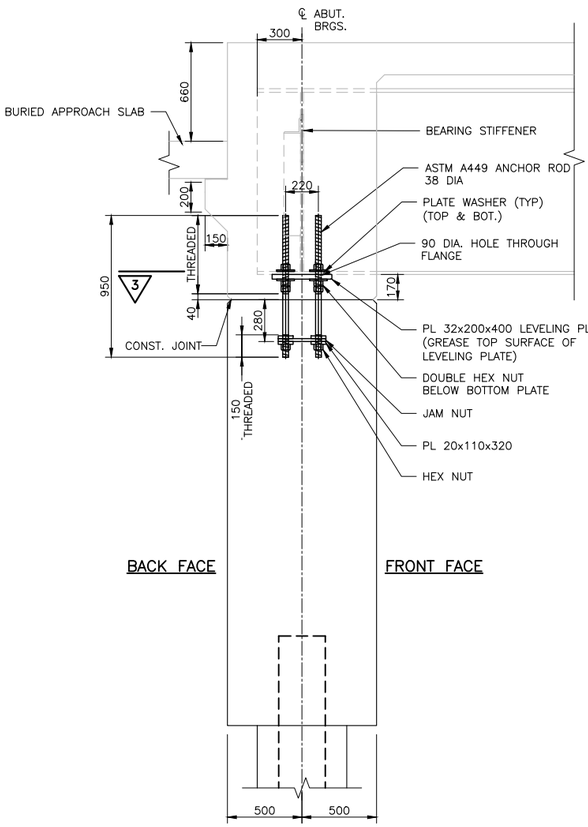
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SCALE 1:40



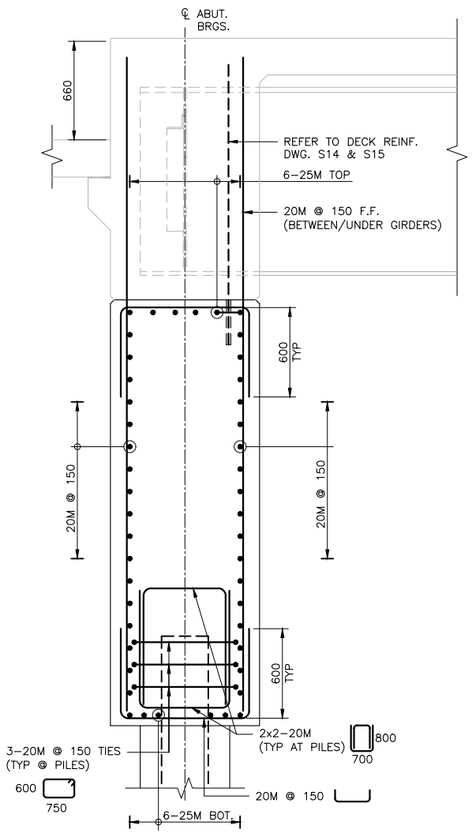
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SCALE 1:10



2 DIMENSIONS

SCALE 1:20



2 REINFORCEMENTS

SCALE 1:20

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

DRAWING NOT TO BE SCALED

100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025–4017

GWP 4248–15–00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT

ABUTMENT

SHEET 46

NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. ANCHOR RODS, WASHERS AND NUTS SHALL BE ACCORDING TO ASTM A449.
3. ANCHOR ROD ASSEMBLY SHALL BE HELD IN POSITION THROUGH USE OF A TEMPLATE DURING PLACEMENT OF ABUTMENT CONCRETE.

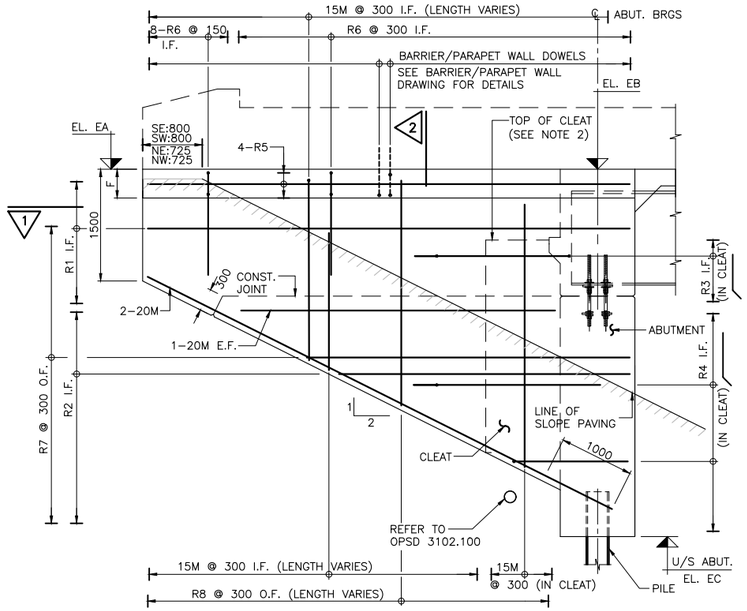
Preliminary

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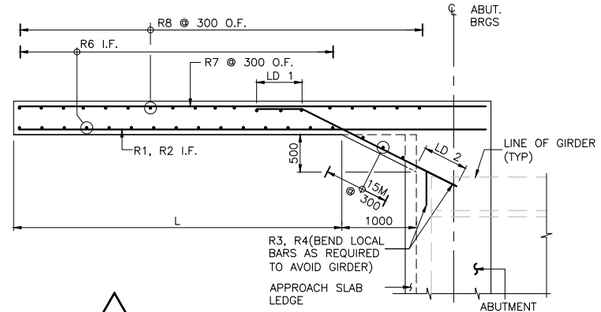
REVISIONS			
DATE	BY	DESCRIPTION	

DESIGN	TF	CHK	JW	CODE	CSA–S6–19	LOAD	CL–625–ONT	DATE	JAN 2026
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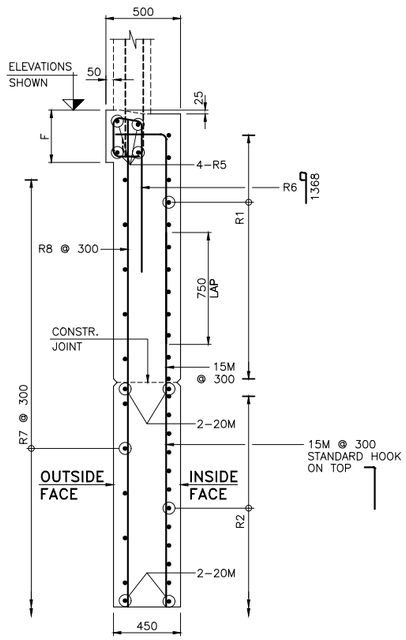
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05



ELEVATION OF WINGWALL



1 FOR NON-SKEW BRIDGES



WINGWALL WITH PARAPET WALL

2

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

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Ontario Ministry of Transportation	
CONT 2025-4017	
GWP 4248-15-00	
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT WINGWALL	SHEET 47

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ABUTMENT AND BARRIER/PARAPET WALL DRAWINGS.
2. TOP OF CLEAT TO BE CAST 35mm BELOW APPROACH SLAB LEDGE.
3. REINFORCING STEEL SHALL BE GRADE 500W UNLESS OTHERWISE SPECIFIED. STAINLESS STEEL BARS SHALL BE TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa.

LEGEND:

*TL-4, TL-5 DENOTE BARRIER TEST LEVELS
O.F. DENOTES OUTSIDE FACE
I.F. DENOTES INSIDE FACE
E.F. DENOTES EACH FACE
EL. DENOTES ELEVATION
U/S DENOTES UNDERSIDE

TABLE 1 - DIMENSIONS AND ELEVATIONS

LOCATION	DIMENSIONS (mm)		ELEVATIONS (m)		
	L	F	EA	EB	EC
NE	4500	350	57.381	57.485	52.800
NW	4500	350	57.381	57.485	52.800
SE	4500	350	57.121	57.264	52.400
SW	4500	350	57.121	57.264	52.400

TABLE 2 - REINFORCEMENT

BAR MARK	SIZE	SPACING (mm)
R1	25M	150
R2	25M	150
R3	25M	150
R4	25M	150
R5	15M	AS SHOWN
R6	15M	AS SHOWN
R7	15M	AS SHOWN
R8	15M	AS SHOWN

TABLE 3 - BAR EXTENSIONS

MARKING	EXTENSION LENGTH (mm)
LD 1	300
LD 2	600

APPLICABLE STANDARD DRAWINGS:

OPSD 3102.100 WALLS. ABUTMENT BACKFILL DRAIN
OPSD 3950.100 JOINTS. CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

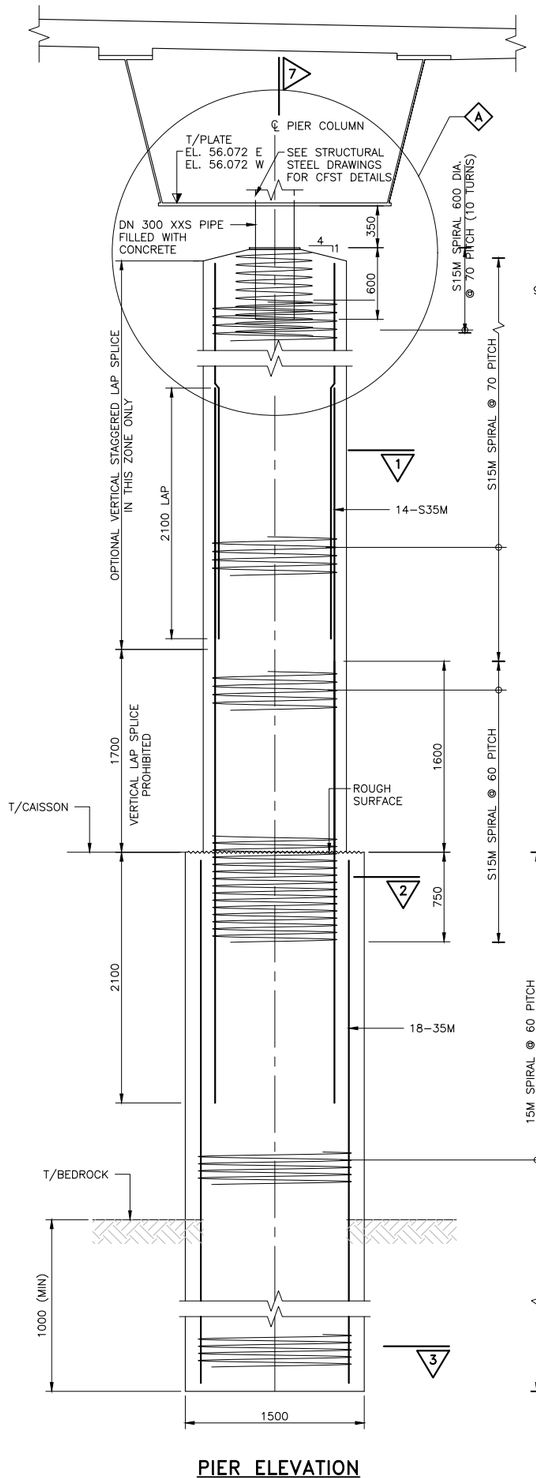
MODIFIED	
STANDARD DRAWING JULY 2023	SS105-12
WINGWALL WITH INTEGRAL ABUTMENT	

DRAFT

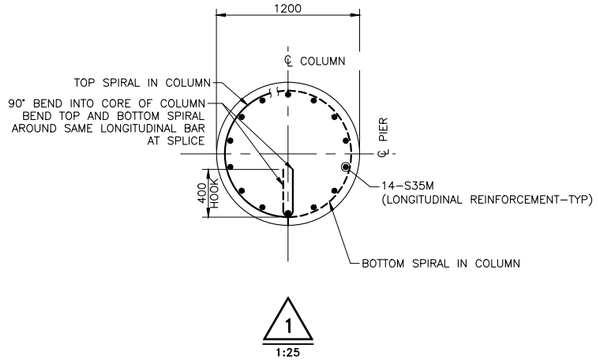
REVISIONS			
DATE	BY	DESCRIPTION	
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DRAWN TF	CHK JW	SITE 31X-0230/BO	DWG S9

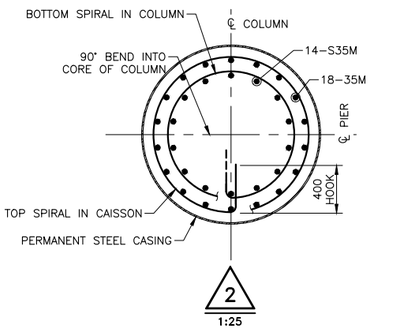
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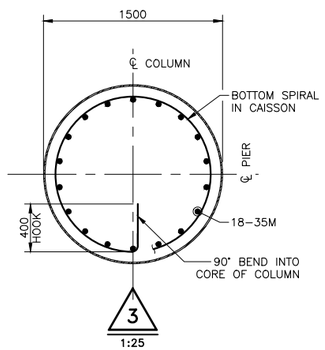
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

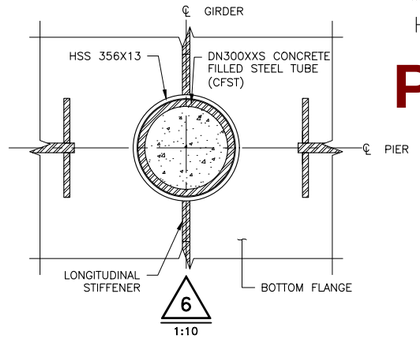


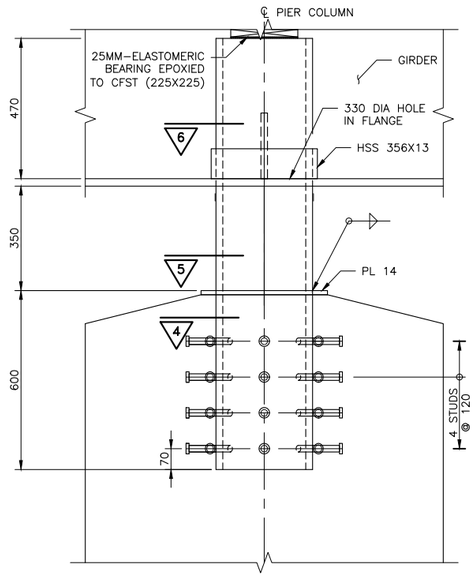
PIER ELEVATION
SCALE 1:25

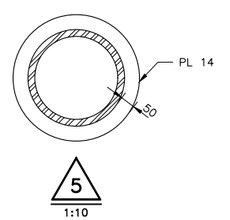


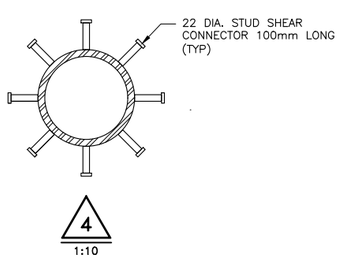


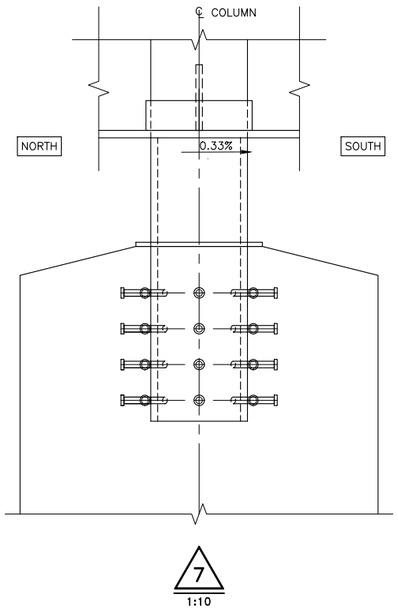












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GWP	4248-15-00
HWY 401 FRASER RD UNDERPASS REPLACEMENT	SHEET 48
PIER	

NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. REFER TO DWG. S5 FOR CAISSON ELEVATIONS AND DETAILS.
3. PIPE SHALL BE ASTM A53 GRADE B SEAMLESS.
4. EXPOSED STRUCTURAL STEEL SURFACE OF PIPE ASSEMBLY SHALL BE COATED. THE COLOUR OF THE TOP COAT SHALL BE 10045 BROWN ACCORDING TO FEDERAL STANDARD 595C COLOURS.
5. STEEL PIPE ASSEMBLY SHALL BE SET IN PLACE PRIOR TO PLACING CONCRETE IN PIER COLUMN AND SHALL BE WELL SECURED. PIPE SHALL BE FILLED WITH CONCRETE AT SAME TIME AS PIER COLUMN CONCRETE PLACEMENT.
6. THE TOP OF STEEL ASSEMBLY SHALL BE WITHIN ±3mm OF DESIGN ELEVATION. THE ℄ OF PLATE SHALL BE WITHIN ±6mm OR DESIGN LOCATION.

