Region of Peel West Trunk Diversion

Class Environmental Assessment Study

Project File Report

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Report Prepared For:

Regional Municipality of Peel

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Executive Summary

INTRODUCTION

The Regional Municipality of Peel (Peel Region) initiated a Class Environmental Assessment (Class EA) Study to identify the preferred method of diverting flows from the existing Credit Valley Trunk Sewer (CVTS) to the recently constructed West Trunk Sewer (WTS) to allow for inspection and rehabilitation of the existing CVTS. Furthermore, the Region has identified the added benefits of redundancy and dynamicity of operations as well as the additional capacity to better manage wet weather flows by linking the CVTS to the newly constructed WTS along Erin Mills Parkway via permanent trunk sanitary sewer connection. The approximate limits of the study area extend from Erin Mills Parkway to the Credit River, and from Eglinton Avenue West up to the intersection of Erin Mills Parkway and Mississauga.

With the exception of Schedule A projects within municipal right-of-way which are pre-approved, all new municipal sewer construction projects in Ontario require approval under the *Environmental Assessment Act* (EA Act). The Class EA process provides a decision-making framework by which a Group or "Class" of undertakings can be planned and implemented in a way that fulfills the requirements of the Act without proponents having to undertake an Individual Environmental Assessment. Given the scope of the Project, it has been assessed to fall under a Schedule B of the Municipal Class EA framework.

EXISTING CONDITIONS

LAND USE AND LAND USE COMPATIBILITY

Land use within the study area is considered primarily 'Mixed Use', 'Business Employment' and 'Low Density Residential'. As the proposed West Trunk Diversion does not include processes that are reasonably expected to impact nearby sensitive receivers, the West Trunk Diversion is anticipated to be compatible with the existing and future surrounding land uses.

PHYSICAL ENVIRONMENT

GEOTECHNICAL

The study area lies within the physiographic region known as the South Slope. The South Slope is comprised of calcareous clay till with lacustrine clay and silt. Surface topography within the study area slopes gradually and uniformly towards Lake Ontario. The main geologic units found across the study area are the Queenston and Georgian Bay Formations.

Boreholes drilled within the study area revealed subsurface conditions consisting of relatively shallow overburden deposits with local deep deposits along sections where it is believed that former river valleys and buried erosion channels may exist. The groundwater levels in existing boreholes ranged from 1.3 m to 14.5 m below existing ground surface, with an average depth of 4 m below existing ground surface.

There is an apparent history of buried valleys in the study area and the identification of these features during the design phase of the project will be critical to the success of the project. A geophysical investigation of the entire project alignment was undertaken during the EA phase to further assist with the identification of notable geologic features. Based on the review of the interpreted geological profiles from the analysis, it appears that all alignment alternatives place the conceptual alignment of the project sewer within potential zones of increased bedrock

weathering, with the Britannia alignment (featured on EA alternatives 2 and 3 exclusively) denoting the presence of a noteworthy buried valley.

A number of properties were also identified as Potential Sources Of Contamination (PSCs), these properties included gas stations, auto service stations, auto sales and service dealerships, as well as a GO Transit Garage.

EXISTING WASTEWATER SERVICING

The Peel Region wastewater system comprises two principal trunk sewer systems: the West Trunk System and the East Trunk System. The East Trunk System conveys flows along and near the Etobicoke Creek Valley to the G. E. Booth Wastewater Treatment Plant. More relevant to this project, the West Trunk system of the Peel Wastewater system was originally constructed in the late 1960s/early 1970s and services the west portion of Peel Region. For the West Trunk system, flow is transported along and near the Credit Valley to the Clarkson Wastewater Treatment Plant (CWWTP) via the CVTS. Since 2016, construction of the new WTS along Erin Mills Parkway has been underway.

NATURAL ENVIRONMENT

NATURAL AREAS

The following designated natural areas/habitats occur within the study area:

- Credit River (warmwater feature with coldwater migratory corridor).
- Mullet Creek (warmwater feature).
- Regionally significant core features.
- Significant natural areas and natural green spaces.
- Special management areas.
- Significant woodlands.
- Significant valleylands.
- Unevaluated wetlands.

Based on a background review and preliminary site screening, Turney Woods Park and Erin Woods (northeast quadrant of Erin Mills and Erin Centre Boulevard) meet the criteria for a significant woodland under the City of Mississauga Official Plan and are considered Significant Natural Areas and Natural Green Spaces. Due to the close proximity to watercourses, the woodland associated with the Credit River and Mullet Creek valley corridors are considered significant.

There are no Provincially Significant Wetlands (PSW) within the study area, however the CVC indicated that there is a wetland mapped within a portion of Turney Woods Park. This wetland has not been identified as provincially significant.

SPECIES AT RISK

The DFO aquatic SAR mapping for the study area indicates that no aquatic SAR have been identified within the Credit River, Mullet Creek or the Unnamed Tributary of Mullet Creek. However, the MECP indicated the presence of four aquatic SAR with potential to be present within the study area including:

- American Eel - species designated as “Endangered” and protected under the provincial *Endangered Species Act* and listed as ‘under consideration’ (for listing) under the federal SARA.
- Lake Sturgeon - Great Lakes St. Lawrence River population designated as “Threatened” and protected under the *Endangered Species Act* and ‘under consideration’ for listing federally under the SARA.
- Redside Dace and Shortnose Cisco - both designated as “Endangered” provincially and federally and protected under the *Endangered Species Act* and SARA.

Searches of the Natural Heritage Information Centre, Ontario Breeding Bird Atlas (OBBA), the Ontario Reptile and Amphibian Atlas (ORAA) and the Ontario Butterfly Atlas were conducted in order to assess the potential for terrestrial SAR to be found in the study area. Species which have potential for their habitat to be within the study area include: American Ginseng, Nine-spotted Ladybird Beetle, Barn Swallow, Chimney Swift, Little Brown Myotis, Northern Myotis and American Eel.

AQUATIC HABITAT AND FISH COMMUNITY

The Credit River, Mullet Creek and the Unnamed Tributary of Mullet Creek, are the three watercourses in the study area. As defined by the *Fisheries Act*, these watercourses support or provide habitat for fish that are a part of Commercial, Recreational, or Aboriginal (CRA) Fishery.

The Ministry of Natural Resources and Forestry (MNRF) indicated that the part of Credit River within the study area is a resident warmwater system with a coldwater migratory corridor. Preliminary investigations have determined that where Britannia Road crosses over the Credit River, there is direct fish habitat which supports bait/forage fish and sensitive coldwater sportfish. The Credit River Fisheries Management Plan has indicated that Mullet Creek located within the vicinity of the study area is classified as a small warmwater fish community that provides direct habitat for bait/forage fish. Preliminary investigations at the Unnamed Tributary of Mullet creek have determined that this area also provides direct habitat for bait/forage fish. The species that can be found in Mullet Creek are migratory species and appear seasonally near the confluence with the Credit River.

WILDLIFE AND SIGNIFICANT WILDLIFE HABITAT

The following table (Table 0-1) outlines the potential presence of wildlife within the study area determined by desktop research, preliminary field investigations and a SWH screening assessment.

Table 0-1: Potential Presence of Wildlife and Wildlife Habitat within the Study Area.

Wildlife	Observations
Birds	Several migratory bird species were observed within the study area. No SAR birds were identified during the preliminary investigations. The alignment study areas do not provide a suitable combination of forest and meadow communities to support overwintering raptors, however the Credit River valley likely provides suitable overwintering habitat for Bald Eagle. There is a potential for the following Species of Conservation Concern (SOCC) (not including Endangered or Threatened Species) to be present within the study area: • Bald Eagle • Eastern Wood Pewee • Peregrine Falcon
Herpetofauna	Preliminary field investigations did not find any reptiles or amphibians incidentally observed within the study area. The Credit River provides suitable overwintering habitat for Snapping Turtle within the study area. Additional surveys may be required depending on the design of the preferred alignment and the potential for impact to this SWH type. Amphibian Breeding Habitat (Woodland) was identified as a Specialized Habitat within the alignment study areas. There is a potential for the following SOCC (not including Endangered or Threatened Species) to be present within the study area: • Snapping Turtle
Insects	There is a potential for the following SOCC (not including Endangered or Threatened Species) to be present within the study area: • Monarch Butterfly • Yellow-banded Bumblebee
Mammals	Mammals commonly found in urbanized settings were observed within the study area. No SAR mammals were observed within the study area. Two wooded areas within alignment study areas have the potential to provide suitable bat maternity (Turney Woods Park and the ESA in the northeast quadrant of the Erin Mills Parkway and Erin Centre Boulevard intersection). No formal assessment has been completed for these areas, and additional bat habitat surveys may be required as a result of the design of the preferred alignment and its potential to impact this SWH type.

TREES AND OTHER FLORA

The two main areas assessed in the Arborist Review included Turney Woods Park and trees located along the roads within the study area. The Turney Woods Park acts as an important natural feature of both vegetation and wildlife, and the woodland was donated to the City. The large majority of trees along the alignments within the Right-of-Way (ROW) have been planted and the only naturally occurring trees were located adjacent to watercourse crossings. A variety of trees located along the ROW and on private property have the potential to be impacted by construction.

There is a single notable tree on Britannia Road West, south of Queen Street. The large Willow species appears to be on private property, but due to its large dripline and root spread, it should be avoided by construction work to protect its integrity. In most other areas, trees are set back from the ROW, providing sufficient protection.

The MECP noted the potential presence of several SAR species including American Chestnut, American Ginseng and Butternut within the study area, however none of these species were observed during the preliminary arborist assessment.

Ecological Land Classification provided by CVC was confirmed during field investigations and resulted in the identification of 9 communities including forests, marshes, meadows, and cultural communities.

CULTURAL HERITAGE AND ARCHAEOLOGY

A Stage 1 Archaeological Assessment (AA) was completed for the study area. It was determined that there are 25 previously registered archaeological sites located within 1 km of the study area, with three of them being within 50 m and one within the study area. Some other notable features which have archaeological potential include water sources that are primary, secondary, or past water source, early historic transportation routes, proximity to early settlements and well-drained soils. The study area is also within the Streetsville Village Core Cultural Heritage Landscape (CHL) and the Mississauga Road Scenic Route CHL. The above noted details of potential are indicative for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbances.

There are 13 potential CHLs and built heritage resources (BHRs) located within and/or adjacent to the proposed study area. These cultural heritage resources include two streetscapes (CHL 1, 2), a watercourse and associated lands (CHL 3), seven residences (BHR 1 – 7)), two natural areas (CHL 5 and 6), and one former farmscape (CHL 4). The CHR identified in the assessment, are historically and contextually connected to early-nineteenth to mid-twentieth century land use patterns in Streetsville and the former Toronto township.

UTILITIES AND TRANSPORTATION

As part of the EA, a Subsurface Utility Engineering (SUE) desktop study was completed for the purposes of assessing existing conditions in the study area. A utility circulation was conducted in June 2019 where all members of the Public Utilities Coordinating Committee (PUCC) of Peel Region were contacted and requested to provide drawings of their existing plants.

A Transportation Impact Assessment (TIA) was conducted to evaluate the EA alternatives and determine a preliminary preferred design alternative from a transportation viewpoint. The following were considered notable features within the study area:

- Regional Arterials (Britannia Road and Erin Mills Parkway)
- Major Collector (Queen Street)
- Two Transitway stations
- Two bus terminals

- Two GO Stations
- Pedestrian activity in the study area is generally low.
- Cycling facilities (bike lanes, signed routes and multi-use trails

ALTERNATIVES

In order to connect the CVTS to the newly constructed WTS, four alternative alignments (solutions) were considered, including the single diversion (Alternative 1 and 4) and dual diversion (Alternatives 2 and 3) concepts (Table 0-2).

Table 0-2: Summary of Alternative Design Solutions

Alternative	Description
Alternative 1	• Single diversion concept (i.e., connecting to the WTS at one (1) location) • Primarily focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West starting east of the intersection with Queen Street North and another along Eglinton Avenue West east of Mississauga Road to just northeast of the Erin Mills Parkway and Eglinton Avenue West intersection (within the bus-turnaround area). • The alignment is approximately 4.1 km in length along Mississauga Road. • There will be seven (7) shaft sites.
Alternative 2	• Dual diversion concept (connecting to the WTS at two (2) locations) • Northern portion is primarily focused Britannia Road West from the Credit River jogging south at Hogan Drive and through Turney Woods Park to connect with the WTS just south of the Britannia Road West and Erin Mills Parkway intersection. • Southern portion is primarily focused on Eglinton Avenue West. • There will be fifteen (15) shaft sites.
Alternative 3	• This dual diversion concept has a northern portion and southern portion similar to Alternative 2. • The southern portion of the alignment is the same as Alignment 2 • The northern portion is primarily focused on Britannia Road West, from the Credit River to Erin Mills Parkway along with the branch north of the intersection of Britannia Road West and Queen Street North. • There will be fourteen (14) shaft sites.
Alternative 4	• Single diversion concept (i.e., connecting to the WTS at one (1) location) similar to Alternative 1. • Primarily focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West, starting east of the intersection with Queen Street North and another along Erin Centre Boulevard east of Queen Street to just northeast of the Erin Mills Parkway and Eglinton Avenue West intersection (within the bus-turnaround area). • The alignment is approximately 3.4 km in length along Mississauga Road. • There will be six (6) shaft sites

The alternate solutions were evaluated against effects on the Socio-economic environment, natural environment, cultural heritage, cost and technical design feasibility. It was determined that the preliminary preferred alternative solution is EA Alternative 4. This alternative was selected due to the following criteria:

- Will require less shafts along the corridor.
- Will have less impact on the socio-economic environment (i.e., less impact to residential areas from a shaft construction perspective, and less nuisance impacts related to vibration, noise and dust during construction).
- There will be fewer intersections impacted by the proposed work.
- No lane restrictions will be required within the community of Streetsville.
- Will have less bends and drops reducing the potential for the release of odourous air.
- Will have notably less staging areas compared to Alternatives 2 and 3.
- Will have no additional watercourses or natural areas impacted, beyond those that are consistent for all four alternatives.
- Construction will be via trenchless methods, reducing traffic impacts and avoiding impacts to street trees.
- Avoids crossing the known deep water-bearing buried valley along Erin Mills Parkway.
- The shaft locations will be positioned outside of the Streetsville Village Core, having minimal impact on known CHL's.
- Will only require one connection point to the WTS.
- Fewer permanent structures required.
- Land acquisition costs and operational costs are significantly lower than EA Alternatives 2 and 3 and comparable to EA Alternative 1.

The alternatives evaluation also denoted the preliminary preferred locations of the tunnel compound staging areas as well as the preferred location of project subcomponents including the West Trunk Sewer connection. Additionally, tunnelling methods were evaluated against the potential for impacts to groundwater and worker safety due to the potential of encountering buried valley features. In order to ensure both human and environmental safety, tunnel boring machines should be either closed faced or capable of being quickly converted from open face to closed face (closeable face) should buried valley features be encountered.

ENGAGEMENT

Consultation is an integral component to any Class EA process to keep Stakeholders and Indigenous Communities informed of a project, as well as to gain insightful input on existing conditions, and the evaluation process to identify a preferred solution that is acceptable to all Stakeholders.