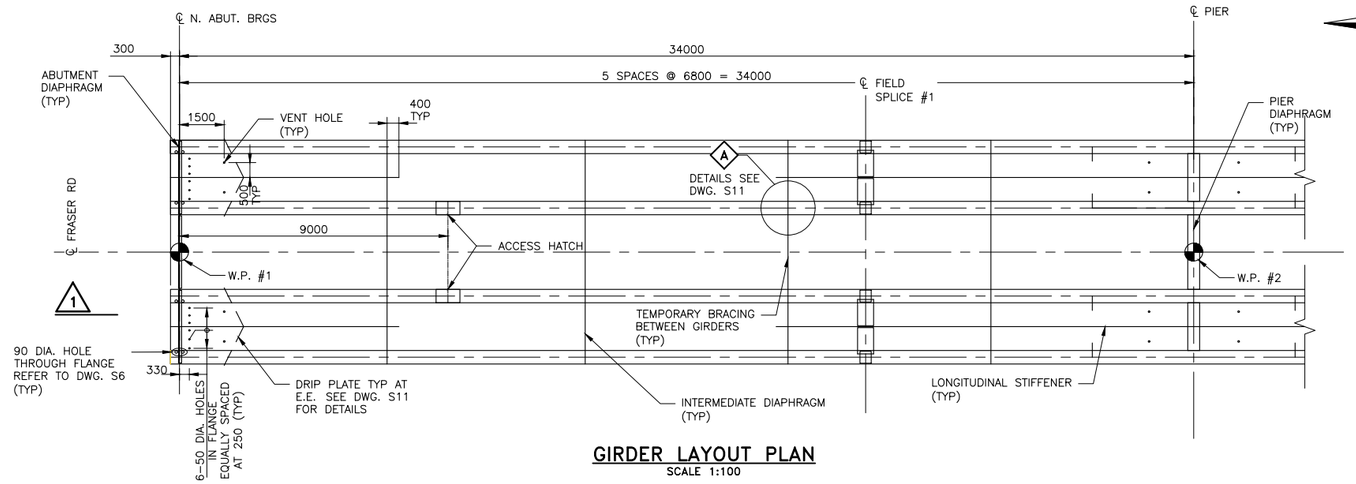
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REVISIONS			
DATE	BY	DESCRIPTION	

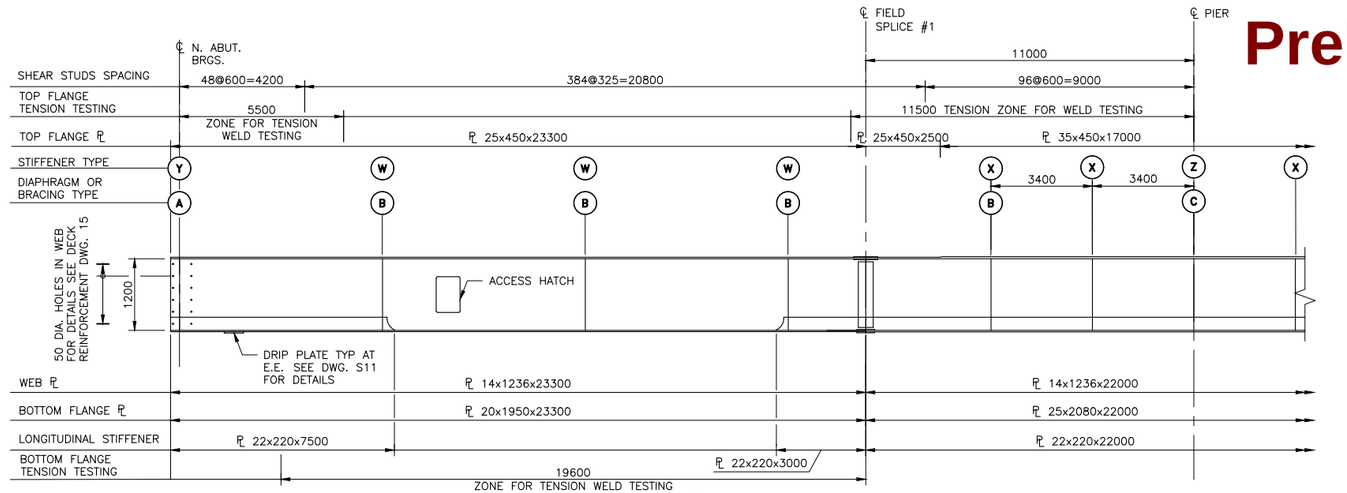
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DRAWN	TF	CHK	JW	SITE	31X-0230/B0			DWG	S10

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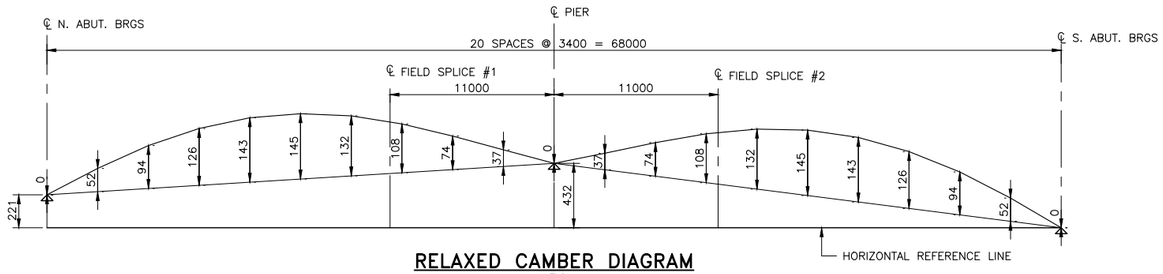
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05



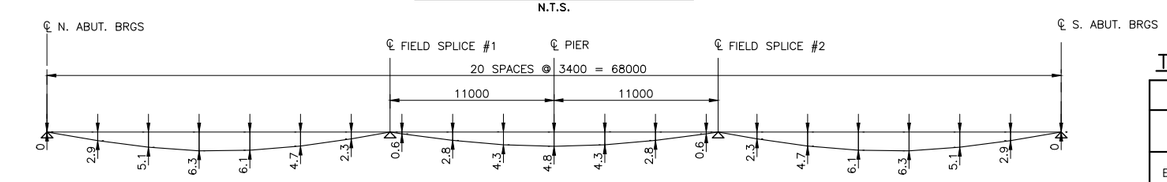
GIRDER LAYOUT PLAN
SCALE 1:100



1
SCALE 1:100 (H)
1:50 (V)



RELAXED CAMBER DIAGRAM
N.T.S.

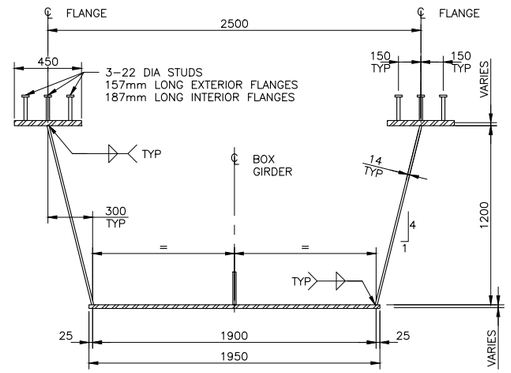


DEFLECTION FOR GIRDER SEGMENTS
N.T.S.

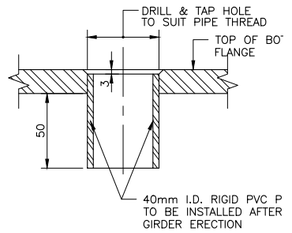
Preliminary

CONSTRUCTION NORTH

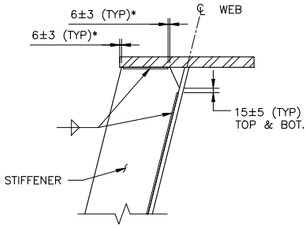
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TYPICAL SECTION
SCALE 1:20

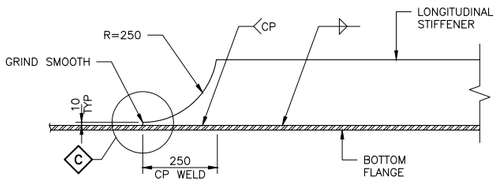


VENT DETAILS
SCALE 1:2

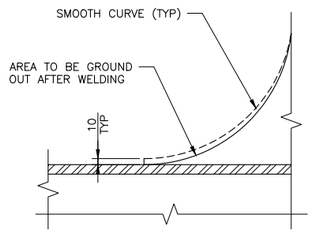


TYPICAL WELD DETAILS
SCALE 1:10

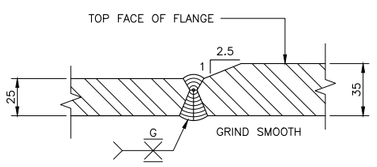
* APPLIES TO STIFFENER/CONNECTION PLATES/DIAPHRAGM WELDED TO TOP AND BOTTOM FLANGES



LONGITUDINAL STIFFENER END DETAIL
N.T.S.



C DETAIL
N.T.S.



TOP FLANGE SHOP SPLICE
SCALE 1:2

TABLE 1

GIRDER ERECTION ELEVATIONS

LOCATION	℄ N. ABUT. BRGS	℄ NORTH SPAN	℄ NORTH FIELD SPLICE	℄ PIER	℄ SOUTH FIELD SPLICE	℄ SOUTH SPAN	℄ S. ABUT. BRGS
EAST GIRDER	57.161	57.400	57.424	57.382	57.327	57.352	56.940
WEST GIRDER	57.161	57.400	57.424	57.382	57.327	57.352	56.940

NOTES:

1. ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.20/G40.21 GRADE 350AT. THE CHARPY IMPACT ENERGY REQUIREMENTS SHALL BE 27 JOULES AND THE TEST TEMPERATURE SHALL BE 0° C.

   ROLLED SECTIONS SHALL CONFORM TO CSA G40.20/G40.21 or ASTM A588/A588M.
2. BOLTS ON ATMOSPHERIC CORROSION RESISTANT STEEL SHALL BE ASTM F3125/F3125M, GRADE A325M TYPE 3, M22. BOLTS ON COATED STEEL SHALL BE GALVANIZED GRADE A325M TYPE 1, M22. BOLT THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANES.
3. STUD SHEAR CONNECTORS SHALL BE 22 mm DIA. AND CONFORM TO ASTM A108 AND CSA W59.
4. ALL LENGTHS SHOWN ARE IN THE HORIZONTAL PLANE AND MEASURED AT 20 °C.
5. GIRDERS SHALL BE CAMBERED TO VALUES SHOWN IN THE RELAXED CAMBER DIAGRAM.
6. RELAXED CAMBER ORDINATES INCLUDE AN ALLOWANCE FOR GIRDER SELF-WEIGHT, CONCRETE DECK, SUPERIMPOSED DEAD LOADS AND PROFILE OF HIGHWAY. ADJUSTMENTS SHALL BE MADE TO THE RELAXED CAMBER DIAGRAM TO COMPENSATE FOR THE DEFLECTION OF THE INDIVIDUAL GIRDER SEGMENTS.
7. THE ENDS OF GIRDERS AND BEARING STIFFENERS SHALL BE TRULY VERTICAL UNDER FULL DEAD LOAD.
8. ALL BUTT WELDS IN FLANGE AND WEB SHOP SPLICES SHALL BE FINISHED SMOOTH AS INDICATED. MARKS LEFT BY GRINDING TO BE IN THE DIRECTION OF APPLIED STRESS. IF SHOP SPLICES ARE REQUIRED IN LOCATIONS OTHER THAN THOSE WHERE PLATE SIZES HAVE TRANSITIONS, THEIR LOCATION SHALL BE APPROVED BY THE ENGINEER.
9. UNLESS OTHERWISE NOTED THE MINIMUM FILLET WELD SHALL BE AS FOLLOWS:

MATERIAL THICKNESS OF THICKER PART JOINDED (mm)	MINIMUM SIZE OF SINGLE PASS FILLET WELD (mm)
TO 12 INCLUSIVE	5
OVER 12 TO 20	6
OVER 20 TO 40	8
OVER 40 TO 60	10
OVER 60 TO 120	12

10. FILLET WELDS BETWEEN STIFFENERS AND WEBS SHALL STOP SHORT OF THE EDGE OF THE BASE METAL BY 15+/−5mm. ALL OTHER FILLET WELDS SHALL STOP SHORT OF THE EDGE OF THE BASE METAL BY A DISTANCE EQUAL TO THE DESIGNED FILLET WELD LEG LENGTH +/−3mm.
11. UNLESS OTHERWISE NOTED, LONGITUDINAL STIFFENERS SHALL BE CUT 25MM SHORT OF THE TRANSVERSE WEB STIFFENERS.
12. BOLT HEADS IN FIELD SPLICES FOR BOX GIRDERS SHALL BE LOCATED ON THE EXTERIOR SURFACES.
13. ALL STRUCTURAL STEEL SURFACES SHALL BE COATED FOR A DISTANCE OF 700 mm AS FOLLOWS: FROM THE FRONT FACE OF THE ABUTMENT 100 mm TOWARD THE ENDS OF GIRDERS AND 600 mm TOWARDS THE CENTRE OF GIRDERS. THE COLOUR OF THE TOPCOAT SHALL BE 10045 BROWN ACCORDING TO FEDERAL STANDARD 595c COLOURS.
14. CONTRACTOR SHALL ENSURE THE STABILITY OF ALL COMPONENTS DURING HANDLING, TRANSPORTATION AND ERECTION AND UNTIL THE STRUCTURAL STEEL IS IN ITS FINAL LOCATION WITH ALL PERMANENT BRACING, CONNECTIONS AND SUPPORTS IN PLACE AND THE CONCRETE IN THE DECK HAS REACHED 75% OF ITS SPECIFIED STRENGTH.
15. GIRDER ERECTION ELEVATIONS ARE TO TOP OF GIRDER AT TOP OF FLANGE OR TO TOP OF TOP SPLICE PLATE AT FIELD SPLICES ALONG ℄ GIRDER.

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Ontario Ministry of Transportation

CONT	2025-4017
GWP	4248-15-00
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT	SHEET 49
STRUCTURAL STEEL I	

REVISIONS	DATE	BY	DESCRIPTION

DESIGN TF CHK JW CODE CSA-S6-19 LOAD CL-625-ONT DATE JAN 2026
DRAWN TF CHK JW SITE 31X-0230/B0 DWG S11

FILE NAME: C:\USERS\FLUCKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\STRUCTURAL STEEL.DGN
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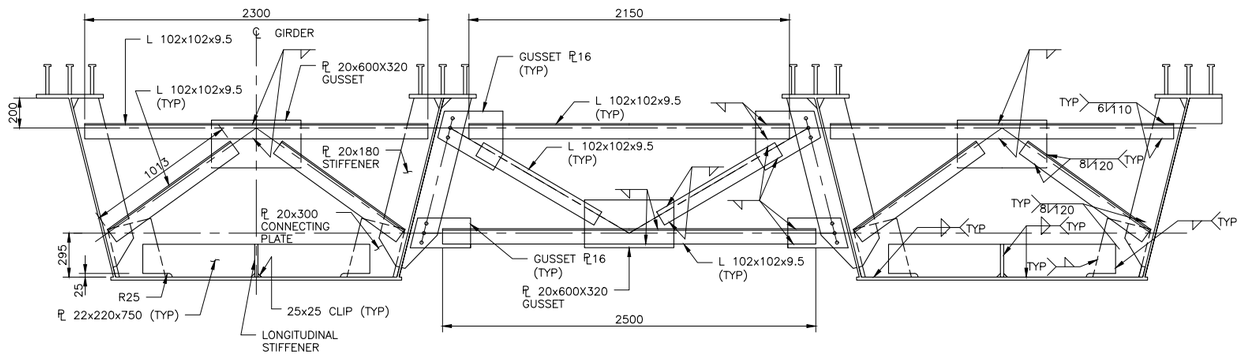
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Ontario Ministry of Transportation

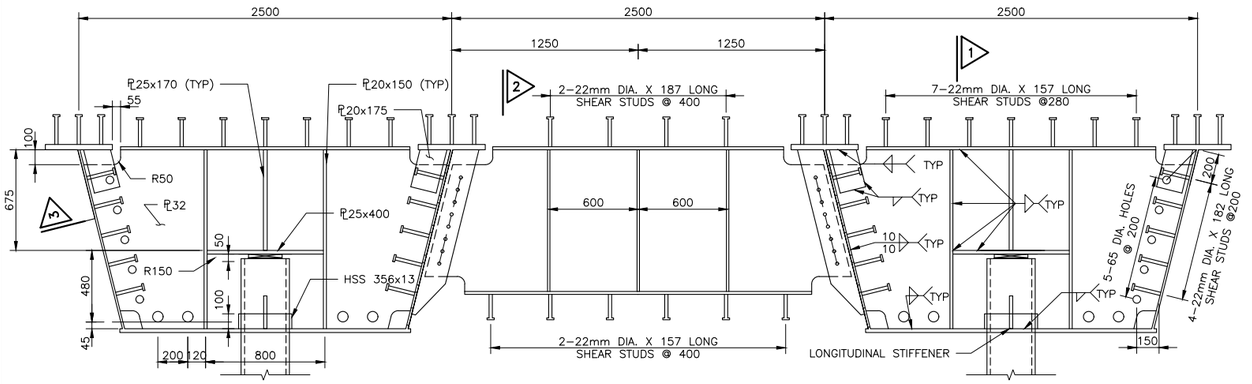
CONT 2025-4017
GWP 4248-15-00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
STRUCTURAL STEEL II

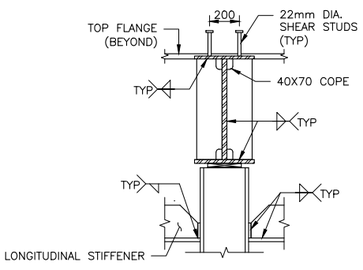
SHEET 50



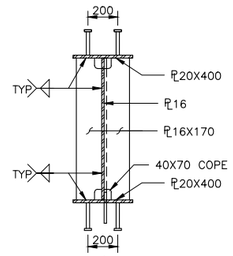
ABUTMENT DIAPHRAGM ELEVATION "A"
SCALE 1:20



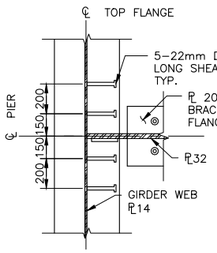
PIER DIAPHRAGM ELEVATION "C"
SCALE 1:20



1
SCALE 1:20



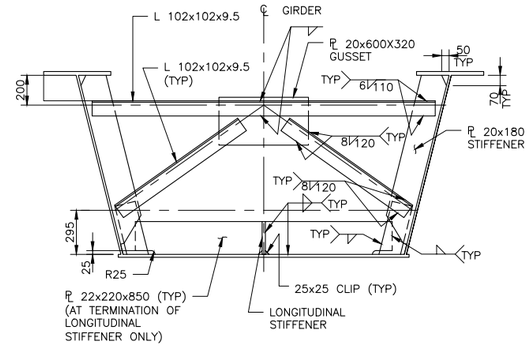
2
SCALE 1:20



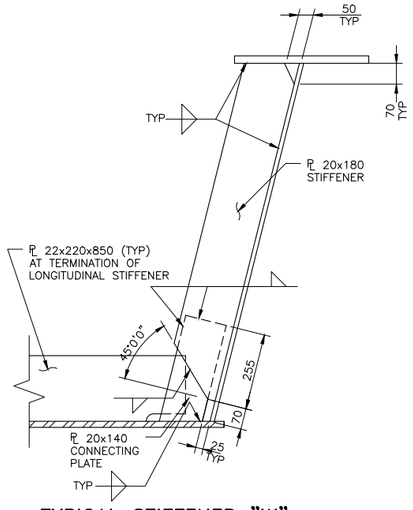
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SCALE 1:20

NOTES:
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS S9, S11, and S12

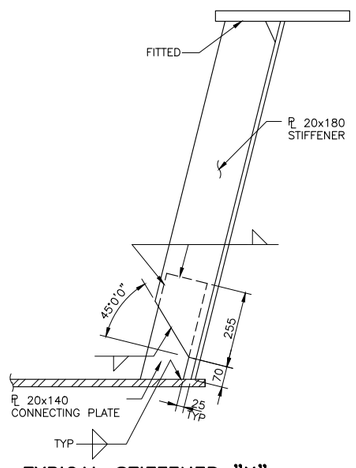
Preliminary



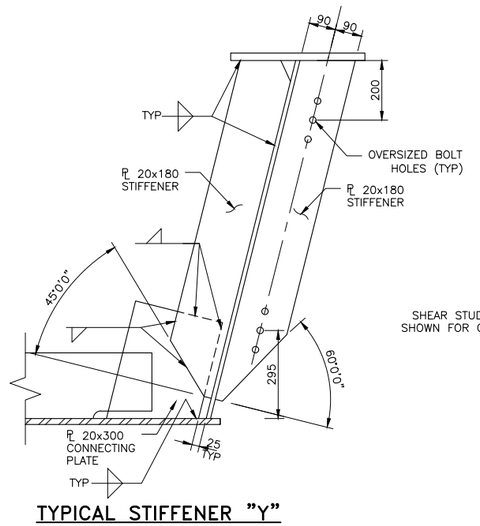
TYPICAL INTERMEDIATE K-FRAME "B"
SCALE 1:20



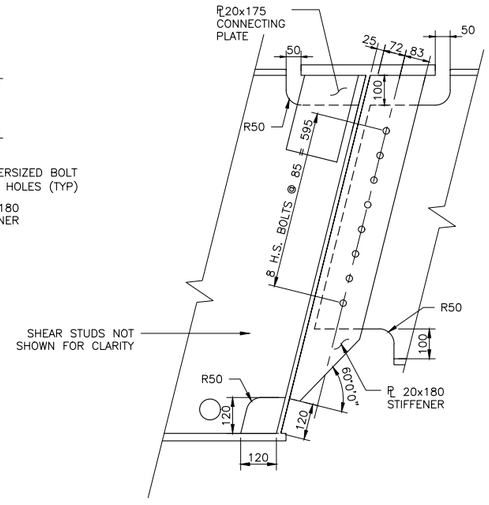
TYPICAL STIFFENER "W"
SCALE 1:10



TYPICAL STIFFENER "X"
SCALE 1:10



TYPICAL STIFFENER "Y"
SCALE 1:10



TYPICAL STIFFENER "Z"
SCALE 1:10

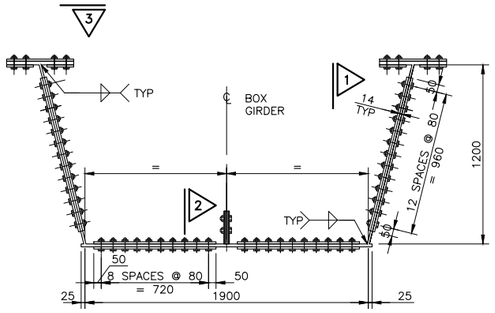
DRAFT

REVISIONS			
	DATE	BY	DESCRIPTION

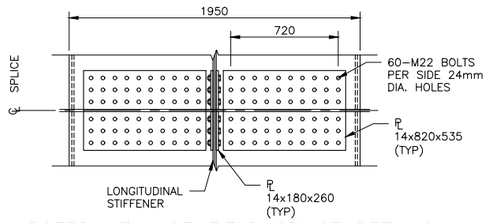
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DRAWN	TF	CHK	JW	SITE	31X-0230/B0			DWG	S12

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\STRUCTURAL STEEL II AND III - TREN_TDWG
MODIFIED: 2026-01-22 16:18
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

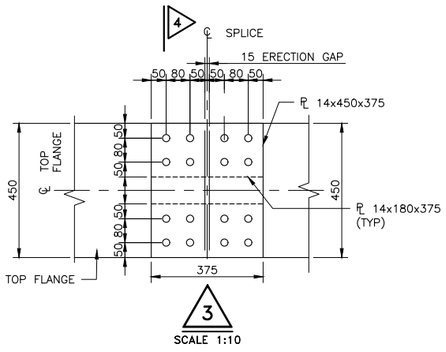
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05
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MODIFIED: 2026-01-22 16:18

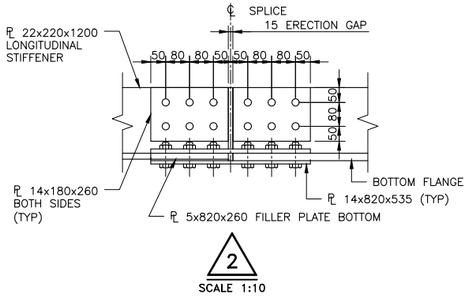


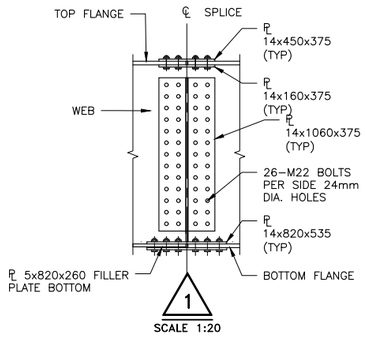
FIELD SPLICE ELEVATION
SCALE 1:20

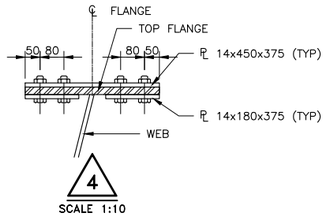


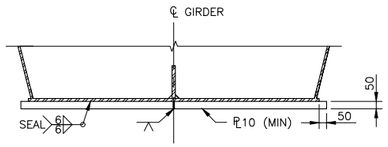
BOTTOM FLANGE FIELD SPLICE DETAILS
SCALE 1:20



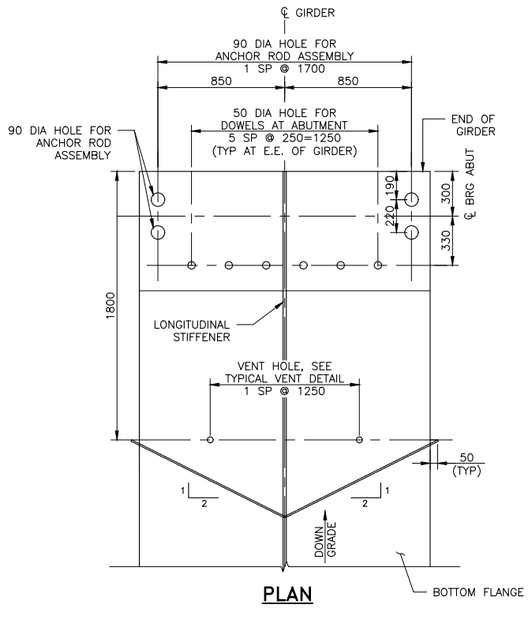






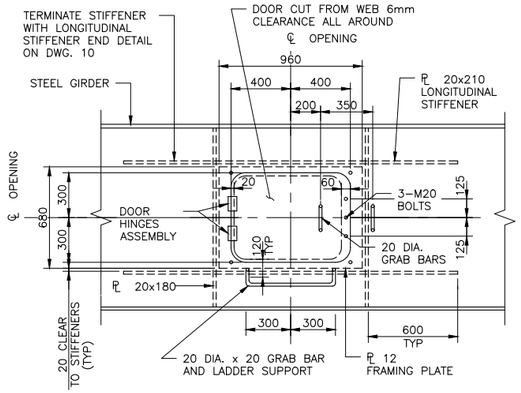


SECTION

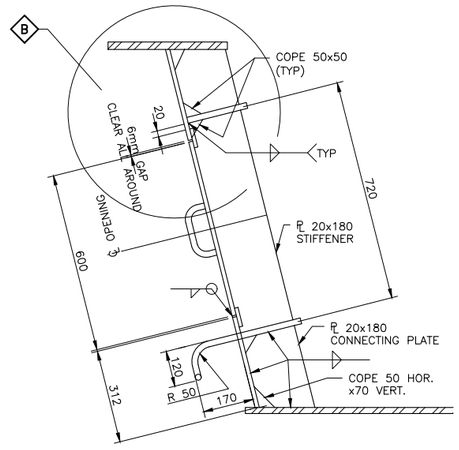


PLAN

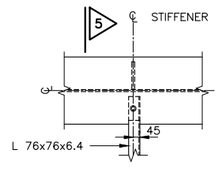
DRIP PLATE, VENT HOLES AND DOWEL HOLE LOCATION DETAILS
SCALE 1:20



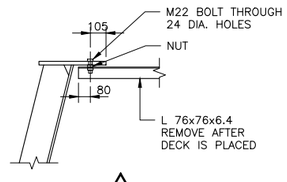
ACCESS HATCH ELEVATION
SCALE 1:20



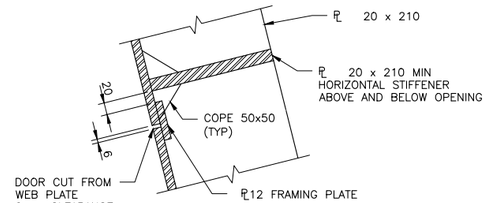
ACCESS HATCH SECTION
SCALE 1:10



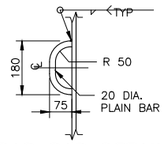
DETAIL
SCALE 1:20



SCALE 1:20



DETAIL
SCALE 1:5



GRAB BAR DETAIL
N.T.S.