A Project Contact list was then developed, including federal department/agencies, provincial ministries/agencies, regional and local municipal departments, and the Credit Valley Conservation Authority (CVC). As part of Study Commencement, the Notice of Study Commencement was emailed to those on the Project contact list, including pertinent review agencies to gather initial feedback on the Project. As a result of the initial contact, there was little input received.

A number of agency meetings were held with the CVC and the City of Mississauga to discuss various construction components and design plans for the proposed project. Meeting minutes of these discussions can be found in Appendix J.

A Public Information Center (PIC) was posted virtually from September 20, 2021 until October 19, 2021. The purpose of the PIC was to provide a summary of the background information, evaluate and identify the preliminary preferred solution. No comments were received from the public, agencies or Indigenous Communities before October 19th, 2021.

INDIGENOUS COMMUNITIES

The following Indigenous Communities were identified as potentially having interest in the proposed project and were provided a letter during the week of May 27, 2019:

- Mississaugas of the Credit First Nation.
- Six Nations of the Grand River.
- Haudenosaunee Confederacy Chiefs Council.
- Huron-Wendat Nation.

Indigenous Communities were also provided with a Notice of PIC in September 2021, which was followed-up by a call and email to determine whether they had any additional comments, prior to Notice of Study Completion.

POTENTIAL EFFECTS AND MITIGATION

Above-ground disturbance including excavation, grading and staging is anticipated to be confined to the six staging areas within the preferred alignment. The following table (Table 0-3) summarizes the potential effects and associated mitigation measures for the proposed project.

Table 0-3: Summary of Potential Effects and Associated Mitigation Measures for the Proposed Project

Effect	Description	Mitigation
Social Environment		
Property Impacts	A permanent easement will be required crossing through the back corner of a residential property at the southeast corner of Erin Centre Boulevard and Erin Mills Parkway for EA Alternative 4. It is estimated that a total of 4 temporary easements will also be required for construction staging.	• Preliminary discussions with property owners commenced prior to the PIC, and will continue as the design progresses. Peel Region will negotiate with individual landowners to acquire the required easements.
Nuisance Impacts	All applicable guidelines and standards will be adhered to, therefore nearby residential and other sensitive land uses adjacent to and within the study area will not be adversely affected as a result of construction activities.	• During construction, all applicable noise regulations, guidelines and bylaws will adhered to. • Dust mitigation measures will be implemented including mud mats, water spraying/non-chloride dust suppressants, street sweeping, etc. • As per MECP recommendations, non-chloride based dust-suppressants will be used. • A process will be established regarding a complaints protocol. • Appropriate mitigation measures will be in place to minimize any potential impacts on air quality based on existing or local air quality conditions
Physical Environment		
Contaminated Soils and Excess Materials Management	Should the removal or movement of excess soil be required, impacts to the soils, groundwater and vegetation have the potential to result if unmitigated.	• Contaminated soils will be managed and disposed of in accordance with O. Reg 153/04: Record of Site Condition and O. Reg 406/19: Excess Soils and Waste Management. • Guidance documents such as MECP's "Management of Excess Soil – A Guide for Best Management Practices" (2021) will be consulted. Contact with the MECP district offices may be required depending on the level of contamination that is identified. • Locations of any current and historical waste disposal sites, underground storage tanks, and underground transmission lines will be identified within the study area. • Mitigation measures such as a spill response plan and consultation with owners will be undertaken to ensure the integrity of the underground storage tanks and transmission lines.

Effect	Description	Mitigation
Groundwater	Construction activities have the potential to result in groundwater contamination and/or a disruption in groundwater quantity if unmitigated.	• Existing groundwater conditions within the study area will be defined prior to construction using the MECP well records database. • Well construction and decommissioning, if required, will be completed in accordance with O. Reg 903: Wells • Potential impacts to groundwater-dependent natural features will be identified and mitigated, as required. • Any permits or potential approval requirements for groundwater taking or discharge will be identified and obtained prior to construction.
Natural Environment		

Tree And Vegetation	Construction activities have the potential to result in injury/harm to both street trees and trees in naturalized areas.	• During detailed design, staging areas will be further refined to avoid/minimize impact to tree and vegetation removal.
		• Implementing setbacks and tree protection zones (e.g., set distance from rooting zone; to be determined in the arborist report).
		• Snow fencing and standard tree protection measures will be implemented as necessary.
		• All disturbed locations will be restored to meet or exceed existing conditions.
		• Development of the following plans during the detailed design phase:
		  ○ *Erosion and Sediment Control Plan*
		  ○ *Environmental Management Plan*
		  ○ *Tree Protection Plan*
		  ○ *Restoration Plan*

Effect	Description	Mitigation

Watercourses	Construction activities occurring within CVC regulated areas has the potential to cause negative impacts to fish habitat.
	
	In-water works or work along channel banks of the Credit River may disrupt American Eel habitat. No in-water works are planned, therefore impacts are not anticipated.
	
	Surface impacts of construction are expected to be minimal and impacts to watercourses and stormwater infrastructure are not anticipated if mitigated appropriately.
		• Siting laydown and staging areas to avoid sensitive features (e.g., away from woodlands and watercourses)
		• In-water works are not being considered as part of this project at this time.
		• A review of "measures to protect fish and fish habitat" as well as the steps associated with whether or not the project needs a review should be completed during the detailed design phase. Review of these two DFO webpages will determine the need for DFO project review by DFO under the Fisheries Protection Provisions of the *Fisheries Act*. As no in-water work is being considered, a DFO project review is not anticipated.
		• No impacts to American Eel habitat are anticipated, however if in water works or channel bank alteration is required, an MECP *Endangered Species Act* registration for American Eel should be undertaken prior to construction
		• For the watercourses, the minimum setback is considered whichever is greater of the watercourse meander belt width or 30 m.
		• If site alteration occurs within the CVC regulation boundary a CVC permit will be required.
		• Appropriate mitigation measures will be in place prior to construction to prevent negative impacts to watercourses from occurring (i.e., spills, erosion, pollution).
		• MECP's "Stormwater Management Planning and Design Manual" (2003) shall be referenced as part of the design process
		• Any permits or potential approval requirements for surface water taking or discharge will be identified and obtained prior to construction
		• Development of the following plans during the detailed design phase:
		  ○ *Erosion and Sediment Control Plan*
		  ○ *Environmental Management Plan*
		  ○ *Restoration Plan*
		• Construction activities (including permeable/impervious surfaces) will need to consider water quality and quantity and ensure pre-construction pathways and flows are maintained or similar to existing conditions. This will minimize potential impacts to both terrestrial and aquatic resources.

Effect	Description	Mitigation

Significant Woodlands	Construction activities have the potential to result in a loss of ecological form and function within significant woodlands (Turney Woods Park, woodland associated with the Credit River and Mullet Creek, woodland located in the northeast quadrant of the Erin Mills and Erin Centre Boulevard intersection).	• Siting laydown and staging areas to avoid sensitive features (e.g., away from woodlands and watercourses)
		• If any areas designated as Greenlands are impacted through development or alteration, the Region of Peel Official Plan requires rehabilitation of the ecological features lost through replacement.
		• Any negative impact that cannot be avoided will require mitigation through replacement.
		• Development of the following plans during the detailed design phase:
		  ○ Erosion and Sediment Control Plan
		  ○ Environmental Management Plan
		  ○ Tree Protection Plan
		  ○ Restoration Plan

Significant Wildlife Habitat	Construction activities have the potential to impact the following SWH: • Raptor Wintering Area • Bat Maternity Colonies • Amphibian Breeding Habitat (Woodland) • Turtle Nesting Area • Special Concern and Rare Wildlife Species	• Upon confirmation of SWH during detailed design, a setback of 30 m is recommended for all SWH types. • Any negative impact that cannot be avoided will require mitigation through replacement. • Developing a wildlife protocol and rescue plan to educate staff on wildlife occurrences (including SAR) and measures to take to minimize potential for injury and incidental take, including environmental controls such as exclusionary fencing to prevent wildlife from entering the site.

Species at Risk	Construction activities have the potential to impact the following SAR and their habitat:
	• American Ginseng
	• Nine-spotted Ladybird Beetle,
	• Barn Swallow,
	• Chimney Swift,
	• Little Brown Myotis,
	• Northern Myotis
	• American Eel.
		• Potential impacts to SAR will need to be dealt with in consultation with MECP during detailed design and permitting. Specific mitigation plans and/or permitting under the *Endangered Species Act* may be required.
		• If habitat being used by any of the listed species is negatively impacted, a permit from the MECP will be required. The following recommendations are provided for detailed design:
		  ○ *ASAR bat habitat assessment and breeding bird survey be conducted should tree removals be needed in the preferred alternative alignment.*
		  ○ *SAR trees be noted during the detailed inventory.*

Effect	Description	Mitigation
Cultural Environment		
Cultural Heritage	Construction activities associated with the preferred alignment include direct impacts anticipated for three CHLs (CHL 2, 3 and 4) and indirect impacts anticipated for three CHLS (CHL 1, 2 and 3). Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources.	• Construction activities and staging should be planned and undertaken to avoid impacts to identified cultural heritage resources. • To ensure that all BHRs and CHLs are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. If vibration impacts are anticipated, a Vibration Monitoring Plan should be prepared and implemented • Consultation is required with the City of Mississauga to determine the applicability of a resource-specific HIA for certain CHL's • post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts. • Should future work require an expansion of the study area, a qualified heritage consultant should be contacted • The Cultural Heritage Resource Assessment was submitted to the MHSTCI in July 2020, and subsequently updated to reflect comments. The CHRA and the Cultural Heritage Report were submitted to the MHSTCI on November 11, 2021. They were issued to the City of Mississauga heritage planning staff as part of Agency review of the Project File Report, and made available to other relevant heritage stakeholders as part of the public review period. • Clearance letter from MHSTCI required prior to construction.

Archaeology	Although trenchless construction is proposed, there are surface impacts associated including shaft locations and staging areas that will require Stage 2 survey in advance of construction activities.
	
	Construction activities within the Credit River have the potential to result in impacts to marine archaeological resources.
		• Areas of with archaeological potential require Stage 2 archaeological assessment by test pit survey at five metre intervals. However, since the project proposes trenchless construction methods, Stage 2 will only be required in areas of surface impacts (i.e., at depths less than five metres below surface). If it is determined that tunnel design elsewhere in the project area cannot guarantee against collapse, a Stage 2 archaeological assessment would be required for areas with archaeological potential that could be impacted by the construction.
		  ○ The preliminary shaft locations and staging areas which exhibit archaeological potential will require Stage 2 survey prior to any construction impacts.
		  ○ The preferred alignment (at depths greater than five metres below surface) will not require Stage 2 survey.
		• Site AjGw-432 was previously destroyed during redevelopment, however it should be noted during any future Stage 2 archaeological assessment on adjacent properties.
		• The study area includes the Streetsville Memorial Cemetery at 299 Queen Street South. As the proposed method of project construction is trenchless installation (10-20 metres below the surface to bedrock in this area), surface impacts in and directly adjacent to the cemetery are not planned within the proposed alignment. All cemetery lands will be avoided by the current proposed project designs.
		  ○ Any future impacts less than five metres below surface within or directly adjacent to the cemetery will require a Stage 3 Cemetery Investigation to be conducted within the cemetery property, in the sidewalk and Queen Street South right-of-way to confirm the presence or absence of human remains.
		  ○ A Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required for any “invasive” Stage 2-4 work.
		  ○ If evidence of burial associated with the cemetery are encountered, the police or coroner and the Register of Burial Sites at the Ministry of Government and Consumer Services must be contacted as per the *Cemeteries Act*

Effect	Description	Mitigation
		(R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2022. • If the Credit River riverbed will be impacted, the MHSTCI's Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential. • Stage 1 Archaeological Assessment has been filed with the MHSTCI.
Transportation		
Transportation Facilities and Routes	Construction activities may result in lane closures, sidewalk closures and relocation of transit stops that have the potential to disrupt transportation within the study area.	• Maintain pedestrian and cycling facilities whenever possible, and to enact appropriate signage alerting travellers of detours. • Maintain existing transit stops whenever possible. If maintaining an existing transit stop is not possible, a barrier-free alternate stop shall be provided following consultation with MiWay. • Advise local residents, businesses, and motorists of proposed changes to road network well in advance of planned construction so they can pre-emptively adjust travel behavior. • Encourage the public to consider use of alternative modes of travel, such as transit, walking, cycling or carpooling. • Consider provision of advanced advisory notifications using Portable Variable Message Signs. This will advise local residents and motorists of proposed construction work and closures well in advance of planned construction so they can adjust travelling behavior/route appropriately. • Consider provision of variable message signs to provide anticipated travel time alerts during construction. • Schedule a pre-construction planning meeting between the design team, the Contractor, the City, police, fire, emergency medical services (EMS), and MiWay to discuss proposed construction stages, and how it will affect their services. • Regularly monitor traffic conditions and traffic control devices, replacing any unacceptable devices as required. • Undertake work zone coordination to identify potential work zone conflicts with other planned roadwork projects.

MONITORING AND FUTURE COMMITMENTS

During the design phase the Contract Documents shall be structured to ensure that Contractors are made aware of all environmental considerations and to ensure that all environmental standards and commitments for construction are met. To that end, stringent monitoring and mitigation measures shall be implemented before, during and after construction.

Pre-construction monitoring activities include, but are not limited to:

- Pre-construction inspections to document existing conditions
- CCTV inspections of existing buried infrastructure
- An ESA to be completed in accordance with O. Reg 153/04 prior to construction activities commencing.
- Erosion and Sediment Control plans to be developed

Construction monitoring activities include, but are not limited to:

- Mud and Dust Control for all roads within proximity to any proposed construction compounds.
- Noise, Vibration and Settlement monitoring will be implemented to ensure exceedances are identified and mitigated
- Construction monitoring to ensure all mitigation measures and contingency measures are implemented according to design and that objectives are being met

Post Construction monitoring activities include, but are not limited to:

- An ESA to be completed in accordance with O. Reg 153/04 following construction. The Contractor will be fully liable and responsible for remediating any potential contamination identified in the post-construction ESA that was not present in the Pre-Construction ESA.
- CCTV inspections of existing buried infrastructure. The pre- and post-construction footage shall be reviewed and contrasted to identify any potential impacts required to be addressed.

PERMITTING

The following table (Table 0-4) outlines the permits and approvals anticipated following the completion of the Class EA:

Table 0-4: Permits and Approvals Anticipated for the Proposed Project

Department/Agency/Ministry	Permit Type
Federal	
Fisheries and Oceans Canada	• Self-Assessment/Letter of Advice or Authorization (*Fisheries Act*)
Provincial	
Ministry of the Environment, Conservation and Parks	• Permit or Registry (*Endangered Species Act*) • Permit to Take Water (PTTW) or Environmental Activity and Sector Registry
Ministry of Heritage, Sport, Tourism and Culture Industries	• Clearance Letter (*Ontario Heritage Act*)
Municipal and Regional	
City of Mississauga	• Approved rehabilitation, replacement and/or mitigation of Significant Natural Areas, Road Occupancy Permit
Region of Peel	• Approved rehabilitation, replacement and/or mitigation of Greenlands and Core Areas, Road Occupancy Permit
Credit Valley Conservation	• Erosion and Sediment Control Plan and Surface Water Management Plan (*Conservation Authorities Act*) • Permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 166/06 under *Conservation Authorities Act*)

In addition to the above noted permits/agreements, property agreements will be required for permanent and temporary easements from affected property owners.