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT	2025–4017
GWP	4248–15–00
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT	SHEET 51
STRUCTURAL STEEL III	

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS S9, S10, and S12

Preliminary

DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	

DESIGN	TF	CHK	JW	CODE	CSA–S6–19	LOAD	CL–625–ONT	DATE JAN 2026
DRAWN	TF	CHK	JW	SITE	31X–0230/B0		DWG	S13

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025–4017
GWP 4248–15–00

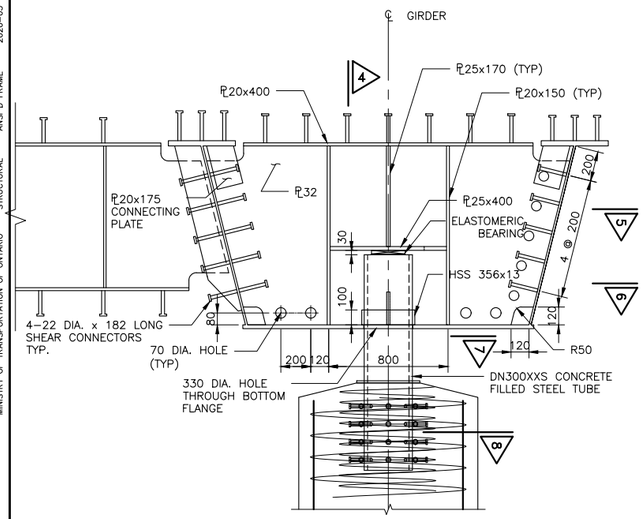
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
STRUCTURAL STEEL IV

SHEET 52

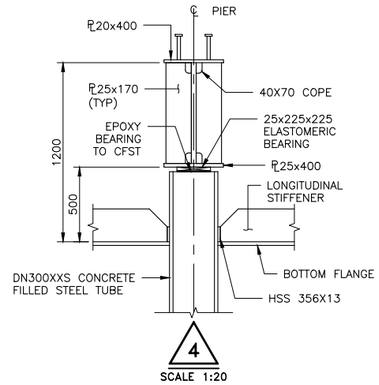
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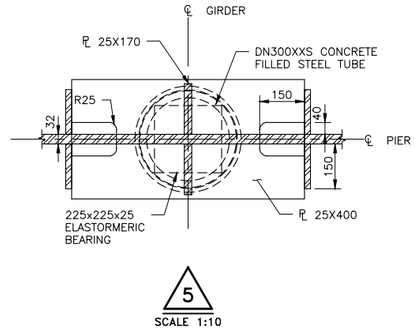
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS S9, S10, and S11

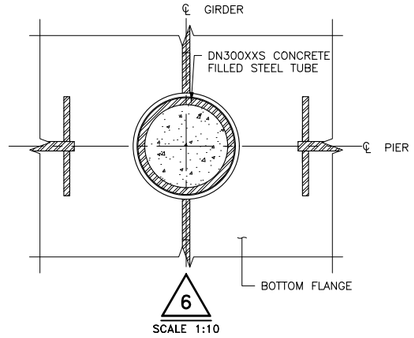
Preliminary

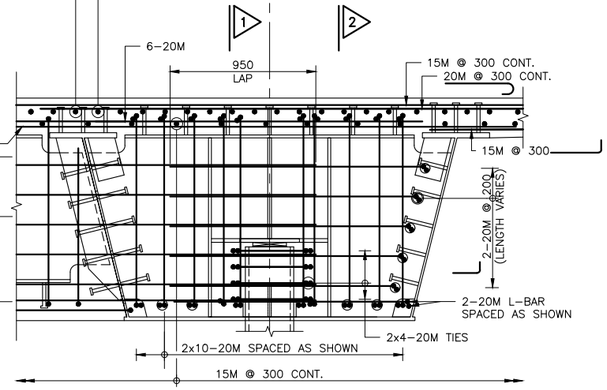


PIER DIAPHRAGM ELEVATION
SCALE 1:20

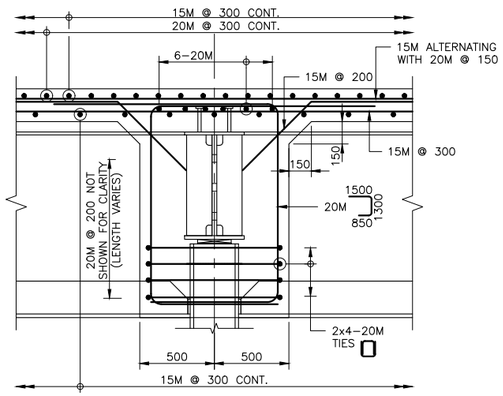


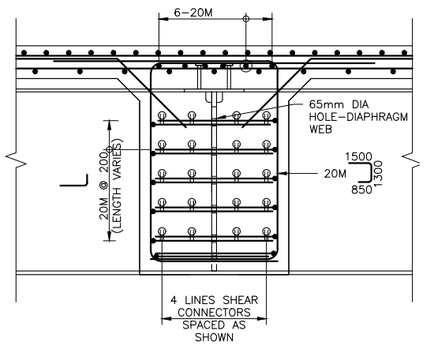


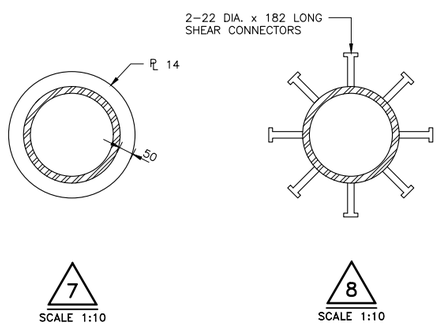


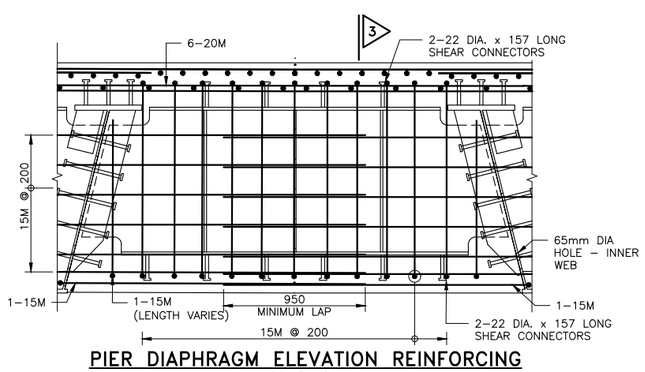


PIER ELEVATION REINFORCING
SCALE 1:20

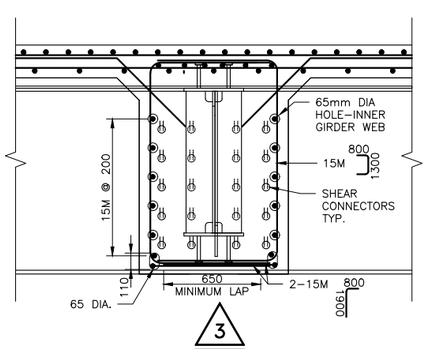








PIER DIAPHRAGM ELEVATION REINFORCING
SCALE 1:20



DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	

DESIGN	TF	CHK	JW	CODE	CSA–S6–19	LOAD	CL–625–ONT	DATE	JAN 2026
DRAWN	TF	CHK	JW	SITE	31X–0230/B0			DWG	S14

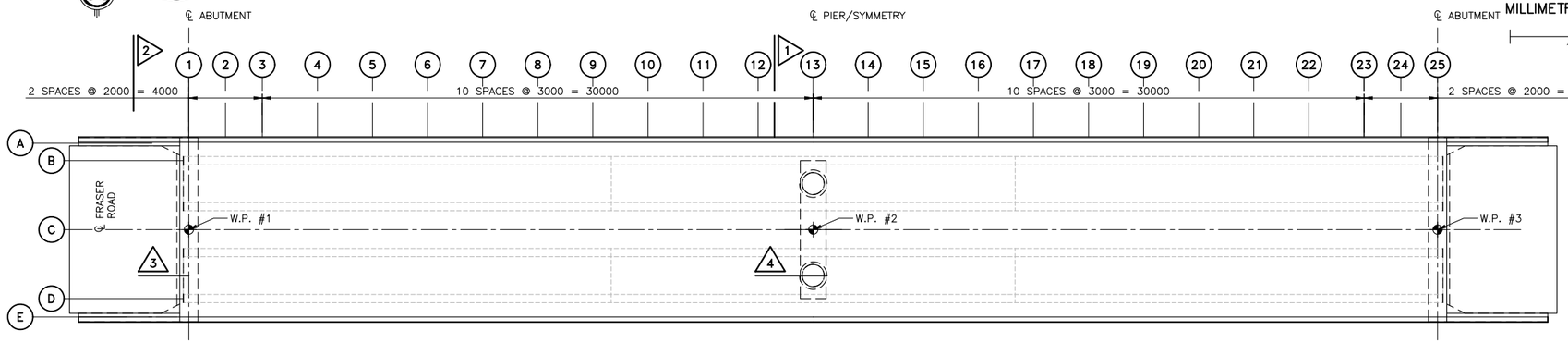
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MODIFIED: 2026–01–22 16:18

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020–05

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

FOR CONSTRUCTION

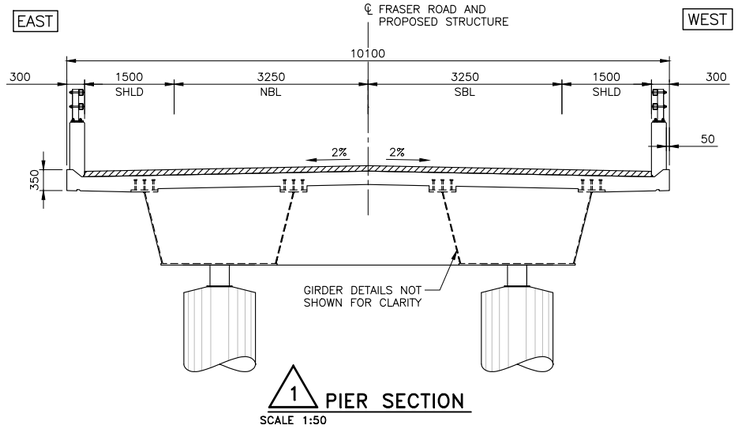
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DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING



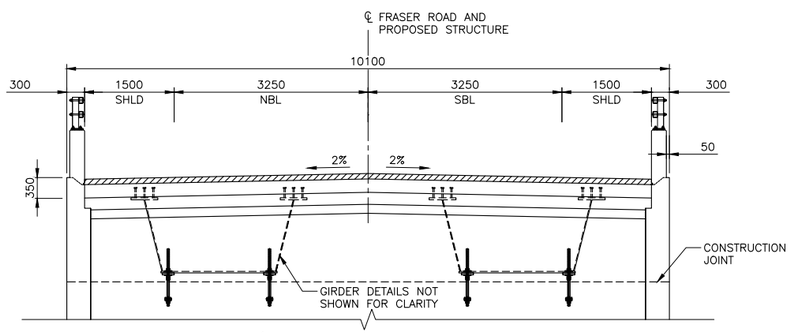
PLAN
SCALE 1:150

DECK SCREED ELEVATION

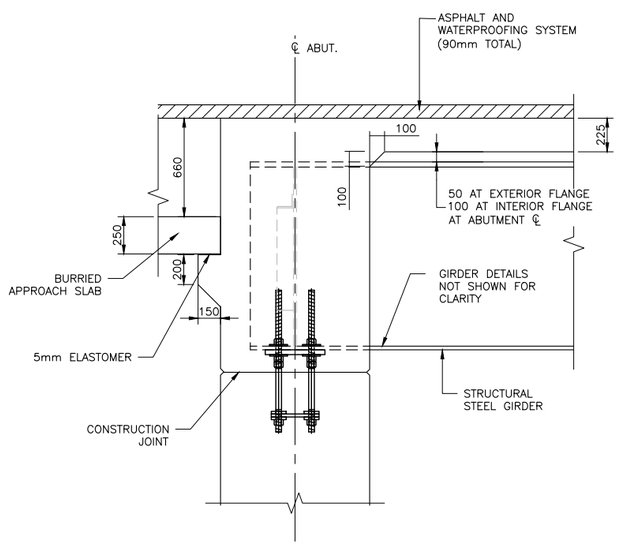
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	9+966	**9+968**	**9+970**	**9+973**	**9+976**	**9+979**	**9+982**	**9+985**	**9+988**	**9+991**	**9+994**	**9+997**	**10+000**	**10+003**	**10+006**	**10+009**	**10+012**	**10+015**	**10+018**	**10+021**	**10+024**	**10+027**	**10+030**	**10+032**	**10+034**
A	57.367	57.408	57.447	57.506	57.552	57.586	57.610	57.622	57.624	57.618	57.605	57.591	57.577	57.572	57.566	57.559	57.546	57.524	57.493	57.450	57.396	57.330	57.252	57.200	57.145
B	57.386	57.427	57.466	57.525	57.571	57.605	57.629	57.641	57.643	57.636	57.624	57.610	57.597	57.591	57.585	57.578	57.565	57.543	57.512	57.469	57.414	57.349	57.271	57.219	57.165
C	57.461	57.502	57.541	57.600	57.646	57.680	57.704	57.716	57.718	57.711	57.699	57.685	57.672	57.666	57.660	57.653	57.640	57.618	57.587	57.544	57.489	57.424	57.346	57.294	57.240
D	57.386	57.427	57.466	57.525	57.571	57.605	57.629	57.641	57.643	57.636	57.624	57.610	57.597	57.591	57.585	57.578	57.565	57.543	57.512	57.469	57.414	57.349	57.271	57.219	57.165
E	57.367	57.408	57.447	57.506	57.552	57.586	57.610	57.622	57.624	57.618	57.605	57.591	57.577	57.572	57.566	57.559	57.546	57.524	57.493	57.450	57.396	57.330	57.252	57.200	57.145



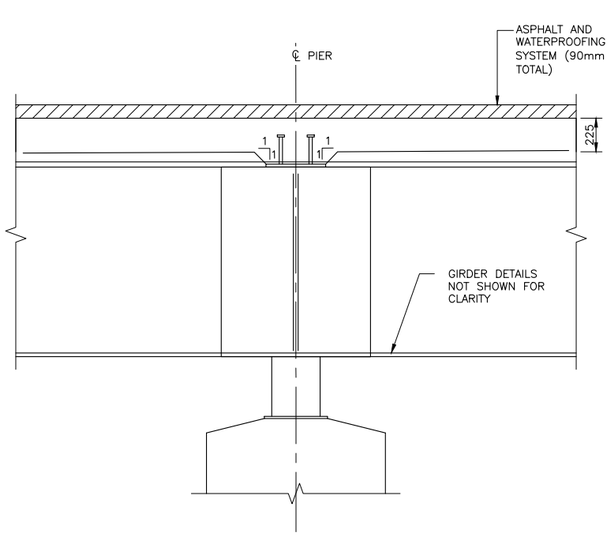
1 PIER SECTION
SCALE 1:50



2 ABUTMENT SECTION
SCALE 1:50



3 DIMENSIONS
SCALE 1:20



4
SCALE 1:20

DRAFT

Ontario Ministry of Transportation

CONT 2025-4017
GWP 4248-15-00

HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
DECK DETAILS

SHEET 53

NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. SCREED ELEVATIONS ARE TO TOP OF THE CONCRETE DECK.
3. SCREED ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR ROADWAY PROFILE, WEIGHT OF CAST-IN-PLACE PORTION OF DECK SLAB AND SUPER-IMPOSED DEAD LOAD.
4. CONCRETE IN DECK SLABS SHALL BE RETARDED USING TYPE "B" OR "D" ADMIXTURE TO ENSURE THAT THE CONCRETE REMAINS PLASTIC FOR THE DURATION OF THE DECK PLACEMENT.
5. TOP PORTION OF INTEGRAL ABUTMENT ABOVE CONSTRUCTION JOINT INCLUDING WINGWALLS, SHALL BE PLACED TOGETHER WITH THE DECK.
6. CONCRETE OF INTEGRAL PIER DIAPHRAGM SHALL BE PLACED TOGETHER WITH THE DECK.