PROJECT COST ESTIMATE

An estimate of capital costs for construction of each alternative was undertaken. Estimated capital costs are in the range of approximately $120M with EA Alternative 4 being the lowest cost alternative. The difference in capital costs between the alternatives was within the bounds of accuracy for the estimates. As such, all alternatives are considered to have similar capital costs at this stage of design development. However, when costs for property acquisitions, operations and maintenance are considered, EA Alternatives 2 and 3 (which have a significantly greater number of shaft sites and permanent structures) are less preferred from a total cost perspective.

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GLOSSARY OF TERMS AND ACRONYMS

ACRONYM/TERM	DEFINITION
AA	Archaeological Assessment
ASI	Archaeological Services Inc.
ATR	Automatic Traffic Recorder
ATRIS	Aboriginal and Treaty Rights Information System
BHR	Built Heritage Resource
CHL	Cultural Heritage Landscape
CHRA	Cultural Heritage Resource Assessment
CRFMP	Credit River Fisheries Management Plan
CTC	Credit Valley – Toronto and Region – Central Lake Ontario
CVC	Credit Valley Conservation
CVR	Credit Valley Railway
CVTS	Credit Valley Trunk Sewer
CWWTP	Clarkson Wastewater Treatment Plant
dbh	diameter at breast height
DFO	Fisheries and Oceans Canada
DWF	Dry Weather Flow
EA	Environmental Assessment
ESA	Environmental Site Assessment
GGH	Greater Golden Horseshoe
GPGGH	Growth Plan for the Greater Golden Horseshoe
HADD	Harmful alteration, disruption or destruction of fish habitat
MEA	Municipal Engineers Association
MECP	Ministry of the Environment, Conservation and Parks
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
MMAH	Ministry of Municipal Affairs and Housing
MH	Maintenance Hole
MNRF	Ministry of Natural Resources and Forestry

ACRONYM/TERM	DEFINITION
NDS	North of Dundas Street
OBA	Ontario Butterfly Atlas
OBBA	Ontario Breeding Bird Atlas
ORAA	Ontario Reptile and Amphibian Atlas
PCTL	Pre-Cast Tunnel Liner
PCSs	Potential Sources Of Contamination
PIC	Public Information Centre
PIF	Project Information Form
PFR	Project File Report
PUCC	Public Utilities Coordinating Committee
PPS	Provincial Policy Statement
ROW	Right-of-Way
SAN	Sanitary Sewer
SAR	Species at Risk
SARA	*Species at Risk Act*
SCADA	Supervisory Controls and Data Acquisition
Section 16(6)	Formally referred to as a Part II Order, which may require the completion of an individual/comprehensive EA or that additional conditions be imposed before being able to proceed. However, Section 16(6) Orders will only be permitted to prevent, mitigate, or remedy potential adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.
SoCC	Species of Conservation Concern
SSA	Stakeholder Sensitivity Analysis
SWH	Significant Wildlife Habitat
TBM	Tunnel Boring Machine
TIA	Transportation Impact Assessment
TMC	Turning Movement Count
WM	Watermain
WTD	West Trunk Diversion

ACRONYM/TERM	DEFINITION
WTS	West Trunk Sewer
WWF	Wet Weather Flow

1. Introduction

1.1 BACKGROUND

The Regional Municipality of Peel (Peel Region) initiated a Schedule 'B' Municipal Class Environmental Assessment (Class EA) Study to identify the preferred method of diverting flows from the existing Credit Valley Trunk Sewer (CVTS) to the recently constructed West Trunk Sewer (WTS) to allow for inspection and rehabilitation of the existing CVTS. This diversion will also benefit Peel Region by providing operational flexibility, redundancy and capacity to better manage wet weather flows. The approximate limits of the study area extend from Erin Mills Parkway to the Credit River, and from Eglinton Avenue West up to the intersection of Erin Mills Parkway and Mississauga as shown in Figure 1-1 for the study area.

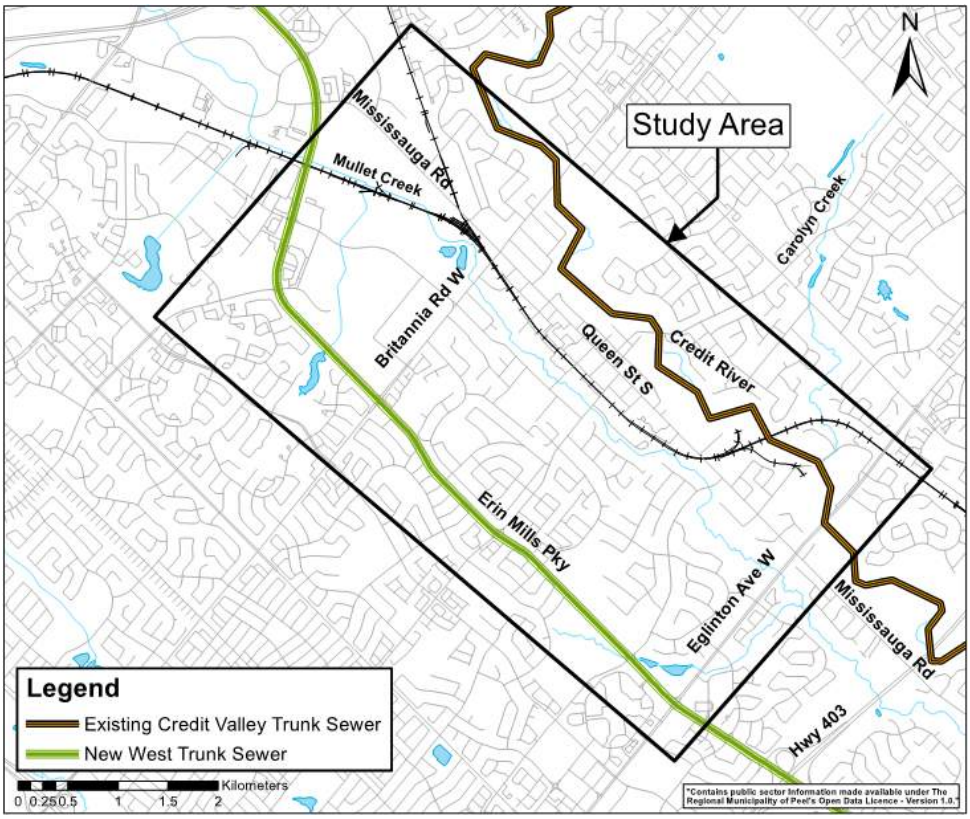

Figure 1-1: Study Area of the Peel West Trunk Diversion Project

With the exception of Schedule A projects within municipal right-of-way which are pre-approved, all new municipal sewer construction projects in Ontario require approval under the *Environmental Assessment Act* (EA Act). The Municipal Engineers Association (MEA) Municipal Class EA process streamlines the planning and decision-making of municipal infrastructure with an approved procedure designed to protect the environment. The Municipal Class EA process provides a decision-making framework that enables the requirements of the EA Act to be met in an effective manner. Further details regarding the Class EA process are described in Section 1.3.

The Peel West Trunk Diversion (WTD) Project serves as the groundwork to facilitate the future rehabilitation of the existing CVTS which was built in the late 1960s and has been servicing the west portion of Peel Region since then. Peel Region has identified additional benefits of linking the WTS with the CVTS using newly installed permanent trunk sanitary sewers first as a means to provide redundancy, and second as a means to provide operational dynamicity, specifically modulation of flows in the CVTS and WTS via the inclusion of automated Supervisory Controls and Data Acquisition (SCADA) controlled gates.

1.2 PURPOSE OF THE STUDY

The purpose of the study is to review alternative flow diversions from the existing CVTS to the newly constructed WTS at Erin Mills Parkway to allow for future rehabilitation of the existing sewer.

1.3 MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

Under the provisions of the *Ontario Environmental Assessment Act* and Regulation 334, certain types of provincial and municipal undertakings can meet the requirements of the Act through the use of an approved environmental planning process referred to as a Class EA.

The Class EA process provides a decision-making framework by which a Group or “Class” of undertakings can be planned and implemented in a way that fulfills the requirements of the Act without proponents having to undertake an Individual Environmental Assessment. Upon completion of the process, the undertaking is considered approved and does not require formal submission to the Ministry of the Environment, Conservation and Parks (MECP).

The Municipal Class EA prepared by the MEA (dated October 2000, as amended in 2015) outlines the approved process for the planning and design of municipal infrastructure.

Figure 1-2 summarizes the five phases of this process. Phase 1 includes the problem identification; Phase 2 includes the identification of the preferred solution; Phase 3 includes the identification of the preferred design concept; Phase 4 includes the documentation of the EA process; and Phase 5 includes the detailed design and construction of the project. As the figure notes, consultation occurs at key consultation milestones throughout the process. This input is essential to ensure that issues are identified early in the process and can be addressed prior to moving forward and making final recommendations.

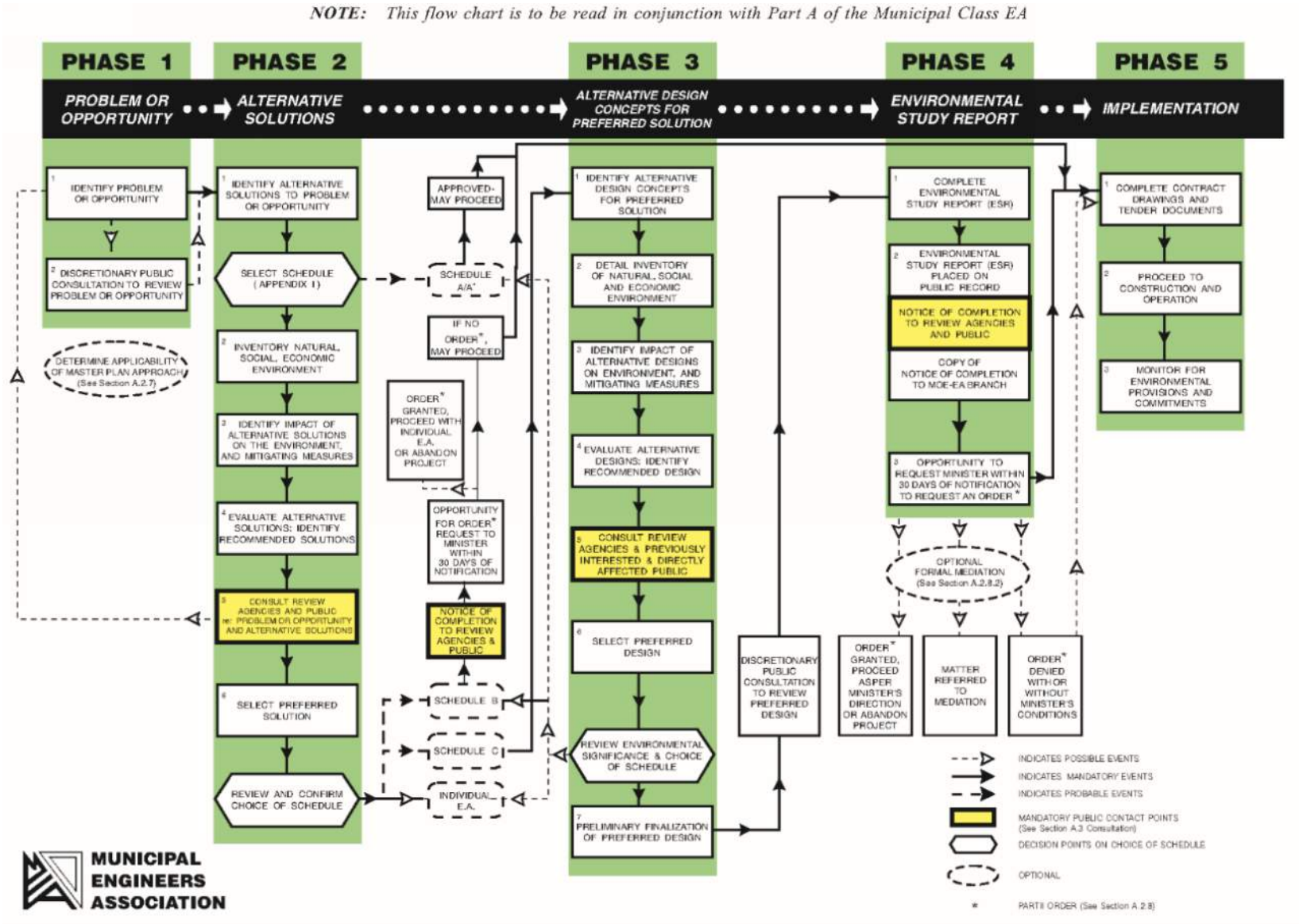

Figure 1-2: Municipal Class EA Planning and Decision Process

The Municipal Class EA process recognizes that there are varying levels of impact requiring a greater or lesser amount of assessment, depending on the nature of the work, the estimated cost and the potential impacts on the environment (which includes natural, social, economic, cultural and technical components). There are four "schedules" of undertakings defined in the Municipal Class EA to account for this variation. These schedules include:

Schedule A:	These projects are limited in scale and include emergency operational and maintenance activities. Schedule A projects are deemed pre-approved without the need for further assessment.
Schedule A+	Schedule A+ projects are also pre-approved, but require the proponent to advise the public of the initiative prior to implementation.
Schedule B	These projects have the potential for some adverse environmental effects and include improvements and minor expansions of existing facilities. For Schedule B projects, the proponent must undertake a screening process, including consultation with those who may be affected by the undertaking. At the conclusion of the process, a Project File Report (PFR) is prepared to document the findings.
Schedule C	These projects have the potential for significant environmental effects and include new facilities and major expansions to existing facilities. Schedule C projects must follow the full planning and decision-making process outlined in the Class EA, including the preparation of an Environmental Study Report.

In scoping the study, the Region of Peel and Hatch assessed that the project would fall under Schedule B of the Municipal Class EA, as the Project corresponded to the following description, under Wastewater Management Projects in the MEA: "… enlarge a sewage collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in an existing road allowance or an existing utility corridor".

1.4 PROJECT FILE REPORT

The Project File Report (PFR) documents the planning and decision making process followed for Schedule B projects, meeting the requirements of Phases 1 and 2 of the Municipal Class EA. The report clearly documents the steps taken to select the technically preferred solution. The PFR is finalized with the issuance of a Notice of Study Completion inviting the public to review and provide input on the document within the 30 calendar day review period. The Notice will identify the location(s) where the PFR can be reviewed.

Given the pandemic, the PFR will not be made available in hard copy, however will be made available on the Region's website for review. Should accommodations be required, please reach out to the Region of Peel Project Manager.

1.5 SECTION 16(6) ORDER

It is recommended that all stakeholders work together to determine the preferred means of addressing the problem. If concerns regarding the project cannot be resolved through discussions with the proponent (for this Study, the proponent is Peel Region), the person or party raising the objection may request that the MECP elevate the level of study through a Section 16(6) order or "bump up" request, formally referred to as a Part II Order, which may require the completion of an individual/comprehensive EA or that additional conditions be imposed before being able to proceed. However, Section 16(6) Orders will only be permitted to prevent, mitigate, or remedy potential adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Order requests should clearly identify the reason for the request, whether additional conditions are to be imposed or if an individual/comprehensive EA should be undertaken, and include the requester's contact information. The Minister may also submit a Section 16(6) Order on their own behalf and impose conditions or elevate the level of study. Requests by the Minister must be submitted within 30 days of the end of the comment period following the Notice of Completion, unless otherwise stated. The order request must be sent to both the Minister and the Director of the Environmental Assessment and Permissions Branch noted below and Peel Region's Project Manager prior to the end of the 30-day public review period. If no requests are received and subject to the receipt of the necessary approvals, Peel Region intends to proceed to implementation of the Project, that is, detailed design and construction.