Preliminary

APPLICABLE STANDARD DRAWINGS

OPSD 3329.100 DECK REINFORCMENT SUPPORTS FOR REINFORCING STEEL FOR SLAB DEPTH 300m OR LESS

OPSD 3390.100 DECK DRIP CHANNEL

REVISIONS			
	DATE	BY	DESCRIPTION

DESIGN	TF	CHK	JW	CODE	CSA-S6-19	LOAD	CL-625-ONT	DATE	JAN 2026
DRAWN	ND	CHK	TF	SITE	31X-0230/B0			DWG	S15

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\DECK DETAILS.DWG
MODIFIED: 2026-01-22 16:18

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

CONSTRUCTION NORTH

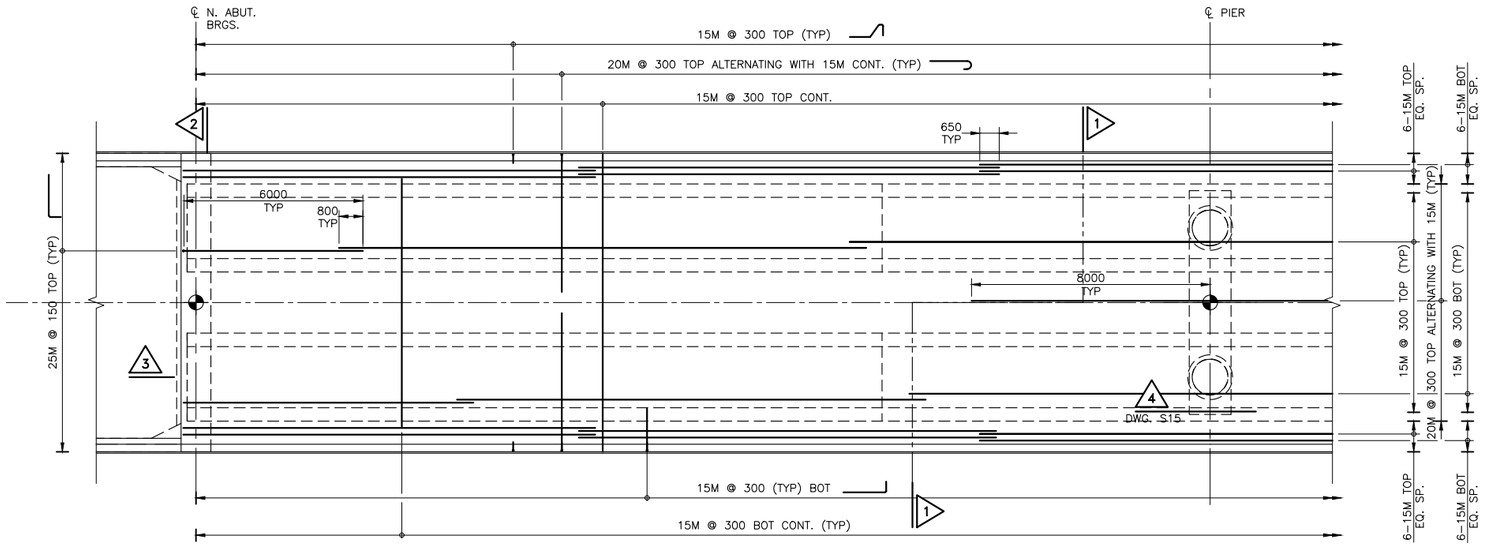
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025-4017
GWP 4248-15-00

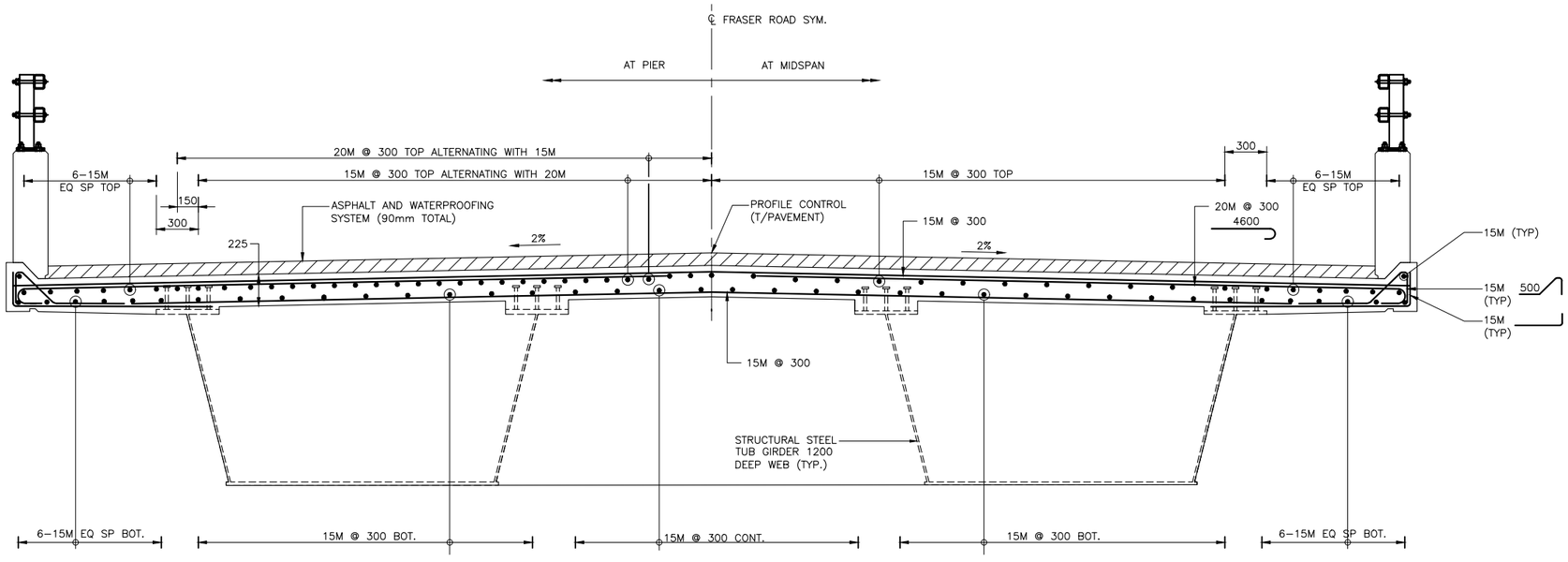
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
DECK REINFORCEMENT I

SHEET 54



PLAN
SCALE 1:100

NOTE: REINFORCEMENT SYMMETRICAL ABOUT WP #2



1
SCALE 1:20

NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS S13 AND S15.

Preliminary

DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN TF	CHK JW	CODE CSA-S6-19	LOAD CL-625-ONT DATE JAN 2026
DRAWN TF	CHK JW	SITE 31X-0230/B0	DWG S16

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\DECK REINFORCEMENT I.DWG
MODIFIED: 2026-01-22 16:18

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025–4017
GWP 4248–15–00

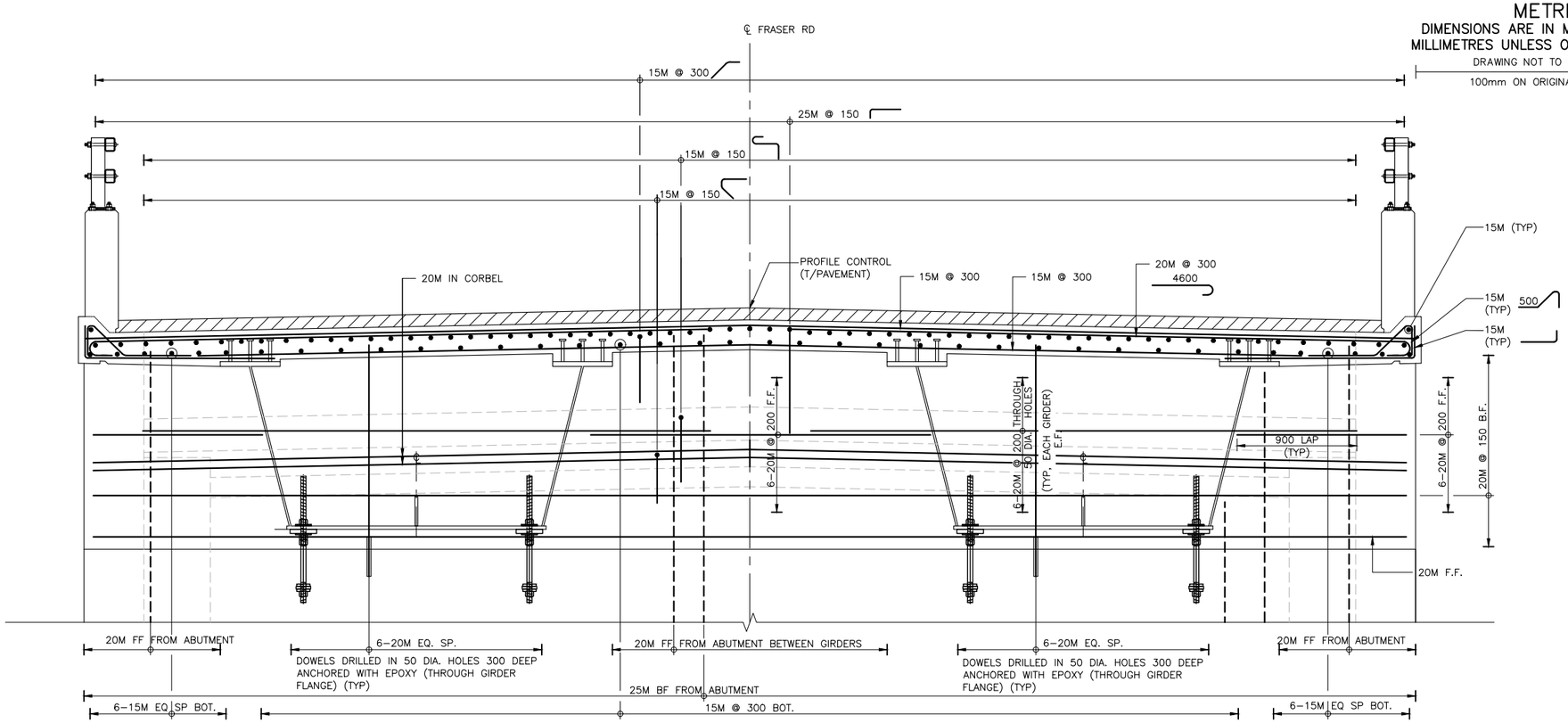
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
DECK REINFORCEMENT II

SHEET 55

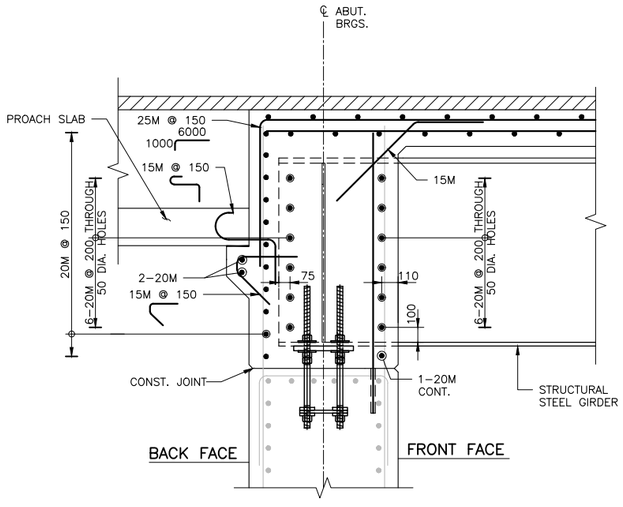
NOTES:

1. REFER TO GENERAL NOTES ON DWG. S1.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS S13 AND S14.

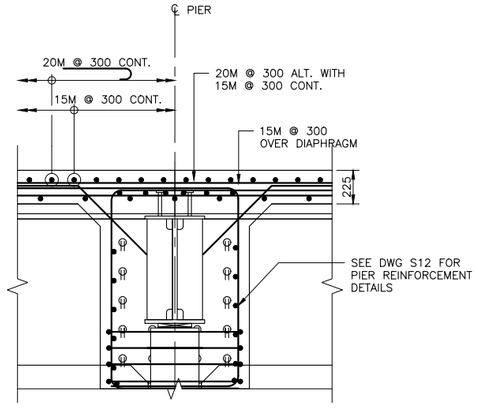
Preliminary



2
SCALE 1:20



3
SCALE 1:20



4
SCALE 1:20

DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN TF	CHK JW	CODE CSA–S6–19	LOAD CL–625–ONT DATE JAN 2026
DRAWN TF	CHK JW	SITE 31X–0230/B0	DWG S17

FILE NAME: C:\USERS\FLOCKTR\ONEDRIVE – GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT – 90% SHEETSET\DECK REINFORCEMENT II.DWG
MODIFIED: 2026-01-22 16:18

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

STRUCTURAL ANSI D FRAME 2020-05
MINISTRY OF TRANSPORTATION OF ONTARIO
FILE NAME: C:\USERS\TLOCKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\OPTION A - PARAPET WALL SS.DWG
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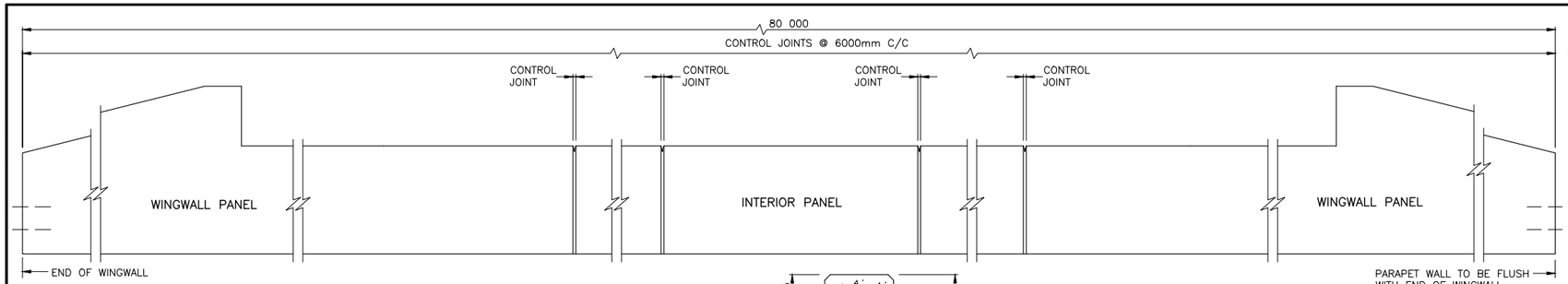
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

Ontario Ministry of Transportation

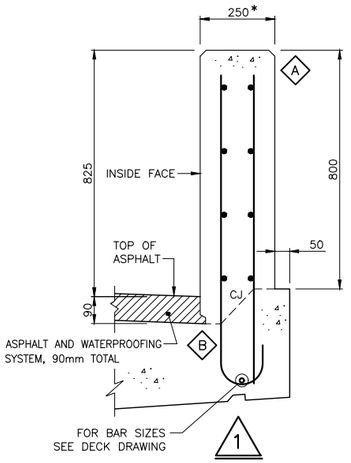
CONT	2025-4017
GWP	4248-15-00

PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4
OPTION A
(STAINLESS STEEL REBAR)

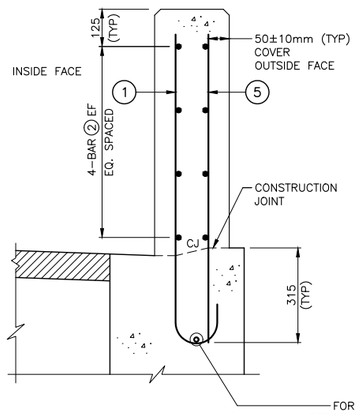
SHEET 56

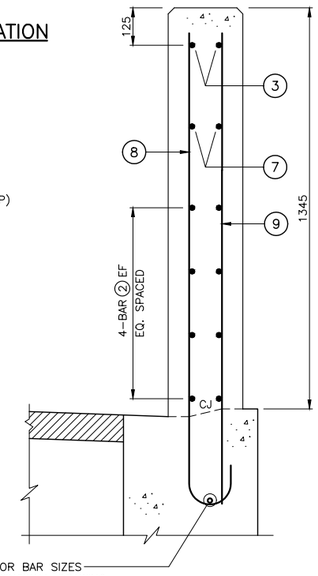


ELEVATION

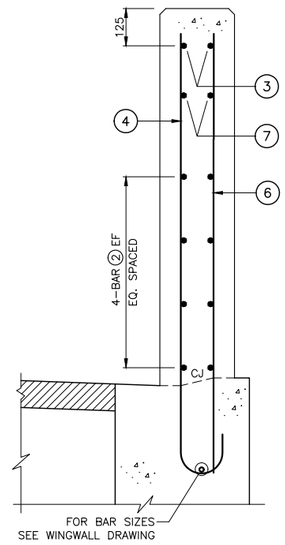


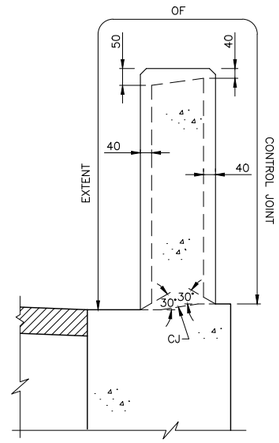
CONCRETE PARAPET ON DECK
TYPICAL DIMENSIONS
(FOR BAR NUMBERS SEE 2)



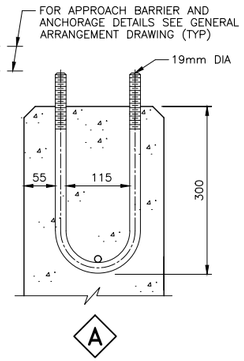


CONCRETE PARAPET ON WINGWALL
TYPICAL REINFORCEMENT





EXTENT OF CONTROL JOINT IN PARAPET WALL



POST ANCHORAGE DETAIL
(SEE S110-85)

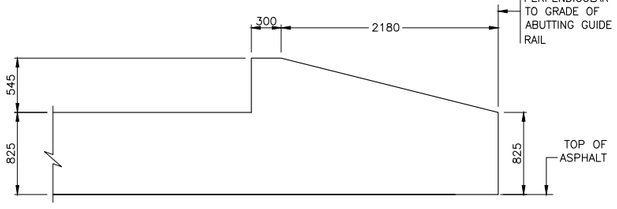
NOTES:

1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
3. CONCRETE COVER TO REINFORCING STEEL 60 ±10mm EXCEPT AS NOTED.
4. REINFORCING STEEL SHALL BE STAINLESS TYPE 316LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPa.
5. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
6. MINIMUM BAR LAP SPLICE TO BE 550mm UNLESS OTHERWISE SHOWN.
7. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
8. CONTROL JOINT TO BE FORMED.
9. SAWCUTS NOT PERMITTED.
10. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
11. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
12. LEGEND: EF – DENOTES EACH FACE
IF – DENOTES INSIDE FACE
OF – DENOTES OUTSIDE FACE
CJ – CONSTRUCTION JOINT

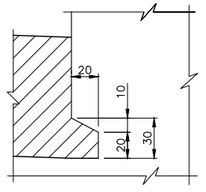
BAR MARK	SIZE	SHAPE
1	S15M	65, 130, 990
2	S15M	STRAIGHT
3	S15M	2190, 530, 230
4	S15M	65, 130, VARIES
5	S10M	STRAIGHT
6	S10M	STRAIGHT LENGTH VARIES
7	S15M	STRAIGHT
8	S15M	65, 130, 1535
9	S10M	STRAIGHT

DRAFT

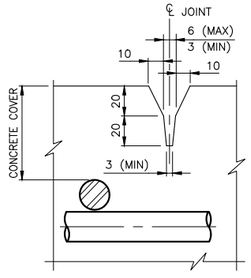
Preliminary



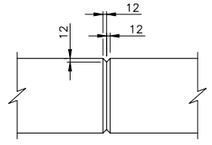
ELEVATION OF PARAPET ON WINGWALL



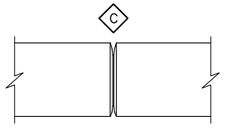
B CHASE DETAIL



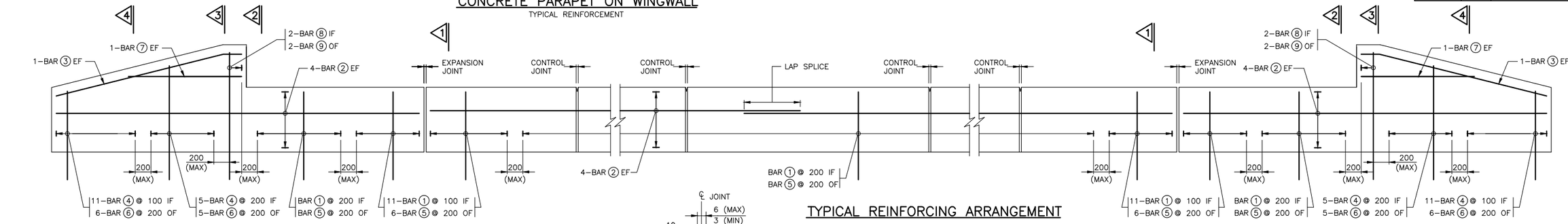
C CONTROL JOINT DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



TYPICAL CONTROL JOINT



TYPICAL REINFORCING ARRANGEMENT

APPLICABLE STANDARD DRAWINGS:

SS110-85 RAILING ON PARAPET/BARRIER FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4

STANDARD DRAWING SEPTEMBER 2016	SS110-82
PARAPET WALL FOR COMBINATION TRAFFIC/ BICYCLE RAIL, TL-4 (STAINLESS STEEL REBAR)	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
DATE	BY	DESCRIPTION

DESIGN	TF	CHK	JW	CODE	CSA-S6-19	LOAD	CL-625-ONT
DRAWN	TF	CHK	JW	SITE	31X-0230/B0	DATE	JAN 2026
						DWG	S18

STRUCTURAL ANSI D FRAME 2020-05
MINISTRY OF TRANSPORTATION OF ONTARIO

FILE NAME: C:\USERS\TLUCKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\OPTION B - PARAPET WALL GFRP.DWG
MODIFIED: 2026-01-22 16:18

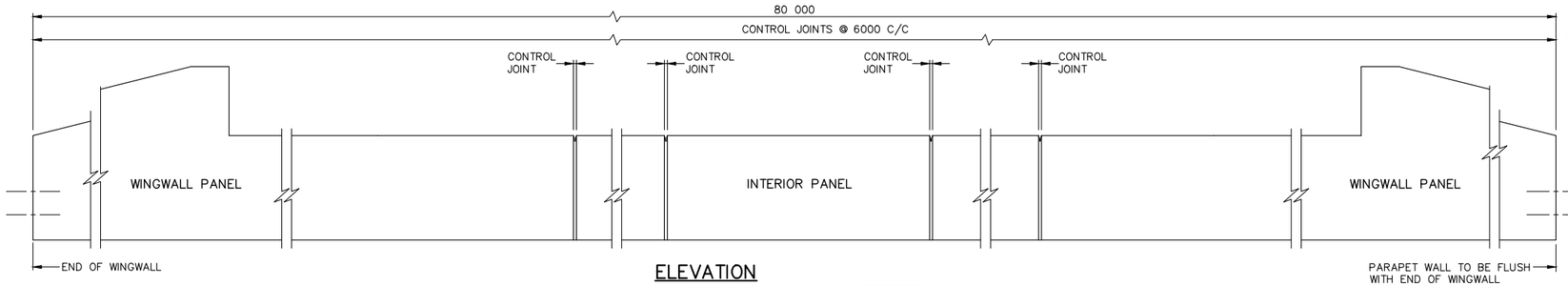
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025-4017
GWP 4248-15-00

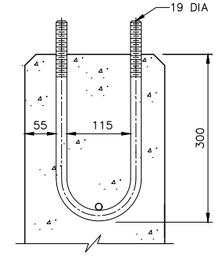
PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4
OPTION B
(GFRP GRADE III REBAR)

SHEET 57



ELEVATION

FOR APPROACH BARRIER AND ANCHORAGE DETAILS SEE GENERAL ARRANGEMENT DRAWING (TYP)



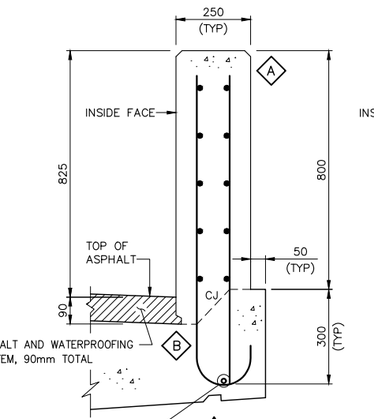
A
POST ANCHORAGE DETAIL
(SEE DWG SS110-85)

NOTES:
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING 60±10mm EXCEPT AS NOTED.
3. REINFORCING SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE III. SIZE IN THE BAR SCHEDULE INDICATES DESIGNATED BAR DIAMETER AND SHALL HAVE A CROSS SECTIONAL AREA ACCORDING TO CSA S-807.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
12. THIS STANDARD DRAWING MAY BE SUBSTITUTED WITH STANDARD DRAWING SS110-84.
13. LEGEND:
EF - DENOTES EACH FACE OF - DENOTES OUTSIDE FACE
IF - DENOTES INSIDE FACE CJ - CONSTRUCTION JOINT

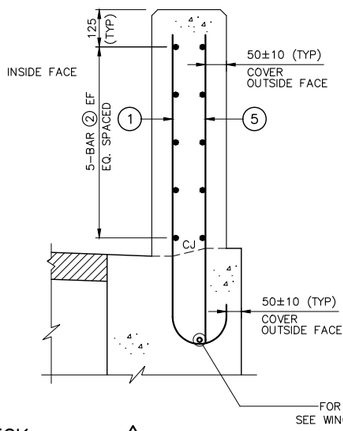
Preliminary

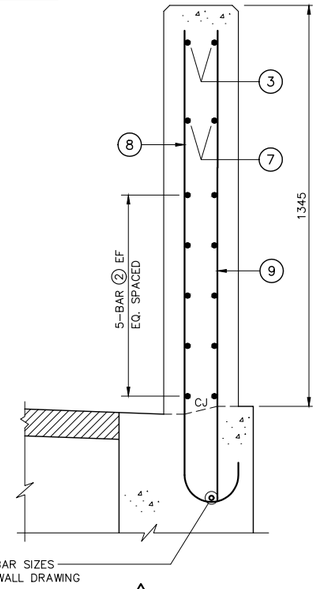
DRAFT

BAR MARK	SIZE	SHAPE
1	G20	190, 80, 945
2	G15	STRAIGHT
3	G15	240, 2185, 530
4	G20	190, 80, VARIES
5	G15	STRAIGHT
6	G15	STRAIGHT LENGTH VARIES
7	G15	STRAIGHT
8	G20	190, 80, 1490
9	G15	STRAIGHT

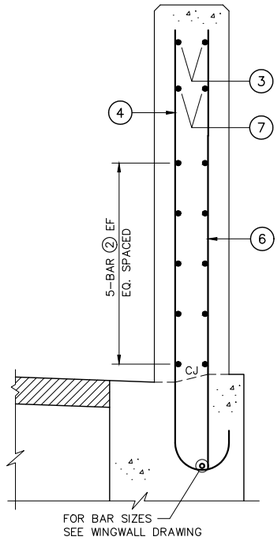


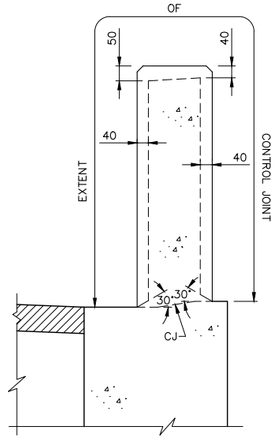
CONCRETE PARAPET ON DECK
TYPICAL DIMENSIONS
(FOR BAR NUMBERS SEE 2)