Minister of the Environment, Conservation and Parks Ministry of Environment, Conservation and Parks 777 Bay Street, 5th Floor Toronto, ON M7A 2J3 Minister.mecp@ontario.ca	**Director, Environmental Assessment Branch** **Ministry of the Environment, Conservation and Parks** 135 St. Clair Avenue West, 1st Floor Toronto, ON M4V 1P5 EABdirector@ontario.ca

The proponent, Peel Region, can be contacted as follows:

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2. Planning and Policy Context

This section provides a review of the pertinent Provincial and Municipal policy documents. The following policies may be applicable to the study area. In addition to the general objectives of these policies, specific descriptions of these policies related to municipal wastewater services are also provided.

2.1 FEDERAL POLICIES

2.1.1 FISHERIES ACT

The *Fisheries Act* requires that projects avoid causing serious harm to fish unless authorized by Fisheries and Oceans Canada (DFO) or a designated representative. The *Fisheries Act* amendment in 2019 consisted of an updated process determining potential impacts to fish and fish habitat from a project. Previously, a Self-Assessment was to be completed if the project activities met the specific criteria outlined by the DFO and/or if potential impacts could be fully mitigated. Under the *Fisheries Act* (2019), proponents undergo a self-assessment to determine if the project is located in a water body or watercourse that is exempt from the Act. If the waterbody in question is not exempt from the Act, the undertaking would require a review by DFO under the Fish and Fish Habitat Protection Program developed in associated with the *Fisheries Act* (Matrix, 2019). Efforts will be made to maintain project activities within the specific criteria to avoid causing any harm to fish.

2.1.2 SPECIES AT RISK ACT

The Federal *Species at Risk Act* (SARA) was developed to protect species that are at risk as a result of human activities on federal lands. Species listed under SARA classified as Threatened, Endangered or Extirpated within Canada are afforded protection. The Act is also responsible for the management of species of Special Concern to prevent them from becoming endangered or threatened (Government of Canada, 2017). SARA contains prohibitions against the killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling or trading of individuals of Endangered, Threatened and Extirpated Species listed in Schedule One of the Act as well as protects against the damage or destruction of their habitat.

In addition to the protection of species at risk (SAR) on federal lands, the Act also protects federally listed aquatic species and migratory birds, however the DFO is the governing authority responsible for the permitting of aquatic species.

Any SAR will be identified if located within the study area and all necessary measures and precautions will be taken for their protection.

2.1.3 MIGRATORY BIRD CONVENTION ACT

The *Migratory Bird Convention Act* and associated Regulations have the goal of ensuring the conservation of migratory bird populations by regulating potentially harmful human activities (Government of Canada, 2010). Sections 5 and 6 of the Act prohibit the destruction/disturbance of migratory bird habitat and killing/removing migratory bird fledglings, eggs, nests or other harmful activity to migratory birds.

Bird nests which are destroyed during construction activities are referred to as “incidental take” and is illegal except under the authority of a permit obtained through the Canadian Wildlife Service. If the work can be completed without interfering with or harming migratory birds, a permit is not needed. Typically, a nest sweep would be conducted during the migratory bird window from April 1 to August 30, in the case that trees need to be removed. If a nest is found, the appropriate setback would be determined, and no work would be allowed to be completed within the setback area until determined by a qualified biologist that the nest is no longer being used.

2.2 PROVINCIAL POLICIES

2.2.1 PLACES TO GROW ACT

The *Places to Grow Act*, 2005 provides a legislative framework to enable decisions about growth, which maintain a robust economy, strong communities, healthy environment and promote conservation. The Act enables planning for growth from a broad geographical standpoint, guided by long-term visions and goals and co-ordination among all levels of government.

2.2.2 PLACES TO GROW - THE GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE

Under the provisions of the *Places to Grow Act*, 2017, the initial regional growth plan known as the Growth Plan for the Greater Golden Horseshoe (GPGGH) was created and adopted by the Government of Ontario in 2006. Since the inception of this plan, there have been initiatives for better land-use planning through the development of urban growth centres and other strategic growth centers, and improvements to transportation planning through investment in regional transit. The GPGGH, 2017 seeks to build upon the 2006 framework, and guide the growth in the Greater Golden Horseshoe (GGH) area through integration of land use, infrastructure planning and public services, intensification efforts, protection and enhancement of natural and cultural heritage resources, and promotion of diverse and sustainable communities.

The GPGGH works in conjunction with other provincial policy and planning documents including the Provincial Policy Statement (PPS), the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan and the Niagara Escarpment Plan. The goals and policies of the GPGGH to build complete and prosperous communities are targeted to be achieved by 2041, the horizon year for the growth plan. These goals and policies pertain to important issues such as transportation, infrastructure, land-use planning, urban form, affordable housing, natural heritage, resource protection and resiliency against climate change. In particular, the GPGGH provides population and employment forecasts for municipalities across the GGH region, and develops principles to accommodate the projected growth through the design of complete communities.

The GPGGHs policies on planning, designing, constructing or expanding municipal water and wastewater systems focus on serving demand and growth in an optimized and efficient manner while prioritizing energy and water conservation. The system will cater to growth in a manner which achieves the minimum intensification and density targets in the GPGGH. The system will also take into account the comprehensive water or wastewater master plan or equivalent, provided by watershed planning, which will demonstrate that the quality and quantity of water will not be negatively impacted, identify the preferred option for servicing growth and development without endangering the hierarchy of services, and identify the full life cycle costs of the system and develop long-term payment options. The GPGGH ensures that the system will consider

interprovincial, national bi-national, or state-provincial Great Lakes Basin agreements or provincial legislation or strategies. To ensure that the quality and quantity of water is of highest priority, the GPGGH requires any municipalities sharing an inland water source or receiving water body will co-ordinate their planning for potable water, stormwater, and wastewater systems based on watershed planning.

2.2.3 GREENBELT PLAN

The Greenbelt Plan was prepared under the *Planning Act* and is an overarching strategy which identifies areas which should be protected from urbanization to provide permanent protection to the agricultural land base and ecological and hydrological features, areas and functions occurring in the landscape. The Greenbelt area identifies Protected Countryside Area, to which all Protected Countryside policies apply. Urban River Valley Areas are not subject to the Policies, except as set out in Section 6 of the Greenbelt Plan. Urban River Valley designation applies to lands within main corridors of river valleys connecting the rest of the Greenbelt to the Great Lakes and inland lakes. The Credit River valley corridor is identified under the Greenbelt Plan, as an Urban River Valley Area, shown on Schedule 1 and Schedule 4 of the Greenbelt Plan.

2.2.4 PROVINCIAL POLICY STATEMENT

The PPS was issued under the *Planning Act* and the new PPS came into effect May 1, 2020 (MMAH, 2020). The PPS relates to matters of provincial interest related to land use planning and development. It provides direction for appropriate development while protecting public health and safety for all Ontarians, as well as the natural and built environment (MMAH, 2020).

From the sanitary sewage services perspective, the PPS has the following objectives: accommodate growth and development by efficiently using and optimizing existing municipal and private communal sewage services; ensure that these services can be sustained by the water resources which the services rely, are feasible and financially viable, complies with all regulatory requirements and protects human health and the natural environment; promote water conservation and water use efficiency; and consider servicing and land use during all stages of planning.

Section 2.1 of the PPS - Natural Heritage, establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as ‘significant’. The Natural Heritage Reference Manual (MNRF, 2012) and the SWH Technical Guide (MNRF 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.

- Section 2.1.4 states that development and site alteration shall not be permitted in significant wetlands in Ecoregions 5E, 6E and 7E or significant coastal wetlands.
- Section 2.1.5 states that development or site alteration shall not be permitted in Significant Wildlife Habitat or other types of significant habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions.
- Section 2.1.6 states that development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

- Section 2.1.7 states that development or site alteration shall not be permitted in habitat or Endangered or Threatened species except in accordance with provincial or federal requirements.

It should be noted that Municipal Official Plans are the primary vehicle for implementation of the PPS and various government ministries, and departments are responsible for the permitting and protection of the various features described in the policy.

The above sections will be taken into consideration while developing the construction area to avoid any impacts to wetlands and habitats of significant wildlife, endangered or threatened species and fish.

2.2.5 MADE-IN-ONTARIO ENVIRONMENT PLAN

The Made-in-Ontario Environment Plan was introduced in November 2018 as a guide for Ontarians to reduce their greenhouse gas emissions and impacts on climate change through "practical, sensible, and affordable solutions" (MECP, 2018). Recognizing the ever-changing needs of the province, the Plan continues to evolve and adapt to new challenges, such as the COVID-19 pandemic, and to include new and emerging technologies as they become available.

As part of Ontario's commitment to protecting its Air, Lakes, and Rivers, the municipal wastewater and stormwater sector is tasked with improving their management and reporting strategies. These strategies could include updates to existing policies, increased investment towards emerging technologies, and enhanced monitoring to protect sewage overflow from occurring.

2.2.5.1 CONSIDERING CLIMATE CHANGE IN THE ENVIRONMENTAL ASSESSMENT PROCESS

The MECP authored *Considering Climate Change in the Environmental Assessment Process* in 2018 as a resource for project planners and developers to consult during the EA process. The guide provides practical advice for incorporating climate change considerations into the project planning process, offers options for climate change adaptation based on existing tools and research, and provides concrete examples of how climate change impacts have been considered in the past by other projects. The guide urges proponents to consider the following:

- The effects of the project on climate change;
- The effects of climate change on the project; and
- An approach to ultimately minimize negative impacts during the detailed design stage.

By considering climate change in accordance with the guide as part of the project planning process, the project will be more resilient to future changes in environmental conditions and have a positive impact on the ecological integrity of the surrounding environment.

2.2.6 CLEAN WATER ACT

The *Clean Water Act* was passed in October 2006 to identify how Drinking Water Source Protection will be carried out in Ontario. The Act established committees for source protection areas and regions to identify significant existing and future risks to their municipal drinking water sources, as well as to identify plans to address these risks.

The Credit Valley, Toronto and Region and Central Lake Ontario Areas are covered under the Credit Valley – Toronto and Region – Central Lake Ontario (CTC) Source Protection Region which spans more than 10,000 square kilometres and 33 municipalities. The Committee undertook a technical assessment of municipal water sources to identify potential vulnerabilities and prepare a Source Protection Plan.

The study area falls within the Credit Valley Source Protection area. Water is not expected to be taken directly from the municipal water supply aquifer.

The majority of the study area is located on a highly vulnerable aquifer, defined under O. Reg 287/07 as an aquifer "on which external sources have or are likely to have a significant adverse effect". In this area, soils are likely coarse or sandy with a high groundwater table which allows for water to travel more quickly from the surface to the aquifer. Highly vulnerable aquifers have a vulnerability scale of 6 out of 10, and the highly vulnerable aquifer in the study area is considered a 6 in terms of vulnerability. Significant groundwater recharge areas have a vulnerability score of 6 out of 10 for highly vulnerable areas. A small portion of the study area is considered a significant groundwater recharge area, ranging in vulnerability from 6 (high) to 4 (moderate). In these areas, it is possible for larger volumes of water to make their way to the aquifer from the surface which can ultimately impact the recharge capacity of the aquifer. Notably, the study area is not considered a Wellhead Protection Area, Intake Protection Zone, Issue Contributing Area, or Event Based Area.

2.2.7 ENDANGERED SPECIES ACT

The *Endangered Species Act* provides for the conservation and protection of fauna and flora species within the Province of Ontario that are threatened with extinction (Government of Ontario, 2008). Species in Ontario designated as Threatened, Endangered or Extirpated and their habitats automatically receive protection under the *Endangered Species Act* (Government of Ontario, 2008). Species at Risk Branch was contacted on April 1, 2019 to confirm SAR within the Study Area

No specific protection is provided to species listed as Special Concern, however, Special Concern species are considered Species of Conservation Concern and their habitat is considered Significant Wildlife Habitat (SWH) and receives protection under the PPS. In order to balance protection and recovery goals with social and economic considerations, the Act provides the MECP the authority to issue permits or enter into agreements with proponents in order to authorize activities which would otherwise be prohibited by the Act. In instances where a SAR or their critical habitat is observed, an Overall Benefit permit may be required to move the SAR or alter their habitat. The Overall Benefit permit provides authorization to perform the activity that would otherwise be prohibited, as long as an overall benefit to the species is provided (Government of Ontario, 2008). Ontario Regulation 242/08 also outlines various exemptions or

agreements that may be employed under the Act, which are project or species specific (Government of Ontario, 2008).

2.2.8 CONSERVATION AUTHORITIES ACT

Section 28(1) of the *Conservation Authorities Act* provides Conservation Authorities with the ability to make regulations governing development that can have an impact to watercourses and water bodies (Government of Ontario 2013). Under the Act, a permit is required from the applicable Conservation Authority (e.g., Credit Valley Conservation (CVC)), before any site alteration to a watercourse, water body or wetland. The CVC also has the authority to grant permission to straighten, change, divert or interfere with the existing channel of a river, creek, stream or watercourse, or to change or interfere with a wetland under conditions outlined in the Act and associated regulation. The study area is partially within the CVC regulated watershed area. The CVC implemented Ontario Regulation 160/06 - Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

The project involved consultation with CVC to discuss mitigation measures along the Credit River, Mullet Creek and the Unnamed Tributary of Mullet Creek within the study area.

2.2.9 CREDIT RIVER FISHERIES MANAGEMENT PLAN

The Credit River Fisheries Management Plan (CRFMP) was created by the Ministry of Natural Resources and Forestry (MNRF) and CVC to protect the fisheries of the Credit River as it is an essential measure of the ecological health and sustainability of the Credit River watershed. Changes to the surrounding land use practices could lead to changes in the river, which may harmfully impact the fisheries including the fish community and its productivity. The CRFMP condensed a short-term list of issues, strategies and tactics on subjects of water quality and quantity, physical habitat, angling opportunities, enforcement, awareness and species mix and partitioning. The plan also provides a wide range of recommendations to protect, enhance and rehabilitate the aquatic ecosystem of the Credit River watershed.

Consultation with MNRF and CVC will be required to discuss mitigation measures along the Credit River within the study area to prevent any harm to the Credit River fisheries.

2.3 MUNICIPAL POLICIES

2.3.1 REGION OF PEEL OFFICIAL PLAN

As the population of Peel Region continues to grow, there is a need for the Region to be able to provide services to its community. The Official Plan serves as a long-term policy framework for decision making from the provincial to the municipal level. It allows for detailed planning for protecting the environment, resource management, directing growth and sets the basis for providing Regional services efficiently.

In terms of sanitary sewage services, the Peel Region Official Plan's objective is to:

- Provide full municipal sewage and water services to accommodate growth in the Urban System to the year 2031 and the three Rural Service Centres to the year 2021.
- Ensure that a Servicing Agreement is finalized with the Region prior to any development requiring additional or new water supply and/or sanitary sewer services.