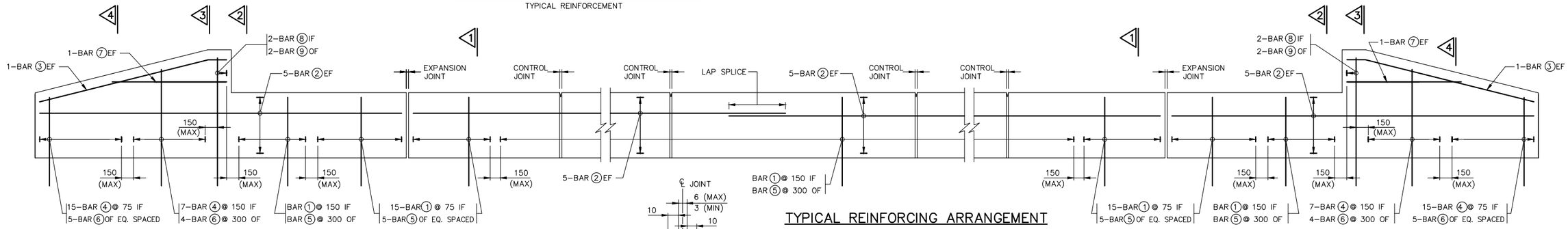


CONCRETE PARAPET ON WINGWALL
TYPICAL REINFORCEMENT

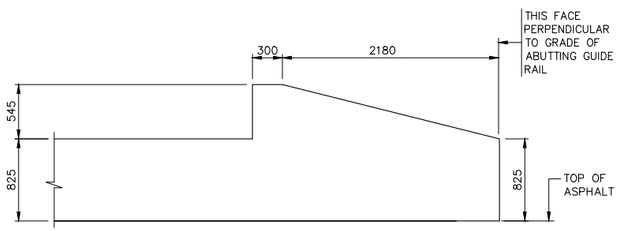




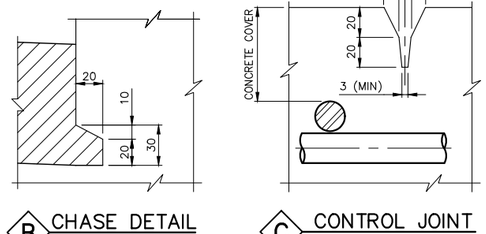
EXTENT OF CONTROL JOINT IN PARAPET WALL



TYPICAL REINFORCING ARRANGEMENT

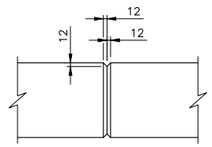


ELEVATION OF PARAPET ON WINGWALL

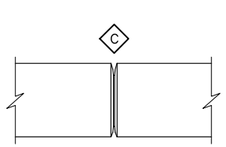


CHASE DETAIL

CONTROL JOINT DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



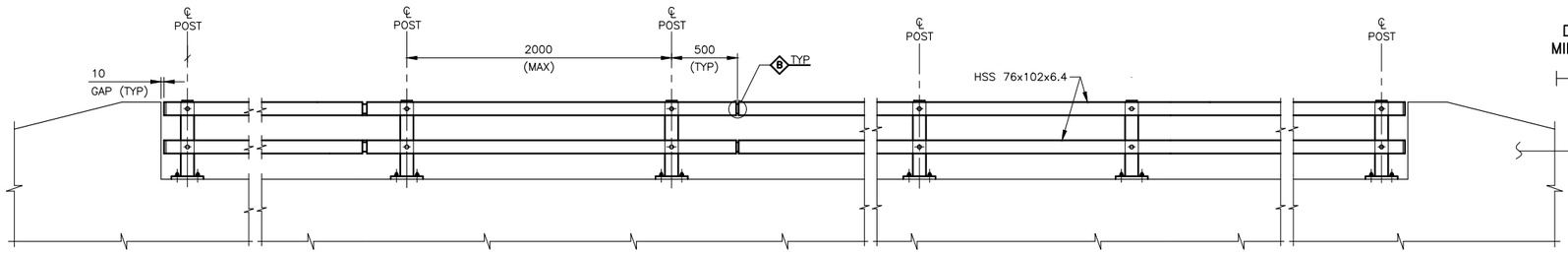
TYPICAL CONTROL JOINT

APPLICABLE STANDARD DRAWINGS:

SS110-85 RAILING ON PARAPET/BARRIER FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4

STANDARD DRAWING FEBRUARY 2021	SS110-83
PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4 (GFRP GRADE III REBAR)	

REVISIONS			
DATE	BY	DESCRIPTION	
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DRAWN TF	CHK JW	SITE 31X-0230/BO	DWG S19



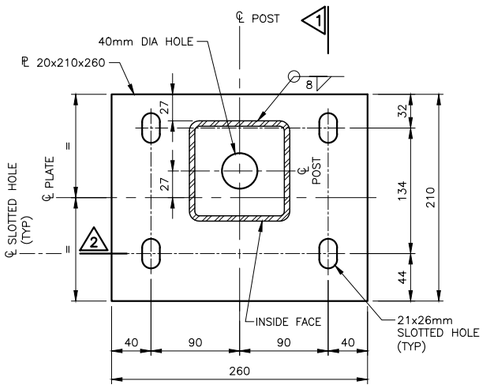
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

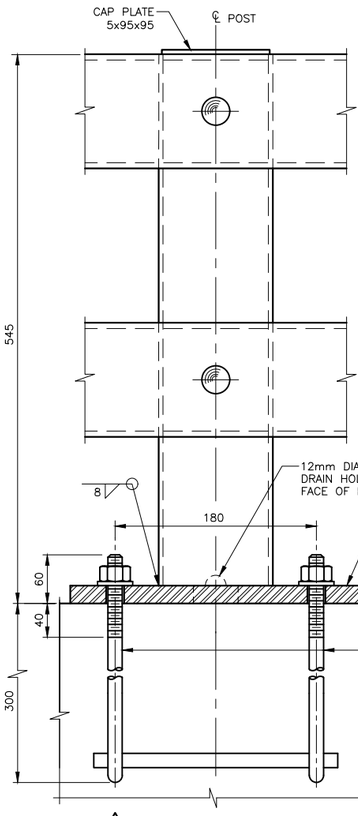
CONT	2025–4017
GWP	4248–15–00

RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL–4

SHEET 58

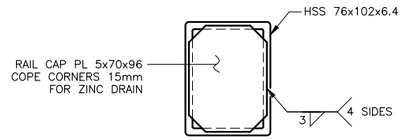


BASE PLATE

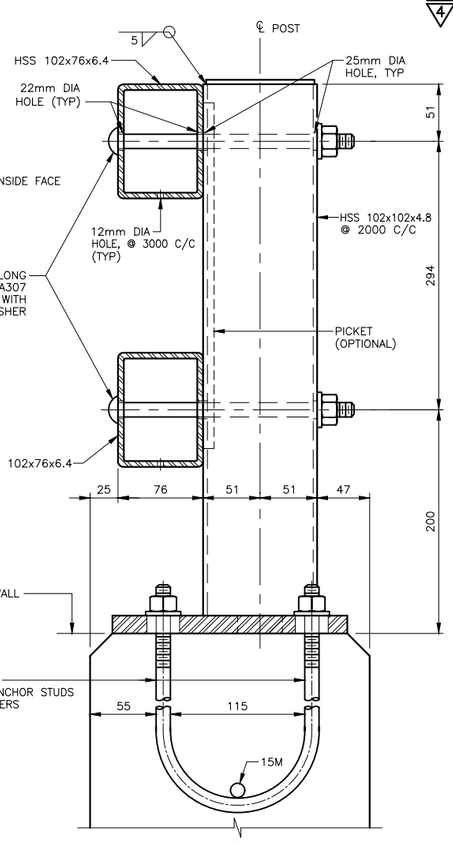


2 FRONT ELEVATION

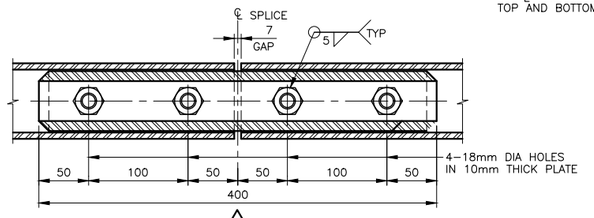
ELEVATION
(INSIDE FACE SHOWN)



6 RAIL CAP

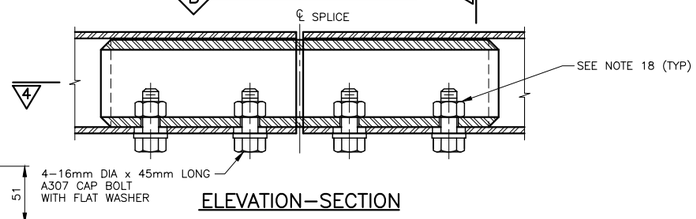


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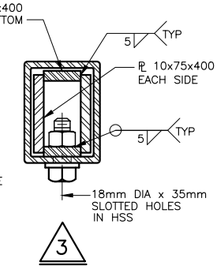


4

B RAIL SPLICE DETAIL 3



ELEVATION–SECTION



3

NOTES:

1. THIS STANDARD TO BE READ IN CONJUNCTION WITH SS110–__.
2. RAIL ELEMENTS AND POSTS SHALL BE HOLLOW STRUCTURAL SECTIONS GRADE 350W, CLASS C.
3. STEEL PLATES SHALL BE GRADE 350W.
4. ANCHOR STUDS, WASHERS AND NUTS SHALL BE ACCORDING TO ASTM A449.
5. BOLTS, WASHERS AND NUTS FOR FASTENING GUIDE RAILS TO POST SHALL CONFORM TO ASTM A307.
6. RAIL SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH SHALL BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
7. GALVANIZING ON MATING SURFACES OF RAILS TO HAVE UNIFORM THICKNESS NOT EXCEEDING 0.15 mm TO ENSURE SLIDING FIT.
8. RAIL, POSTS AND RAIL SPLICES SHALL BE HOT DIP GALVANIZED. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION.
9. BOLTS, ANCHOR STUDS, PLATES, WASHERS AND NUTS SHALL BE HOT DIP GALVANIZED. LOCKNUTS SHALL BE ZINC PLATED ACCORDING TO ASTM–B695.
10. RAILS SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150 METRES.
11. RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
12. RAIL MAY BE CUT AS REQUIRED IN FIELD. CUT TO BE SURFACE TREATED WITH A ZINC TOUCH–UP SOLDER, GALVAGUARD OR APPROVED EQUIVALENT.
13. WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
14. GROUT SHALL NOT BE USED UNDER BASE PLATES. THIN PAD OF OF EPOXY GROUT MAY BE USED WHEN REQUIRED FOR FILLING THE VOIDS UNDER THE BASE PLATE.
15. BOLTS IN RAIL SPLICES SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
16. HOLES FOR HSS RAILING SHALL BE DRILLED IN FIELD
17. POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT CONDITION AND GIVEN AN ADDITIONAL 1/3 OF A TURN
18. PRIOR TO ASSEMBLY, APPLY LOCTITE 242, OR APPROVED EQUIVALENT THREAD–LOCKING FLUID, TO THE BOLT THREADS AT THE NUT ENGAGEMENT AREA, PER MANUFACTURER'S SPECIFICATION.

Preliminary

STANDARD DRAWING AUGUST 2019	SS110–85
RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL–4	

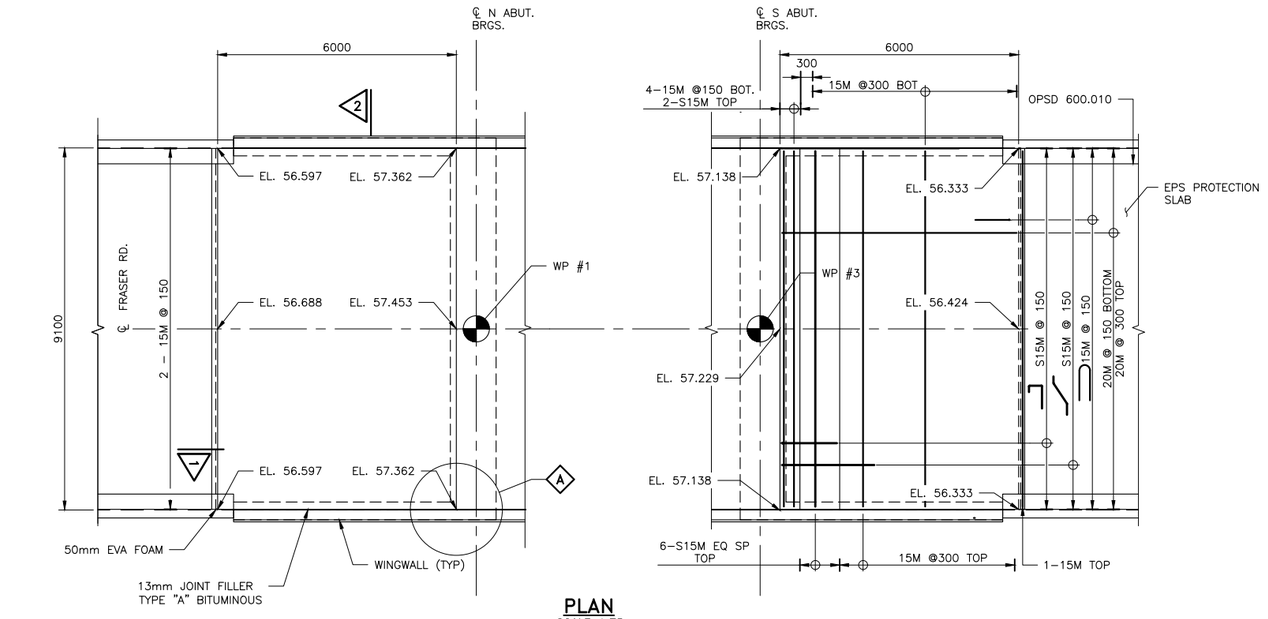
REVISIONS			
DATE	BY	DESCRIPTION	

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MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

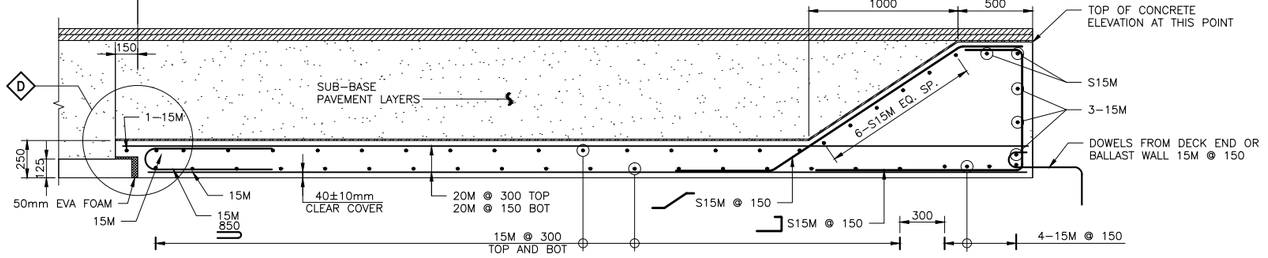
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MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05
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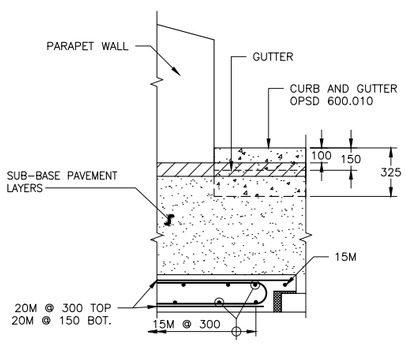


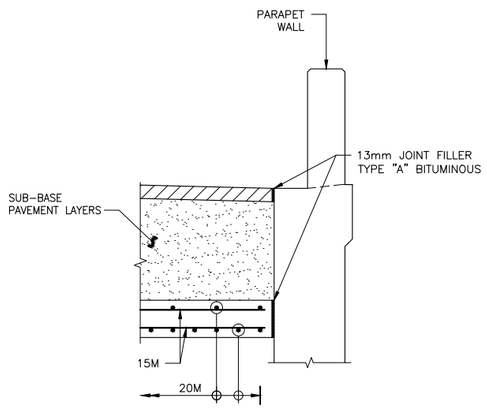
PLAN
SCALE 1:75

NOTE: REINFORCING STEEL SIMILAR AT BOTH APPROACH SLABS

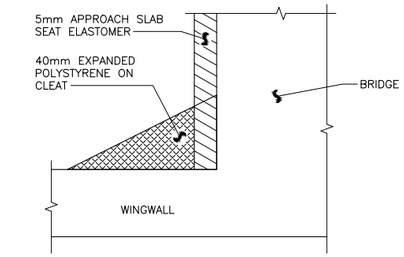


LONGITUDINAL SECTION
SCALE 1:20

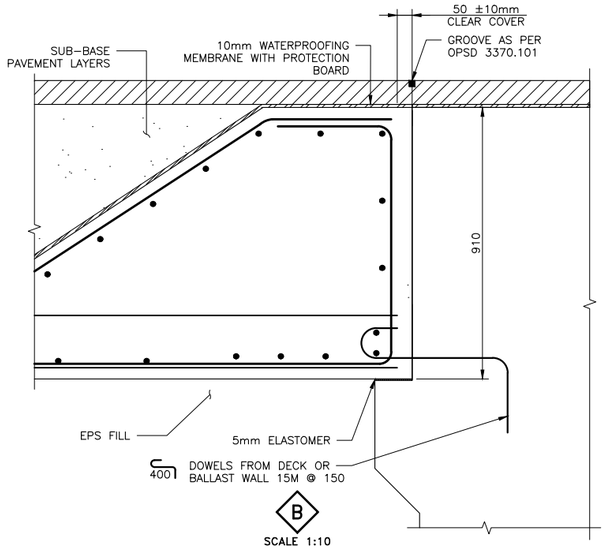




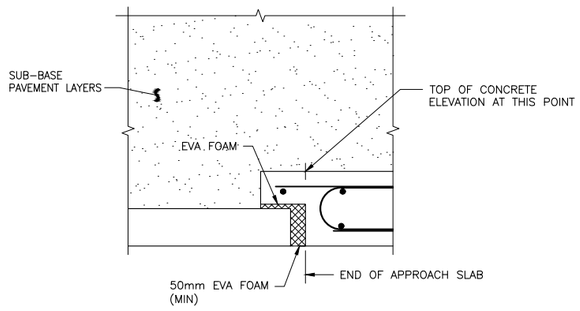
2 SECTION BESIDE WINGWALL
SCALE 1:20



A DETAIL AT CLEAT
SCALE 1:20



B
SCALE 1:10



D END OF APPROACH SLAB WITH INTEGRAL/SEMI–INTEGRAL
SCALE 1:10

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation

CONT 2025–4017
GWP 4248–15–00

HIGHWAY 401 FRASER ROAD UNDERPASS REPLACEMENT

BURIED APPROACH SLAB

SHEET 59

NOTES:

1. CLEAR COVER TO REINFORCING STEEL 70±20mm EXCEPT AS NOTED.
2. REINFORCING STEEL SHALL BE GRADE 500W UNLESS SHOWN OTHERWISE ON GENERAL ARRANGEMENT.
3. STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa.
4. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD 3370.100.
5. DIMENSION "A" SHALL BE 50mm FOR TRANSITION BETWEEN SIDEWALK OR CURB ON BRIDGE TO CURB AND GUTTER AT APPROACH AND 105mm FOR TRANSITION FROM CONCRETE SAFETY–SHAPE BARRIER ON BRIDGE TO STEEL BEAM GUIDE RAIL AT APPROACHES.

APPLICABLE STANDARD DRAWINGS:

OPSD 3370.100	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD.
OPSD 3370.101	DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS.

Preliminary

MODIFIED

STANDARD DRAWING JANUARY 2025	SS105–15
6000mm APPROACH SLAB	

REVISIONS			
DATE	BY	DESCRIPTION	

DESIGN	TF	CHK	JW	CODE CHBDC S6–19	LOAD CL–625–ONT	DATE	JAN 2026
DRAWN	ND	CHK	TF	SITE 31X–0230/B0		DWG	S21

SHEET NUMBER

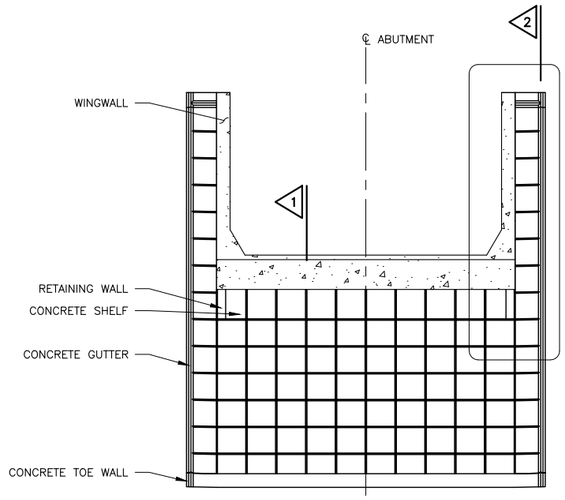
MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE - GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT - 90% SHEETSET\DETAILS OF CONCRETE SLOPE PAVING.DWG
MODIFIED: 2026-01-26 14:14

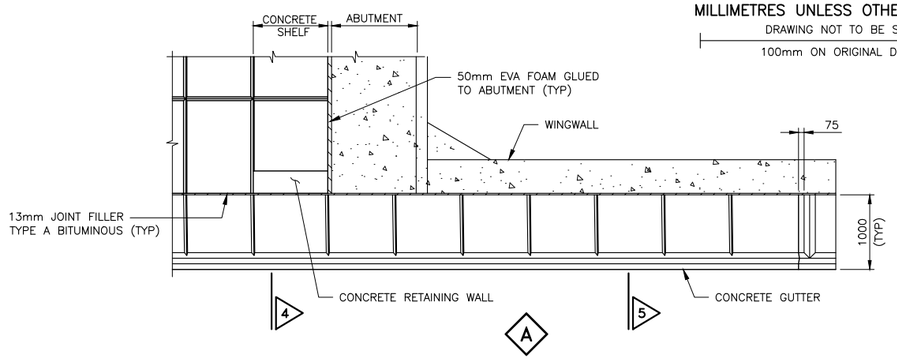
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

Ontario Ministry of Transportation	
CONT	2025-4017
GWP	4248-15-00
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT DETAILS OF CONCRETE SLOPE PAVING	SHEET 60

Preliminary

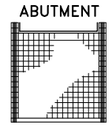


SLOPE PAVING PLAN

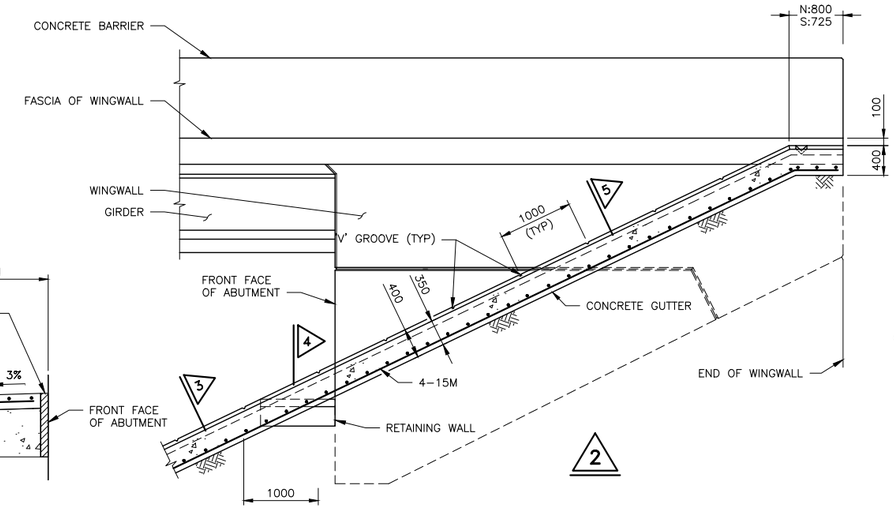


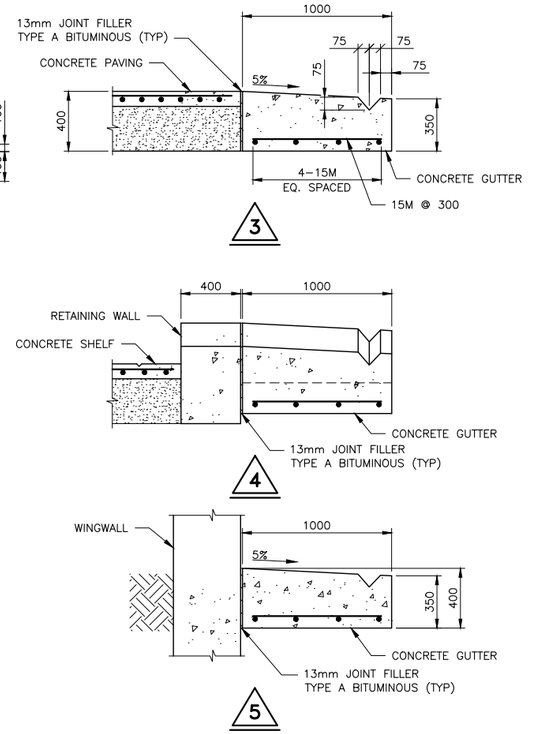
NOTES:

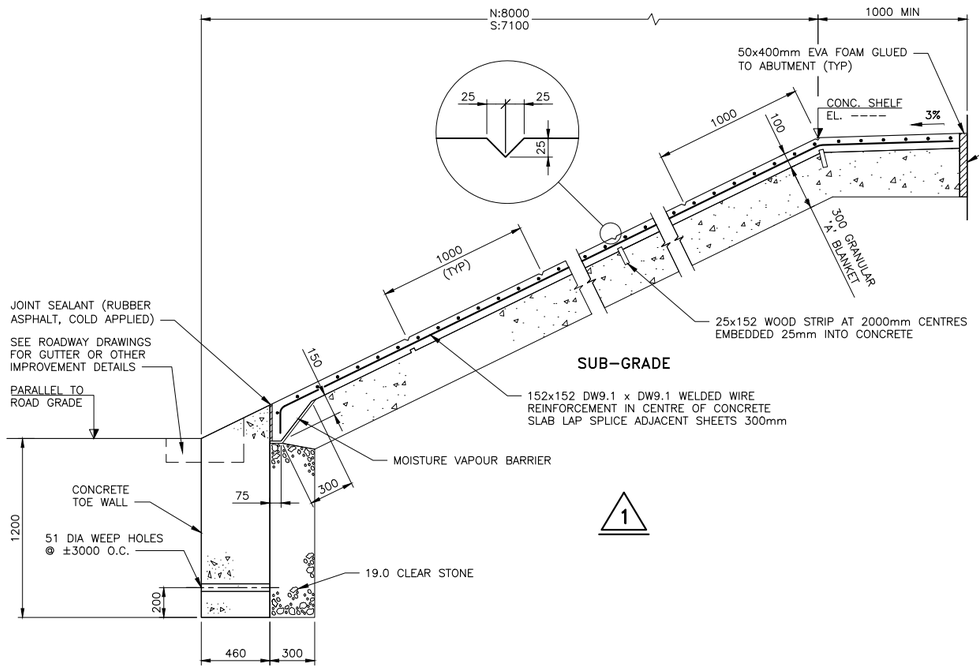
1. SECTIONS AND DETAILS TYPICAL FOR ALL LAYOUTS.
2. FOR BRIDGES WITH SKEW EXCEEDING 45°, 'V' GROOVES SHALL BE PROVIDED AT 2000mm O.C. OVER WOOD FRAME STRIPS ONLY.



SLOPE PAVING LAYOUT







DRAFT

STANDARD DRAWING AUGUST 2023	SS105-23
DETAILS OF CONCRETE SLOPE PAVING	

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN	TF	CHK	JW	CODE	CHBDC S6-19	LOAD	CL-625-ONT	DATE	JAN 2026
DRAWN	TF	CHK	JW	SITE	31X-0230-B0			DWG	S22

MINISTRY OF TRANSPORTATION OF ONTARIO STRUCTURAL ANSI D FRAME 2020-05

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN
DRAWING NOT TO BE SCALED
100mm ON ORIGINAL DRAWING

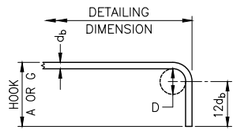
Ontario Ministry of Transportation

CONT 2025–4017
GWP 4248–15–00

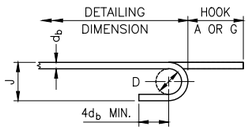
HWY 401 FRASER ROAD UNDERPASS REPLACEMENT
STANDARD DETAILS

SHEET 61

Preliminary



STANDARD 90° HOOK



STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	400W OR 500W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.
(2) For stainless steel, with Fy = 500, the same D as for 400R.

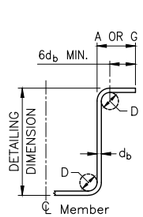
STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W OR 500W	400R	400W OR 500W	400R	400W OR 500W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

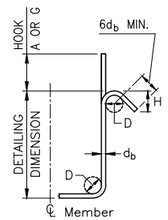
NOTE: All Hook Dimensions are according to the CHBDC–2019.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b(mm)	PIN DIAM. D(mm)	90°	135°	
			A OR G (mm)	A OR G (mm)	H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	100	190	190	115
25M	25.2	150	280		



MIN. 90° HOOK



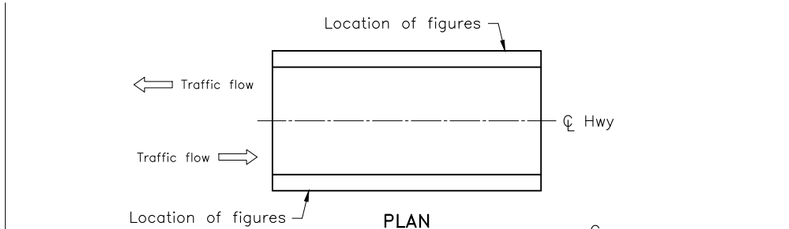
MIN. 135° HOOK

HOOK DIMENSIONS
FOR REINFORCING STEEL BARS

Ontario Ministry of Transportation

SS112–1

Date OCTOBER 2022 Rev –



NOTES:
A Figure forms shall be cast on the bridge fascia or face of culvert top slab or outside face of retaining wall.
B 'DATE' shall be the original year of construction.
C Leading zero(es) is/are required to be shown.
D All dimensions are in millimetres unless otherwise shown.

MINISTRY OF TRANSPORTATION ONTARIO DRAWING | Date MAY 2018 | Rev 0

FIGURES IN CONCRETE
SITE NUMBER AND DATE
LAYOUT

MTOD 3941.210

DRAFT

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN	CHK	CODE CSA–S6–19 LOAD	DATE JAN 2026
DRAWN	CHK	SITE 31X–0230/B0	DWG S23

FILE NAME: C:\USERS\FLICKTR\ONEDRIVE – GOVERNMENT OF ONTARIO\DESKTOP\FRASER RD\CAD\TRENT CAD\TRENT – 90% SHEETSET\STANDARD DETAILS.DWG
MODIFIED: 2026-01-22 16:18



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