- Continue to have water and/or sewer services provided by private or communal systems, where suitable and planned for existing and future development.
- Consider the financial, operational and environmental impacts and long-term suitability of communal wastewater systems.
- Connect with the public and businesses to apply water conservation strategies to improve the efficiency of the system.
- Plan, construct, expand, extend, operate and maintain water and sanitary sewer services such that it protects the environmental systems and natural resources of Peel Region in a manner consistent with the objectives and policies in the Peel Region Official Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Greenbelt Plan.
- Reduce loads to the sanitary sewers and sewage treatment plants through Peel Region's sewer use by-law, education and the proper disposal of household hazardous waste.
- Conduct a water efficiency strategy with a goal to reduce per capita consumption by 10-15% over the next 20 years.

The Official Plan recognizes the need for effective environmental protection and management measures to ensure environmental sustainability. The Official Plan has created a Greenland System, made up of Core Areas, Natural Areas, and Corridors. The natural corridor associated with the Credit River valley system is designated as a Core Area. In the event that any of the designated areas are impacted, the Official Plan requires rehabilitation of the ecological features lost through replacement (Region of Peel, 2014).

2.3.2 WATER AND WASTEWATER MASTER PLAN FOR THE LAKE BASED SYSTEMS

Peel Region completed a Master Plan for the Water and Wastewater for the Lake Based Systems in 2013. The 2013 Master Plan builds on work undertaken as part of the 1999 Master Plan, the 2002 Master Plan Addendum and the 2007 Master Plan Update. The 2013 Master Plan provides the framework and vision for the water and wastewater servicing needs for the Region to 2031 and beyond. In terms of sanitary sewage services, the key objectives of the Master Plan include the following:

- Review planning forecasts to 2031 and determine the impacts on servicing needs.
- Evaluate and incorporate proposed water and wastewater infrastructure needs to 2041 and 2051.
- Review the Region's current water and wastewater servicing strategies to ensure the existing servicing agreements with York Region and the City of Toronto are supported.
- Analyze and review water and wastewater servicing requirements.
- Address servicing considerations including, but not limited to, level of service, operational flexibility, security of supply, mitigation of impacts to natural, social and

economic environments, meet criteria specified in policies, regulations and technical requirements, and cost efficiency.

- Integrate sustainable solutions into servicing.
- Apply updated industry trends to provide better capital cost estimates.
- Utilize recently completed and on-going projects to update infrastructure status, capacity and cost estimates.
- Apply the most up to date water and wastewater hydraulic models for analyzing servicing alternatives.
- Establish a complete and feasible water and wastewater capital program.
- Involve the public and stakeholders for extensive consultation.

As part of the Master Plan, existing infrastructure conditions and capacities were established which provided the basis for future recommendations. An assessment of future flows and impact on the wastewater collection system was analyzed to develop and recommend servicing strategies.

The Master Plan noted that the InfoWorksCS hydraulic model was used to assess the Region's wastewater collection system's performance under dry and wet weather conditions. According to the model results, the CVTS has insufficient capacity for peak flows under both the existing and future conditions. Diversion of flows between the CVTS and the WTS can augment operational flexibility, redundancy and provide additional capacity to better manage wet weather flows.

2.3.3 CITY OF MISSISSAUGA OFFICIAL PLAN

The City of Mississauga has adopted the 'Green System' that incorporates the natural heritage system, the urban forest, natural hazard limits, and parks/open spaces which all contribute to a healthy natural environment in the City (Mississauga, 2019). The natural heritage system is protected from development to maintain the ecological functions of the area. The natural corridors associated with the Credit River, Mullet Creek and Unnamed Tributary of Mullet Creek are designated as 'Significant Natural Areas' under the City's natural heritage system. Negative impacts that cannot be avoided will require mitigation through replacement (Mississauga, 2018).

Any development or alteration, where tree preservation is not feasible, a replacement must be completed in compliance with the City's tree permit bylaw and a Landscape Restoration Plan may need to be developed for review and approval by the City to replace any lost trees.

Two corridors of Natural Hazards extend north-south through the study area, one associated with the Credit River main branch, east of Queen Street, and the other just west of Queen Street, associated with Mullet Creek, within the Credit River watershed. According to Schedule 3 of the City of Mississauga Official Plan (2019), the two features are Significant Natural Areas and Natural Green Spaces. Associated with the Credit River main branch, there are two Areas of Natural and Scientific Interest of Provincial Significance, however they are both located outside of the study area. There is a small segment of the Significant Natural Areas and Natural Green Space, which crosses Erin Mills Parkway and Eglinton Avenue just east of Erin Mills Parkway.

North of Britannia Road, and just west of Queen Street is a small area identified as Special Management Area.

2.3.3.1 STREETSVILLE COMMUNITY NODE

Streetsville is located south of Britannia Road, and is identified in Schedule 9 as the Streetsville Community Node. There are locations within the Node, which require special attention and have a number of pertinent policies that must be followed. The Node commences at Britannia Road, and extends southerly on both sides of Queen Street, down to Princess Street. The Node provides policies related to planned development, pertinent to residential office, motor vehicle and commercial, business and employment, as well as industrial.

2.4 NEED AND JUSTIFICATION

This section provides a review of the need and justification for the project which forms the basis for the problem/opportunity statement.

2.4.1 PROBLEM/OPPORTUNITY STATEMENT

The CVTS was originally constructed in the late 1960s and extends from the Clarkson Wastewater Treatment Plant (CWWTP) to just north of Britannia Road, east of Mississauga Road in the Credit River Valley.

The CVTS has been responsible for servicing the west portion of the Region for almost half a century. As noted within the Master Plan, the age and capacity constraints of the CVTS are problematic, and need to be addressed to better manage existing and projected wastewater flows. To alleviate these issues, the Region has identified the need to undertake the rehabilitation of the CVTS. The Region recognizes that in order to implement significant lengths of rehabilitation of the CVTS, sequenced large scale temporary bypass pumping operations would be required to isolate appropriate section lengths of the sewer, which is not feasible from both a scheduling and financial perspective. Furthermore, the Region has identified the added benefits of redundancy and dynamicity of operations by linking the CVTS to the newly constructed WTS along Erin Mills Parkway via permanent trunk sanitary sewer connection.

To summarize the identified issues driving the project and the generalized approach to a solution, the following problem/opportunity statement has been developed:

There is a need to undertake the rehabilitation of the existing CVTS. To complete this work, it will be necessary to divert some or all of the flow to the recently constructed WTS so that it can be undertaken in conditions of low to no flow. It is therefore necessary to undertake an interconnection between the CVTS and the WTS which has the benefit of providing operational flexibility, redundancy and additional capacity to better manage wet weather flows.

3. Existing Conditions

3.1 EXISTING AND FUTURE LAND USES

3.1.1 EXISTING LAND USES

This section describes the existing land uses within the study area.

Along Britannia Road, between Erin Mills Parkway and Queen Street, land use consists of 'Business Employment' on the north side, and residential on the south side, of varying densities. At Queen Street, the land use is 'Mixed Use' extending east and west along Britannia Avenue.

The majority of the land uses along Queen Street, consist of 'Mixed Use' and 'Business Employment' north of Britannia Road, and 'Mixed Use' south of Britannia Avenue. The 'Mixed Use' extends southerly on Queen Street until just south of Thomas Street, and then changes to 'Low Density Residential'.

The majority of the land uses along Eglinton Avenue consist of residential on both sides, and a small mixed use area adjacent to 'open park space'. The Credit Valley Hospital is located in the southeast quadrant of Erin Mills Parkway and Eglinton Avenue West, as well as office space associated with the hospital and medium density residential.

3.1.2 CHURCHES AND HERITAGE CENTRES

There are six churches/heritage centres located within the study area including: 7 Altars Coptic Church; Hindu Heritage Centre; The Church of Mississauga (northwest corner of Britannia Road West and Mississauga Road); Mississauga West Christadelphians; Croatian Martyrs (southeast corner of Eglinton Avenue West and Mississauga Road); and Kingdom Hall of Jehovah's Witness (northwest corner of Queen Street South and Erin Centre Boulevard).

3.1.3 EMERGENCY SERVICES

Mississauga Fire Station 108 is located north of Britannia Road, between Erin Mills Parkway and Mississauga Road. Peel Regional Paramedic Services is located in the southeast corner of Thomas Street and Erin Mills Parkway. There are no police stations within the study area, however there are two in close proximity, including the Peel Regional Police Headquarters located along Mississauga Road, north of Highway 401, as well as a Peel Regional Police station located in the northwest corner of Erin Mills Parkway and Dundas Street West.

3.1.4 SCHOOLS

There are a number of schools within the study area, including four private schools, most of which are located along Queen Street South. There are two elementary public schools - one on each side of Queen Street South within the residential neighbourhoods. There is a secondary public school located west of Queen Street south, and one Catholic elementary school, located east of Queen Street.

3.2 PHYSICAL ENVIRONMENT

3.2.1 AREAS OF POTENTIAL CONTAMINATION

A Phase 1 Environmental Site Assessment (ESA) was completed along each of the major roadways within the study area to document Potential Sources Of Contamination (PSCs). A copy of these reports are included in Appendix A. The findings for the study area roadways included:

- Britannia Road West, between Erin Mills Parkway and just east of Queen Street.
    - Two PSCs were identified adjacent to Britannia Road West including the CPR tracks and a gas station/auto service station.
- Mississauga Road/Queen Street North & South between Alpha Mills Road and just south of Eglinton.
    - There were 12 identified PSCs at 10 locations on properties adjacent to Queen Street North with the majority being gasoline service stations, auto repair stations, auto sales and service dealerships and a GO Transit Garage.
    - Three PSCs were identified adjacent to Mississauga Road including the CPR tracks, a gas station and an auto repair shop.
- Eglinton Avenue West from just west of Erin Mills Parkway to east of Mississauga Road.
    - No PSCs were identified adjacent to Eglinton Avenue West in the study area.
- Erin Centre Boulevard from Mississauga Road to Erin Mills Parkway
    - No PSCs were identified adjacent to Erin Centre Boulevard in the study area.

3.2.2 GEOTECHNICAL AND HYDROGEOLOGICAL BACKGROUND REVIEW

The following sections are a synopsis of the Geotechnical and Hydrogeological Background Review (refer to Appendix B) which reviewed a significant number of existing geotechnical and hydrogeological reports for previous projects within the study area.

3.2.2.1 GEOLOGIC HISTORY OF THE AREA

Southern Ontario, including the study area, has been subjected to extensive glaciations during the last 20,000 years. At least four periods of glaciations are known to have occurred within this period of time which were interrupted by warmer climate inter-glacial periods. The last glacier (Wisconsin Glacier) withdrew from the area approximately 8,000 to 10,000 years ago.

Remnants from the soil deposits laid down during the first three glaciations and the inter-glacial periods have been largely or completed obliterated by the last Wisconsin Glacier. As the last glacier retreated eastward into the Lake Ontario basin, a shallow water body, Lake Peel, was dammed between the ice front and the Niagara Escarpment. Traces of glacial lake sediments can be found in shallow depressions along the creek and river valleys. Sands and gravels left behind as near shore, or delta deposits, can also be found in the area. As the glacier withdrew further,

and when drainage via the Hudson River into the Atlantic Ocean became possible, lake levels stabilized into the Lake Ontario basin. This stable stage formed the prominent shoreline of glacial Lake Iroquois, the remnant of which can be found a short distance south of Dundas Street.

The study area lies within the physiographic region known as the South Slope. The South Slope is comprised of calcareous clay till with lacustrine clay and silt reworked by the aforementioned glaciers, with numerous scattered drumlins and deep valley cuts caused by flowing streams towards Lake Ontario. The surface topography slopes gradually and uniformly towards Lake Ontario. The main geologic units found across the study area are the Queenston and Georgian Bay Formations. The Georgian Bay Formation consists of blue-grey shale interbedded with minor siltstone and limestone. The overlying Queenston Formation consists of brownish red to maroon, slight calcareous to non-calcareous, sparsely fossilferous and locally gypsiferous shale interbedded with grey green shale, bioclastic limestone and calcareous siltstone. Mississauga Road, Queens Street North, and Queens Street South are near the contact zone between the two formations, therefore both rock types are present in the local stratigraphy.

3.2.2.2 GENERAL SUBSURFACE CONDITIONS

Existing boreholes in the study area were advanced to depths ranging between approximately 3 m to 70 m below the existing ground surface. Generally, the subsurface conditions in the study area consist of relatively shallow overburden deposits with local deep deposits along sections where it is believed that former river valleys and buried erosion channels may exist. The overburden is underlain by shale bedrock of the Queenston and/or Georgian Bay Formations. the soil stratigraphy in the existing borehole logs can be summarized in the following strata units: topsoil/asphalt and fill materials; clayey silt to silty clay deposits; cohesive till deposits; granular till deposits; deformation till deposit; and, sand and gravel to sand to silt sand/sandy silt to and silt/silt deposits. The overburden is underlain by local bedrock, which can be described as shale interbedded with thin limestone and siltstone layers from the Queenston Formation overlying shale interbedded with thin limestone layers from the Georgian Bay Formation. The interpreted bedrock surface was encountered in boreholes at depths ranging from 0.5 m to 46 m below existing ground surface. Despite this wide range, bedrock was typically encountered at an average depth of 7 m below ground surface. The groundwater levels in existing boreholes ranged from 1.3 m to 14.5 m (average depth of 4 m below existing ground surface), with hydraulic conductivity values ranging from 7.7×10^{-7} to 1.5×10^{-4}.

3.2.2.3 NOTABLE GEOLOGIC FEATURES

A major system of buried valleys extending from Lake Huron to Lake Ontario intersects with the study area. Recent project experience and existing geotechnical investigation data have identified several of these buried valley features, including a buried valley near the intersection of Highway 403 and Erin Mills Parkway, as well as a second buried valley near the intersection of Burnhamthorpe Road West and Erin Mills Parkway. A third buried valley feature near the intersection of Erin Mills Parkway and Britannia Road, was encountered during the construction phase of the West Trunk Sewer, and this deep, water bearing buried valley significantly impeded tunnel mining operations. There is an apparent history of buried valleys in the study area and the identification of these features during the design phase of the project will be critical to the success of the project. To mitigate the risk associated with buried valleys, a full suite of geotechnical and

hydrogeological investigations will be carried out during the design phase to identify the aforementioned features. Peel Region has also opted to undertake a geophysical investigation of the entire project alignment during the EA phase to further assist with the identification of notable geologic features.

3.2.2.4 GEOPHYSICAL INVESTIGATION RESULTS

To further refine the understanding of the subsurface conditions within the study area, geophysical investigations were undertaken for all areas corresponding with the noted alignment alternatives. Seismic refraction and multi-channel analysis of surface wave (MASW) interpretation techniques were performed on common data sets along segments of Britannia Road West, Mississauga Road/Queen Street, Eglinton Avenue West, Turney Woods, Woodland Chase Trail and Erin Centre Boulevard resulting in the collection of approximately 10 km of seismic survey data. Based on this seismic survey data, interpreted geological profiles based on the combined shear wave (s-wave) and compressional wave (p-wave) velocity models were developed to provide an indication of subsurface geological conditions. Table 3-1 provides a brief summary of the geophysical investigation findings specifically with respect to interpreted bedrock elevations:

Table 3-1: Geophysical Investigation Bedrock Depths

Seismic Data Location	Bedrock Elevations (m)	Bedrock Depth (m)
Britannia Road West (Credit River Crossing to Erin Mills Parkway)	143 - 171	3.5 - 34
Mississauga Road/Queen Street (Britannia Road to Eglinton Ave. West)	139 – 162	4.5 – 13.5
Eglinton Avenue West	134 – 162	3.5 – 18
Woodland Chase Trail	145 – 158	6.5 – 18
Turney Woods	-	7.5 – 23
Erin Centre Boulevard (Queen Street to Erin Mills Parkway)	141 – 163	8.5 – 20

One of the prime motivators to undertake the geophysical investigations was to ascertain an indication of the presence of geological hazards (i.e., buried valleys) along the alternative alignments being considered. In advance of having access to a geotechnical data report, which is typically produced during the detailed design phase following borehole drilling and analysis, the seismic data and associated interpreted bedrock profiles can provide an indication of any potential buried valleys within the study area. Based on the review of the interpreted geological profiles from the analysis, it appears that all alignment alternatives place the conceptual alignment of the project sewer within potential zones of increased bedrock weathering, with the Britannia alignment (featured on EA alternatives 2 and 3 exclusively) indicating the presence of a noteworthy buried valley shown in Figure 3-1. Other interpreted bedrock valleys were also noted along Eglinton Avenue West east of Erin Mills Parkway (featured on EA alternatives 1, 2 and 3) and along Erin

Centre Boulevard east of Erin Mills Parkway (featured on EA alternative 4 exclusively) shown in Figure 3-2 and Figure 3-3 respectively.

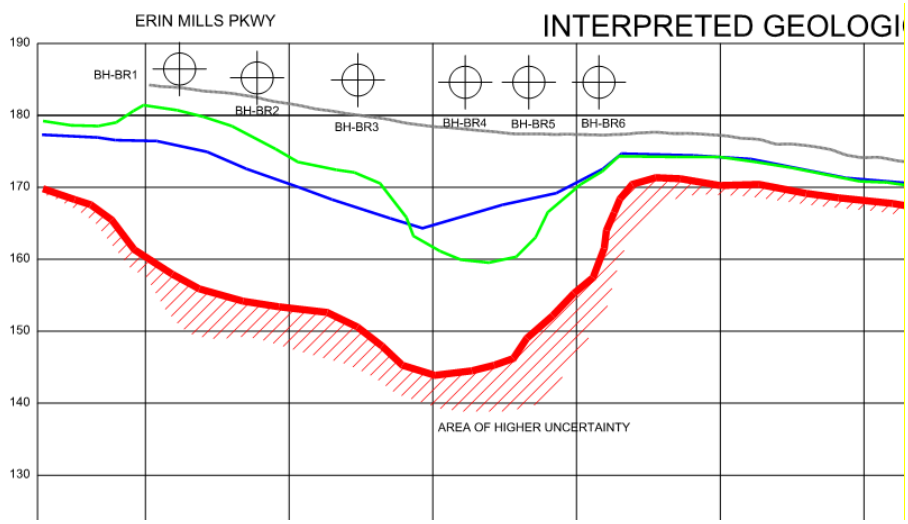

Figure 3-1: Excerpt of the Britannia Road West Seismic Profile

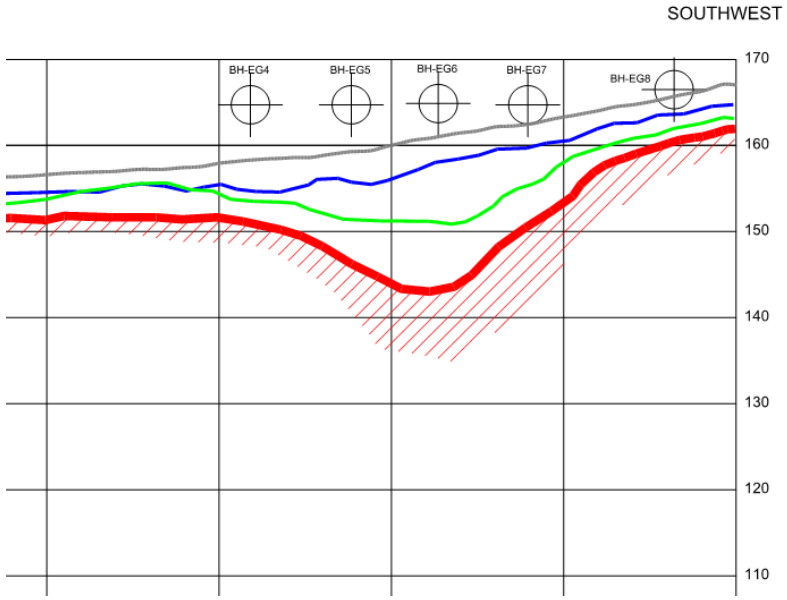

Figure 3-2: Excerpt of the Eglinton Avenue West Seismic Profile

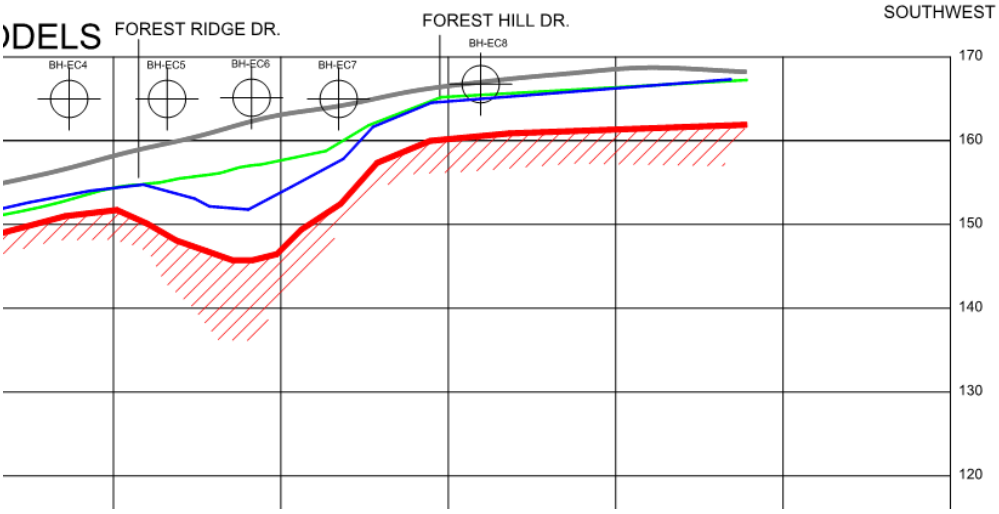

Figure 3-3: Excerpt of the Erin Centre Boulevard Seismic Profile

These findings are consistent with the issues encountered during the trenchless installation of the West Trunk Sewer, specifically the buried valley that was encountered in close proximity to the Erin Mills Parkway and Britannia Road West intersection. The results of this seismic data can be further interpreted upon the future completion of confirmatory boreholes.

An added benefit of undertaking the geophysical investigation is the generation of a list of recommended borehole locations, all of which will be considered when developing the scope of work for the geotechnical investigations to be undertaken during the detailed design phase. The entirety of the geophysical investigation reports and all associated findings can be found within Appendix M.

3.2.3 EXISTING WASTEWATER SERVICING

The Peel Region wastewater system comprises two principal trunk sewer systems: the West Trunk System and the East Trunk System.

The East Trunk System conveys flows along and near the Etobicoke Creek Valley to the G. E. Booth Wastewater Treatment Plant. More relevant to this project, the West Trunk system of the Peel Wastewater system was originally constructed in the late 1960s/early 1970s and services the west portion of Peel Region. For the West Trunk system, flow is transported along and near the Credit Valley to the Clarkson Wastewater Treatment Plant (CWWTP) via the CVTS. Since 2016, construction of the new WTS along Erin Mills Parkway has been underway. The four EA alternative alignments under review for the West Trunk Sewer Diversion identify alternative methods of diverting flows from the CVTS to the WTS.

3.2.4 LAND USE COMPATIBILITY

The MECP published the D-Series guidelines to guide land use planning authorities on the assessment of nuisances related to noise, vibration, dust and odour emitted from facilities such as sewage treatment plants, landfills and industrial facilities. The guidelines suggest separation distances, mitigation measures and warning clauses to protect sensitive land uses from noise-, vibration-, dust- and/or odour-emitting facilities.

The scope of this Class EA does not include processes that are anticipated to emit noise, vibration, dust and/or odour during normal operation. Related processes that may require an assessment of impacts on sensitive receivers include the operation of wastewater treatment plants and pump stations, but are not included in the scope of this study. Further, the proponent of the project will be responsible for mitigating nuisances during construction as described in Section 6.1.2.

As the proposed West Trunk Diversion does not include processes that are reasonably expected to impact nearby sensitive receivers, the West Trunk Diversion is anticipated to be compatible with the existing and future surrounding land uses.

3.3 NATURAL ENVIRONMENT

Natural heritage features within the study area were documented as part of this assessment, and the associated report is contained in Appendix C.

3.3.1 SOILS

The study area is within the drumlinized till plains and moraines of the South Slope physiographic region of southern Ontario. According to surficial geology mapping, the study area is underlain by clay to silt-textured till derived from glaciolacustrine deposits or shale; coarse-textured glaciolacustrine deposits of sand and gravel; fine-textured glaciolacustrine deposits of silt and clay and modern alluvial deposits of clay, silt, sand and gravel. Different types of surficial soils present in the study area include: Oneida clay loam, a grey-brown podzolic which drains well; Chinguacousy clay loam, a grey brown luvisol which has imperfect drainage; Bottom Land alluvial soil which has little profile differentiation and variable drainage; and Jeddo clay, a dark grey gleisolic which has poor drainage.

3.3.2 BEDROCK

The main geologic units found across the West Trunk Diversion Sewer project are the Queenston and Georgian Bay Formations. The Georgian Bay Formation consists of blue-grey shale interbedded with minor siltstone and limestone. The overlying Queenston Formation consists of brownish red to maroon, slight calcareous to non-calcareous, sparsely fossilferous and locally gypsiferous shale interbedded with grey green shale, bioclastic limestone and calcareous siltstone. Mississauga Road, Queens Street North, and Queens Street South are near the contact zone between the two formations, therefore both rock types are present in the local stratigraphy.

3.3.3 WATERCOURSES

Three watercourses that exist within the study area include the Credit River, Mullet Creek and the Unnamed Tributary of Mullet Creek. As defined by the *Fisheries Act*, these watercourses support or provide habitat for fish that are a part of Commercial, Recreational, or Aboriginal (CRA) Fishery; and as indicated by the MECP, provide habitat for American Eel specifically in the Credit River, which is an endangered species protected under the provincial *Endangered Species Act*.

Work is only permitted in the CVC regulated area if it is authorized by the CVC and completed in accordance within provincial and federal requirements. To avoid any potential negative impacts from site alteration that will affect fish habitat, the Credit River Fisheries Management Plan identifies setbacks which protect riparian areas and provide guidance on which natural buffers should be used for watercourses. The minimum setback considered to be used for these three watercourses, is whichever is greater of the watercourse meander belt width or 30 m.

3.3.4 DESIGNATED NATURAL AREAS

The CVC indicated that Erin Woods (northeast of Erin Centre Boulevard and Erin Mills Parkway) is considered an Environmentally Significant Area. No Areas of Natural and Scientific Interest (ANSI) were identified within 120 m of the proposed alignments during background review or preliminary field review.

The valleylands and riparian habitat associated with the three watercourses are designated as ‘Natural Significant Areas’ and are considered part of the ‘Green System’ as per the Mississauga Official Plan (Mississauga, 2016).

The Mullet Creek valleylands upstream of Britannia Road are identified as “Special Management Area” under the natural heritage system of the Mississauga Official Plan. The Credit River is part of Peel Region’s designated Greenlands System “Core Areas” (Region of Peel, 2016). All three watercourse’s floodplain areas are regulated by the CVC.

The following designated natural areas/habitats occur within the study area:

- Credit River (warmwater feature with coldwater migratory corridor).
- Mullet Creek (warmwater feature).
- Regionally significant core features.
- Significant natural areas and natural green spaces.
- Special management areas.
- Significant woodlands.
- Significant valleylands.
- Unevaluated wetlands.

Based on a background review and preliminary site screening, Turney Woods Park and Erin Woods (northeast quadrant of Erin Mills and Erin Centre Boulevard) meet the criteria for a significant woodland under the City of Mississauga Official Plan and are considered Significant Natural Areas and Natural Green Spaces. Due to the close proximity to watercourses, the woodland associated with the Credit River and Mullet Creek valley corridors are considered significant.

3.3.5 SPECIES AT RISK - AQUATIC AND TERRESTRIAL

3.3.5.1 AQUATIC SPECIES AT RISK

The MECP indicated that a large number of SAR may be present within the study area. This detailed list is included in Appendix C.

The DFO aquatic SAR mapping for the study area indicates that no aquatic SAR have been identified within the Credit River, Mullet Creek or the Unnamed Tributary of Mullet Creek. However, the MECP indicated the presence of four aquatic SAR with potential to be present within the study area including:

- American Eel - species designated as “Endangered” and protected under the provincial *Endangered Species Act* and listed as ‘under consideration’ (for listing) under the federal SARA.
- Lake Sturgeon Great Lakes St. Lawrence River population designated as “Threatened” and protected under the *Endangered Species Act* and ‘under consideration’ for listing federally under the SARA.
- Redside Dace and Shortnose Cisco both designated as “Endangered” provincially and federally and protected under the ESA and SARA.

3.3.5.2 TERRESTRIAL SPECIES AT RISK

The Natural Heritage Information Centre search of the study area identified one additional SAR, which includes Henslow’s Sparrow. The Ontario Breeding Bird Atlas (OBBA) provided records for nine SAR which included Barn Swallow, Bank Swallow, Bobolink, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Wood-Pewee, Peregrine Falcon and Wood Thrush. The Ontario Reptile and Amphibian Atlas (ORAA) provided records of six SAR which included the Blanding’s Turtle, Eastern Milksnake, Eastern Ribbonsnake, Jefferson Salamander, Northern Map Turtle, and Snapping Turtle. The Ontario Butterfly Atlas (OBA) provided records of one SAR being within the area, which was a Monarch.

A more detailed list of SAR that have the potential to be found within the study area is included in Appendix C, Table 2. Species which have potential for their habitat to be within the study area include: American Ginseng, Nine-spotted Ladybird Beetle, Barn Swallow, Chimney Swift, Little Brown Myotis, Northern Myotis and American Eel.

3.3.6 AQUATIC HABITAT & FISH COMMUNITY

3.3.6.1 AQUATIC HABITAT

The MNRF has indicated that the part of Credit River within the study area is a resident warmwater system with a coldwater migratory corridor. Preliminary investigations have determined the following:

- Where Britannia Road crosses over the Credit River, there is direct fish habitat which supports bait/forage fish and sensitive coldwater sportfish.
- It flows within a deep river valley in a relatively wide floodplain.
- The riparian zone consists of open meadow with scattered trees and is occupied by an urban park-like environment.
- At the reach of the Credit River, a quality and diverse instream habitat is provided for a variety of fish species, but poorer water quality exists downstream of Highway 401.

The Credit River Fisheries Management Plan has indicated that Mullet Creek located within the vicinity of the study area is classified as a small warmwater fish community dominated by cyprinids such as Creek Chub, Blacknose Dace, Brook Stickelback, Bluntnose Minnow, and Fathead Minnow. Preliminary investigations have determined the following:

- It is a highly altered permanent watercourse that provides direct habitat for bait/forage fish.
- Significant change and negative influences from landscape change and urbanization over time have occurred within the subwatershed.
- Species diversity has decreased over time due to habitat degradation.
- The fish community is mainly comprised of habitat generalists that are tolerant of turbidity and poor water quality.

Preliminary investigations of the Unnamed Tributary of Mullet Creek have determined the following:

- Provides direct habitat for bait/forage fish.
- The upstream reach has been altered near the proposed Eglinton Avenue crossing due to the creation of two online stormwater management ponds, and the downstream reach has been channelized and hardened with gabion baskets.
- Similar to Mullet Creek, the unnamed tributary likely supports a bait/forage fish community that is tolerant of degraded habitat and poor water quality.

3.3.6.2 FISH COMMUNITY

As indicated by the MNRF with information obtained from the Land Information Ontario database, a number of species can be found in the Credit River. The species that can be found in Mullet Creek are migratory species and appear seasonally near the confluence with the Credit River. A full list of species likely found within the study area can be found in Appendix C.

A number of crossings have been identified within the study area. Fish community information at these crossings can be found below:

- Britannia Road Crossing of Credit River: As indicated by the CVC from historical fish sampling between from 1954, 1983 and 1984, the following species can be found: Eastern Blacknose Dace, Blacknose Shiner, Bluntnose Minnow, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Longnose Dace, Northern Hog Sucker, Rock Bass, Rainbow Darter, Stonecat and White Sucker
- Britannia Road Crossing of Mullet Creek: As indicated by the CVC from historical fish sampling between 1954 and 1995, the following species can be found: Brook Stickleback, Bluntnose Minnow, Common Shiner, Creek Chub, Johnny Darter, Pumpkinseed, Rainbow Darter, Rock Bass and White Sucker.
- Eglinton Avenue of Mullet Creek Crossing: Fish sampling conducted by the CVC in 2012 and 2018 900 m downstream from the Eglinton Avenue crossing near Highway 403 indicated that Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Creek Chub, Fathead Minnow and Pumpkinseed are located in this area.
- Erin Centre Boulevard of Mullet Creek Crossing: Due to close proximity of the Eglington Crossing, a similar fish community as noted above would be expected.

In addition to species found in the Credit River and Mullet Creek, CVC underwent historic fish sampling in 1954 and 1965 at the Unnamed Tributary of Mullet Creek: As indicated by the CVC, Blacknose Dace, Common Shiner, Creek Chub, Hornyhead Chub and White Sucker were found in the study area. No recent fish sampling in this area has been conducted.

3.3.7 SIGNIFICANT LANDFORMS AND WETLANDS

There are no Provincially Significant Wetlands (PSW) within the study area, however the CVC indicated that there is a wetland mapped within a portion of Turney Woods Park. This wetland has not been identified as provincially significant. There were no other wetlands within 120 m of the proposed alignments. A 30 m development setback is recommended for any wetlands located within the preferred alignment.

3.3.8 WILDLIFE AND WILDLIFE HABITAT

3.3.8.1 WILDLIFE HABIT

Birds

- The following bird species were incidentally observed within the study area during field investigations: Black-throated Blue Warbler *(Setophaga caerulescens*), Chestnut Sided Warbler (*Setophaga pensylvanica*), Red-winged Blackbird (*Agelaius phoeniceus*), Red-tailed Hawk (*Buteo jamaicensis*), Black-capped Chickadee (*Poecile atricapillus*), Mourning Dove (*Zenaida macroura*), American Robin (*Turdus migratorius*), American Crow (*Corvus brachyrhnchos*), an unidentified sparrow (*Melospiza sp.*), and Blue Jay (*Cyanocitta cristata*). A number of SAR birds were identified as potentially present during the background review, but none were identified during the preliminary investigations.

Herpetofauna	• The ORAA found two SAR herptiles, including the Jefferson Salamander and Snapping Turtle. Preliminary field investigations did not find any reptiles or amphibians incidentally observed within the study area.
Insects	• The OBA found one record of a SAR insect, Monarch Butterfly, within the study area. No other SAR insects were identified by the MECP to be present within the study area. No insects were incidentally observed within the alignment study areas during preliminary field investigations.
Mammals	• Several Eastern Grey Squirrels (*Sciurus carolinensis*) and evidence of a Coyote (*Canis Iatrans*) with warning signs, were found within Turney Woods Park. No other SAR mammals were observed within the study area, however, several SAR mammals were identified as potentially present in the background review.

3.3.8.2 SIGNIFICANT WILDLIFE HABITAT

The study areas are located within Ecoregion 7E. The four categories of significant wildlife habitat located within this region are outlined below:

Seasonal Concentration Areas: The screening exercise identified the following seasonal concentration areas SWH types as candidate (potentially present) within the study areas:

- Raptor Wintering Area - Raptor wintering areas must provide a combination of forest communities and field/meadow communities to provide opportunities for roosting, foraging and resting to ensure winter survival. Bald Eagle in particular, require forest communities in close proximity to large rivers or open water for hunting. The SWH screening exercise indicated that the alignment study areas do not provide a suitable combination of forest and meadow communities to support overwintering raptors, however the Credit River valley likely provides suitable overwintering habitat for Bald Eagle.
- Bat maternity colonies - Many species of bats form roosting colonies during the day in small spaces found in loose bark, hollow trees, rock faces, and human structures. Other species will roost in foliage high up in the tree canopy. Based on the SWH screening exercise, there are two wooded areas within alignment study areas which may provide suitable bat maternity, Turney Woods Park and the ESA in the northeast quadrant of the Erin Mills Parkway and Erin Centre Boulevard intersection. No formal assessment has been completed for these areas, and additional bat habitat surveys may be required as a result of the design of the preferred alignment and its potential to impact this SWH type.
- Turtle wintering areas - Turtle wintering areas are the same general area as their core habitat. Over wintering waterbodies must have soft muddy bottoms and adequate water depth so as not to completely freeze over. The Credit River provides suitable overwintering habitat for Snapping Turtle within the study area. Additional surveys may be required depending on the design of the preferred alignment and the potential for impact to this SWH type.

Rare Vegetation Communities and Specialized Habitat for Wildlife: No rare vegetation communities were identified during the preliminary screening of the study areas. However, Amphibian Breeding Habitat (Woodland) was identified as a Specialized Habitat within the alignment study areas.

Habitat for Species of Conservation Concern (not including Endangered or Threatened Species): The SWH screening exercise resulted in the identification of habitat potential for several SoCC within the alignment study areas including Bald Eagle, Eastern Wood Pewee, Peregrine Falcon, Monarch Butterfly, Yellow-banded Bumblebee and Snapping Turtle.

Animal Movement Corridors: No animal movement corridors within any of the alignment study areas.

3.3.9 VASCULAR FLORA

The following vascular plants were incidentally observed during the field survey: American Beech (*Fagus grandifolia*), maples (*Acer sp*.), Red Oak (Quercus rubra), White Pine (*Pinus strobus*), Black Walnut (Juglans nigra), Ironwood (*Ostrya virginiana*), Balsam Poplar (*Populus balsamifera*), Blue Spruce (*Picea pungens*), Honey Locust (*Gleditsia triacanthos*), Shagbark Hickory (*Carya ovata*), willows (*Salix sp*.), Staghorn Sumac (*Rhus typhina*), Garlic Mustard (*Alliaria petiolata*), and Trout Lily (*Erythronium americanum*). The MECP noted the potential presence of American Chestnut, American Ginseng and Butternut within the study area, however none of these species were observed during the preliminary site investigations.

A detailed botanical inventory will need to be completed for the preferred alignment option during the detailed design phase.

3.3.10 VEGETATION COMMUNITIES

Mapping of ELC communities within the study area was provided by CVC and confirmed by Matrix Solutions Inc. during the preliminary screening visits. The following vegetation communities were identified within the study area:

- Deciduous Forest (FOD)
- Cultural Woodland (CUW)
- Cultural Meadow (CUM)
- Cultural Thicket (CUT)
- Swamp Thicket (SWT)
- Marsh (MA)
- Open Aquatic (OA)
- Commercial and Institutional (CVC)
- Residential (CVR)

ELC communities will need to be refined during detailed design of the project.

3.3.11 ARBORIST REVIEW

The two main areas assessed included Turney Woods Park and trees located along the roads within the study area. Turney Woods Park was dominated by an equal mix of American Beech, Maple species with occasional and rare inclusions of Red Oak, White Oak and Ironwood. The variety of the age and diameter of the trees provides a well distributed canopy, sub-canopy and understory. Trees ranged in size from 30 cm diameter at breast height (dbh) to 60 cm dbh. Along portions of the main trail (in Turney Woods Park), are planted conifer species providing a buffer between the residential and wooded area. The wooded area directly adjacent to the CVC identified wetland included a large quantity of Willow species. Bird species were heard calling within the wooded area and there was evidence of use by small mammals. This woodland acts as an important natural feature of both vegetation and wildlife. The woodland was donated to the City with the intension that the natural beauty of the area be preserved.

The Erin Woods area was dominated by Norway maple with an abundance of Shagbark Hickory. There were occasional Ash species, Black Cherry, Red Oak, White Oak and Ironwood with rare inclusions of Basswood and American Elm. The trees in this park varied in age class and diameter which provided a well distributed canopy and sub-canopy. Ground cover was minimal. Trees which made up the canopy ranged in size from 30 cm to 80 cm DBH with extensive branch canopy that in leaf out conditions would provide full shade. There is some evidence of human impact throughout the forested community due to lack of established trail. Invasives species including European Buckthorn and Garlic Mustard are occasionally present. Multiple trees qualify as potential bat habitat due to having cavities and loose bark. Erin Woods meets the critical for significant woodland under the City of Mississauga Official Plan and is considered a Significant Natural Area and Natural Green Space. It is also considered an Environmentally Significant Area per the CVC.

The large majority of trees along the alignments within the Right-of-Way (ROW) have been planted and the only naturally occurring trees were located adjacent to watercourse crossings. A variety of trees located along the ROW and on private property have the potential to be impacted by construction.

There is a single notable tree on Britannia Road West, south of Queen Street. The large Willow species appears to be on private property, but due to its large dripline and root spread, it should be avoided by construction work to protect its integrity.

Queen Street has several private and street trees greater than 40 cm dbh on both sides. Trees near Eglinton Avenue are not significant and areas can be utilized for construction if an appropriate protection and compensation plan is created and followed.

The majority of trees along Eglinton Avenue East are on the north side, and designated as street trees, parking lot trees and trees used as a barrier between the road and residential dwellings. There are groupings of large diameter Willows adjacent to the watercourse crossing east of the hospital, however set back from the ROW and should provide sufficient protection.

Trees along Erin Centre Boulevard have either been planted on the boulevard are or are considered private front yard tree. The species planted in the boulevard includes either Locus species, Maple species or Oak species and private yard trees are varied, however the majority include ornamental species or Spruce species. None of the trees were greater than 50 cm dbh.

Naturally occurring trees are located adjacent to the three watercourses. In most areas, trees are set back from the ROW providing sufficient protection.

No SAR species were identified within the study area during the preliminary arborist assessment.

3.4 CULTURAL HERITAGE

Archaeological Services Inc. (ASI) was retained to document existing archaeological and cultural heritage resources within the study area.

3.4.1 ARCHAEOLOGICAL

A copy of the Stage 1 Archaeological Assessment is included in Appendix D. The purpose of this study was to describe past and present land use, settlement history, and other relevant historical information related to the study area.

All activities completed throughout this Stage 1 Archaeological Assessment (AA), were completed in accordance with the *Ontario Heritage Act* (1990, as amended in 2018) and the 2011 Standards and Guidelines for Consultant Archaeologists (S & G), administered by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI 2011).

The study area is located within the urban ROWs of Queen Street/Mississauga Road, Britannia Road, Eglinton Avenue, Erin Centre Boulevard and Erin Mills Parkway. Minimal construction activities have occurred in Streetsville, since 2004. Northwest of Britannia Road and Queen Street, there is industrial development. The following places or structures have been completed or have ongoing construction activities within or close to the study area.

A stormwater management pond was constructed northeast of Erin Mills Parkway and Eglinton Avenue West in 2009 along with the following construction activities over time:

1. A residential subdivision was constructed on Summersky Court between 2009 and 2013.
2. In 2017, construction for a residential subdivision began at the addresses of 5175, 5201, and 5215 Mississauga Road.
3. The Kingdom Hall of Jehovah's Witnesses at 2125 Erin Centre Boulevard was constructed between 2006-2007.
4. Ongoing construction has begun on the new West Trunk Sewer on Erin Mills Parkway since 2016

It was determined that there are 25 previously registered archaeological sites located within 1 km of the study area, with three of them being within 50 m and one within the study area. Some other notable features which have archaeological potential include water sources that are primary, secondary, or past water source (i.e., Credit River, Mullet Creek); early historic transportation routes (i.e., Eglinton Avenue, Mississauga Road, Queen Street, Britannia Road, Erin Mills Parkway, Credit Valley Railway (CVR)); proximity to early settlements (i.e., Streetsville, Barberton); and well-drained soils (i.e., Oneida clay loam). In reference to the Municipal Heritage Register, out of the 241 properties listed, 23 are designated under Part IV and V of the *Ontario Heritage Act* since they are adjacent to the study area. Also, as recorded in the 2005 Cultural Landscape Inventory, the study area is within the Streetsville Village Core Cultural Heritage Landscape (CHL) and the Mississauga Road Scenic Route CHL.

The above noted details of potential are indicative for the identification of Indigenous and Euro-Canadian archaeological resources, depending on soil conditions and the degree to which soils have been subject to deep disturbances.

3.4.2 CULTURAL HERITAGE LANDSCAPES AND BUILT HERITAGE RESOURCES

A copy of the Cultural Heritage Resource Assessment (CHRA) Report for Alternatives 1, 2a and 2b. A Cultural Heritage Report – Existing Conditions and Preliminary Impact Assessment (Cultural Heritage Report) was subsequently prepared to summarize the impact of Alternative 4. Both Reports are included in Appendix E. The CHRA and Cultural Heritage Report, considered cultural heritage resources in the context of improvements to specified areas, in accordance with the *Environmental Assessment Act*. For the purposes of this assessment, cultural heritage resources are cultural heritage landscapes and built heritage resources. Cultural landscapes are a collection of individual built heritage resources and other related features which form farm complexes, roadscapes and nucleated settlements. Built heritage resources are individual buildings or structures associated with human activities such as historical settlement and patterns of architectural development.

The study area is located in the former Toronto Township (for the purposes of this study-consisting of Streetsville, Barberton, Mississauga Road, Credit River, and Credit Valley Railway (CVR)), County of Peel partially on Lot 32, Concession II North of Dundas Street (NDS); Lots 1-3, Range V NDS; Lot 1, Concession VI West of Centre Road (WCR); Lots 5-6, Concession VI WCR; Lots 1-7, Concession V WCR; and Lots 1-7, Concession IV WCR. The study area is also located within the Iroquois Plain physiographic region of Southern Ontario, the Credit River Watershed, and bisects the old CVR. Since the late twentieth century, historical mapping from 1994 has indicated that growth and development have occurred adjacent to the study areas, mainly in the Streetsville area. Some areas which have become sparsely populated include north of Eglinton Avenue West between Erin Mills Parkway and Mississauga Road; and north of Britannia Road West between Erin Mills Parkway and Mississauga Road. Since 1994, the path of Erin Mills Parkway has remained the same where it curves from northwest to southeast around the Vista Heights community.

There are 13 potential cultural heritage resources located within and/or adjacent to the proposed study area (see Table 3-2). These cultural heritage resources include two streetscapes (CHL 1, 2), a watercourse and associated lands (CHL 3), seven residences (BHR 1 – 7)), two natural areas (CHL 5 and 6), and one former farmscape (CHL 4). The CHR identified in the assessment, are historically and contextually connected to early-nineteenth to mid-twentieth century land use patterns in Streetsville and the former Toronto township.

Table 3-2: Summary of Existing and Potential Built Heritage Resources and Cultural Heritage Landscapes

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition
CHL1	CHL	Streetsville Village Core • See Appendix E for full list of properties designated under Part IV	Streetscape	Identified in the 2005 Cultural Landscape Inventory
CHL 2	CHL	Mississauga Road Scenic Route • See Appendix E for full list of properties designated under Part IV	Streetscape	Identified in the 2005 Cultural Landscape Inventory
CHL 3	CHL	Credit River Corridor	Watercourse	Identified in the 2005 Cultural Landscape Inventory
BHR 1	BHR	21 Amity Road	Residence	Listed in the Heritage Register for Mississauga
BHR 2	BHR	23 Amity Road	Residence	Listed in the Heritage Register for Mississauga
BHR 3	BHR	25 Amity Road	Residence	Listed in the Heritage Register for Mississauga
BHR 4	BHR	27 Amity Road	Residence	Listed in the Heritage Register for Mississauga
BHR 5	BHR	24 Ardsley Street	Residence	Listed in the Heritage Register for Mississauga
BHR 6	BHR	4695 Beaufort Terrace	Residence	Listed in the Heritage Register for Mississauga
CHL 4	CHL	1700 Britannia Road West	Former farmscape	Listed in the Heritage Register for Mississauga
BHR 7	BHR	2275 - 2285 Britannia Road West	Residence	Designated Part IV
CHL 5	CHL	1760 The Chase	Natural Area	Listed in the Heritage Register for Mississauga
CHL 6	CHL	1745 Thorny Brae Place	Natural Area	Listed in the Heritage Register for Mississauga

3.5 EXISTING UTILITIES

As part of the EA, a Subsurface Utility Engineering (SUE) desktop study was completed for the purposes of assessing existing conditions in the study area. A utility circulation was conducted in June 2019 where all members of the Public Utilities Coordinating Committee (PUCC) of Peel Region were contacted and requested to provide drawings of their existing plants. All received existing utility information was combined into the base composite utility model for existing utilities. No existing utility information has yet been received for Zayo, Plains Midstream and Esso. A comprehensive list of all utility owners who have been contacted and the noted circulation letters can be found in Appendix G. Table 3-3 represents utilities/utility owners with plant located within preferred tunnel compound locations for all EA alternatives being evaluated.

Table 3-3: Utilities Identified within Compounds

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
EA Alternative 1 (Streetsville)		
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4’’ dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
SA10	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	None
SA13.3	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting • 250mm SAN sewer • 450mm STM sewer • 750mm WM	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) • Traffic lighting
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None
EA Alternative 2 (Britannia Woodlot)		
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
SA3.2	• Alectra poles (1) • Bell underground conduit • Bell pedestal • Rogers overhead and underground fire cable • Cogeco underground cable • STM catchbasins (1)	• Bell underground conduit • Rogers overhead and underground fire cable • Cogeco underground cable
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4'' dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable
SA5.1	• Enbridge gasmain (4" dia. HP) • Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting	• Bell underground conduit • Rogers underground and overhead fibre cable
SA6.2	• Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting • 300mm WM • 750mm WM • Hydrant • STM catchbasins (2)	• Alectra underground duct bank • Alectra pole (1) • Bell underground conduit • Rogers underground and overhead fibre cable • 300mm WM
SA7	• Alectra underground duct bank • Alectra poles (2) • Bell underground conduit • Enbridge gasmain (4" dia. IP) • 750mm STM sewer • 250mm SAN sewer	• Alectra underground duct bank
SA8	• Alectra poles (2) • Alectra underground conductor • 750mm WM	• Alectra underground conductor

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
SA10	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	None
SA11.2	• Alectra underground duct bank • Alectra poles (1) • Alectra transformer • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 250mm SAN sewer • 150mm WM • STM catchbasins (1)	• Alectra underground duct bank • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 150mm WM
SA13.1	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting • 250mm SAN sewer • 450mm STM sewer • 750mm WM	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) • Traffic lighting
SA15	None	None
SA16.3	None	None
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None
EA Alternative 3 (Britannia Straight)		
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6" dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6" dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro
SA3.2	• Alectra poles (1) • Bell underground conduit • Bell pedestal • Rogers overhead and underground fire cable • Cogeco underground cable • STM catchbasins (1)	• Bell underground conduit • Rogers overhead and underground fire cable • Cogeco underground cable
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4'' dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable
SA5.1	• Enbridge gasmain (4" dia. HP) • Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting	• Bell underground conduit • Rogers underground and overhead fibre cable
SA6.2	• Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting • 300mm WM • 750mm WM • Hydrant • STM catchbasins (2)	• Alectra underground duct bank • Alectra pole (1) • Bell underground conduit • Rogers underground and overhead fibre cable • 300mm WM
SA9	• Alectra underground duct bank	• Alectra underground conductor

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
	• Alectra underground conductor • Alectra poles (3) • Traffic lighting • 750mm WM	• Alectra pole (1)
SA10	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	None
SA11.2	• Alectra underground duct bank • Alectra poles (1) • Alectra transformer • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 250mm SAN sewer • 150mm WM • STM catchbasins (1)	• Alectra underground duct bank • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 150mm WM
SA13.1	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting • 250mm SAN sewer • 450mm STM sewer • 750mm WM	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) • Traffic lighting
SA15	None	None
SA16.3	None	None
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)
EA Alternative 4 (Erin Centre Boulevard)		
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4’’ dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable
SA10	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	None
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None

3.6 EXISTING TRANSPORTATION NETWORK

A Transportation Impact Assessment (TIA) was conducted to evaluate the EA alternatives and determine a preliminary preferred design alternative from a transportation viewpoint (Refer to

Appendix F). Within the study area, Britannia Road and Erin Mills Parkway are both identified as Regional Arterials; while Queen Street (north of Britannia Road) is identified as a Major Collector, and south of Britannia Road is identified as a Major Collector/Scenic Route. Eglinton Avenue is an Arterial Road and Erin Centre Boulevard is a Major Collector. The roads in the study area are generally high traffic with moderate to high speed limits.

There are multiple transit stations in the study area, including two transitway stations, two bus terminals, and two GO Stations. The Milton GO Transit corridor extends north-south, just west of Queen Street within Streetsville, with the Streetsville GO Station at Queen Street. MiWay operates the Erin Mills Town Centre bus terminal within the study area. The Erin Mills Town Centre bus terminal provides connections to local bus routes operated by MiWay and regional bus routes operated by Metrolinx.

Pedestrian activity in the study area is generally low. Pedestrian volumes are moderately high near major generators of pedestrian activity in area, including the Streetsville GO Station, Erindale GO Station, and Erin Mills Town Centre. All roads in the study area have sidewalk on at least one side, with the vast majority having sidewalks on both sides of the road.

There are a number of cycling facilities within the study area, including bike lanes, signed routes, and multi-use trails. However, cycling facilities are sometimes discontinuous, contributing to low cyclist volumes during the A.M. and P.M. peak hours in the study area.

Turning Movement Count (TMC) data at each of the key intersections identified in the study area were provided by the City of Mississauga and Peel Region, or collected by Spectrum Traffic Data Inc and Automatic Traffic Recorder (ATR) which collected data on Queen Street, Britannia Road West and Eglinton Avenue West within the study area. The collected TMC and ATR information along with other existing transportation network information can be found in Appendix F of this Report.

4. Identification And Evaluation Of Alternative Solutions

4.1 ALTERNATIVE SOLUTIONS

As described in Section 2.4.1, related to the need and justification for this project, the Master Plan identified that the age and capacity constraints of the CVTS are problematic and need to be addressed to better manage existing and projected wastewater flows. To alleviate these issues, the Region identified the need to undertake the rehabilitation of the CVTS. It was recognized that in order to implement significant lengths of rehabilitation, large scale temporary bypass pumping operations would be required to isolate appropriate section lengths of the sewer, which is not feasible from both a scheduling and financial perspective. The Region therefore identified the benefits of linking the CVTS to the newly constructed WTS along Erin Mills Parkway via permanent trunk sanitary sewer connection.

In order to connect the CVTS to the newly constructed WTS, four alternative alignments (solutions) were considered, including single diversion (Alternatives 1 and 4) and dual diversion (Alternatives 2 and 3) concepts.

The following is a summary of the alternative alignments (solutions) and their proposed shaft sites.

Alternative 1: Single Diversion Concept along Eglinton Avenue West (Streetsville)

This single diversion concept (i.e., connecting to the WTS at one (1) location) is primarily focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West, starting east of the intersection with Queen Street North and another along Eglinton Avenue West east of Mississauga Road to just northeast of the Erin Mills Parkway and Eglinton Avenue West intersection (within the bus-turnaround area). The alignment is approximately 4.1 km in length along Mississauga Road. Mississauga Road is oriented in a northwest-southeast alignment and features two lanes of traffic (one in each direction). Mississauga Road has sidewalks and curbs on both sides. The alignment branches easterly along Britannia Road West for 700 m. Britannia Road West has two lanes of traffic in each direction with curbs and sidewalks on both sides. The eastern end of this branch extends to the Credit River. The proposed alignment and shaft locations are presented in Figure 4-1.

There will be seven (7) shaft sites in the following proposed locations:

- SA0 – south of Britannia Road West and Ellesboro Drive intersection.
- SA1 – connecting with the CVTS.
- SA2 – located north of Britannia Road along Mississauga Road.
- SA4 – at the intersection of Britannia Road West and Queen Street South.
- SA10 – just south of the CP Rail, on the east side of Mississauga Road.
- SA13 – west of the intersection of Mississauga Road along Eglinton Avenue West.
- SA17 – within the northeast quadrant of Erin Mills Parkway and Eglinton Avenue West.

Alternative 2: Dual Diversion Concept Through Woodlot (Britannia Woodlot)

This dual diversion concept (connecting to the WTS at two (2) locations) has a northern portion and a southern portion. The northern portion is primarily focused Britannia Road West, from the Credit River jogging south at Hogan Drive and through Turney Woods Park to connect with the WTS just south of the Britannia Road West and Erin Mills Parkway intersection. It has a branch that begins at the intersection of Britannia Road West and Queen Street North and extends northerly. The southern portion is primarily focused on Eglinton Avenue West from just east of Mississauga Road to just northeast of the Erin Mills Parkway and Eglinton Avenue West intersection (within the bus-turnaround area). A branch of this portion of the study area travels north along Mississauga Road from the intersection of Eglinton Avenue West and Mississauga Road. The proposed alignment and shaft locations are presented in Figure 4-2.

There will be fifteen (15) shaft sites in the following proposed locations:

- SA0 – south of Britannia Road West and Ellesboro Drive intersection
- SA1 - connecting with the CVTS.
- SA2 - located north of Britannia Road along Mississauga Road.
- SA3 - located north of Britannia Road along Mississauga Road.
- SA4 - at the intersection of Britannia Road West and Queen Street South.
- SA5 - at Millcreek Drive along Britannia Road West (west of Queen Street South).
- SA6 - at Hogan Drive along Britannia Road West (west of Queen Street South).
- SA7 - northeastern edge of Turney Woods Park.
- SA8 - south of Britannia Road West, within Turney Woods Park.
- SA10 - just south of the CP Rail, on the east side of Mississauga Road.
- SA11 - Mississauga Road and Barbertown Road.
- SA13 - west of the intersection of Mississauga Road along Eglinton Avenue West.
- SA15 - west of The Chase along Eglinton Avenue West.
- SA16 - just west of the Credit River, along Eglinton Avenue West (just prior to Erin Mills Parkway).
- SA17 - within the northeast quadrant of Erin Mills Parkway and Eglinton Avenue West.

Alternative 3: Dual Diversion Concept Along Britannia Road (Britannia Straight)

This dual diversion concept has a northern portion and southern portion similar to Alternative 2. The northern portion is primarily focused on Britannia Road West, from the Credit River to Erin Mills Parkway along with the branch north of the intersection of Britannia Road West and Queen Street North. The southern portion of the alignment is the same as Alignment 2 along with the branch north along Mississauga Road from the intersection of Eglinton Avenue West and Mississauga Road. The proposed alignment and shaft locations are presented in Figure 4-3.

There will be fourteen (14) shaft sites in the following proposed locations:

- SA0 – south of Britannia Road West and Ellesboro Drive intersection
- SA1 - connecting with the CVTS.
- SA2 - located north of Britannia Road along Mississauga Road.
- SA3 - located north of Britannia Road along Mississauga Road.
- SA4 - at the intersection of Britannia Road West and Queen Street South.
- SA5 - at Millcreek Drive along Britannia Road West (west of Queen Street South).
- SA6 - at Hogan Drive along Britannia Road West (west of Queen Street South).
- SA9 - at Britannia Road West and Erin Mills Parkway.
- SA10 - just south of the CP Rail, on the east side of Mississauga Road.
- SA11 - Mississauga Road and Barbertown Road.
- SA13 - west of the intersection of Mississauga Road along Eglinton Avenue West.
- SA15 - west of The Chase along Eglinton Avenue West.
- SA16 - just west of the Credit River, along Eglinton Avenue West (just prior to Erin Mills Parkway).
- SA17 - within the northeast quadrant of Erin Mills Parkway and Eglinton Avenue West.

Alternative 4: Single Diversion Concept Along Erin Centre Blvd. (Erin Centre Boulevard)

This single diversion concept (i.e., connecting to the WTS at one (1) location) is primarily focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West, starting east of the intersection with Queen Street North and another along Erin Centre Boulevard east of Queen Street to just northeast of the Erin Mills Parkway and Eglinton Avenue West intersection (within the bus-turnaround area). The alignment is approximately 3.4 km in length along Mississauga Road. Mississauga Road is oriented in a northwest-southeast alignment and features two lanes of traffic (one in each direction). Mississauga Road has sidewalks and curbs on both sides. The alignment branches easterly along Britannia Road West for 705 m. Britannia Road West has two lanes of traffic in each direction with curbs and sidewalks on both sides. The eastern end of this branch extends to the Credit River. The proposed alignment and shaft locations are presented in Figure 4-4.

There will be six (6) shaft sites in the following proposed locations:

- SA0 - south of Britannia Road West and Ellesboro Drive intersection
- SA1 - connecting with the CVTS.
- SA2 - located north of Britannia Road along Mississauga Road.
- SA4 - at the intersection of Britannia Road West and Queen Street South.
- SA10 - just south of the CP Rail, on the east side of Mississauga Road.

- SA17 - within the northeast quadrant of Erin Mills Parkway and Eglinton Avenue West.

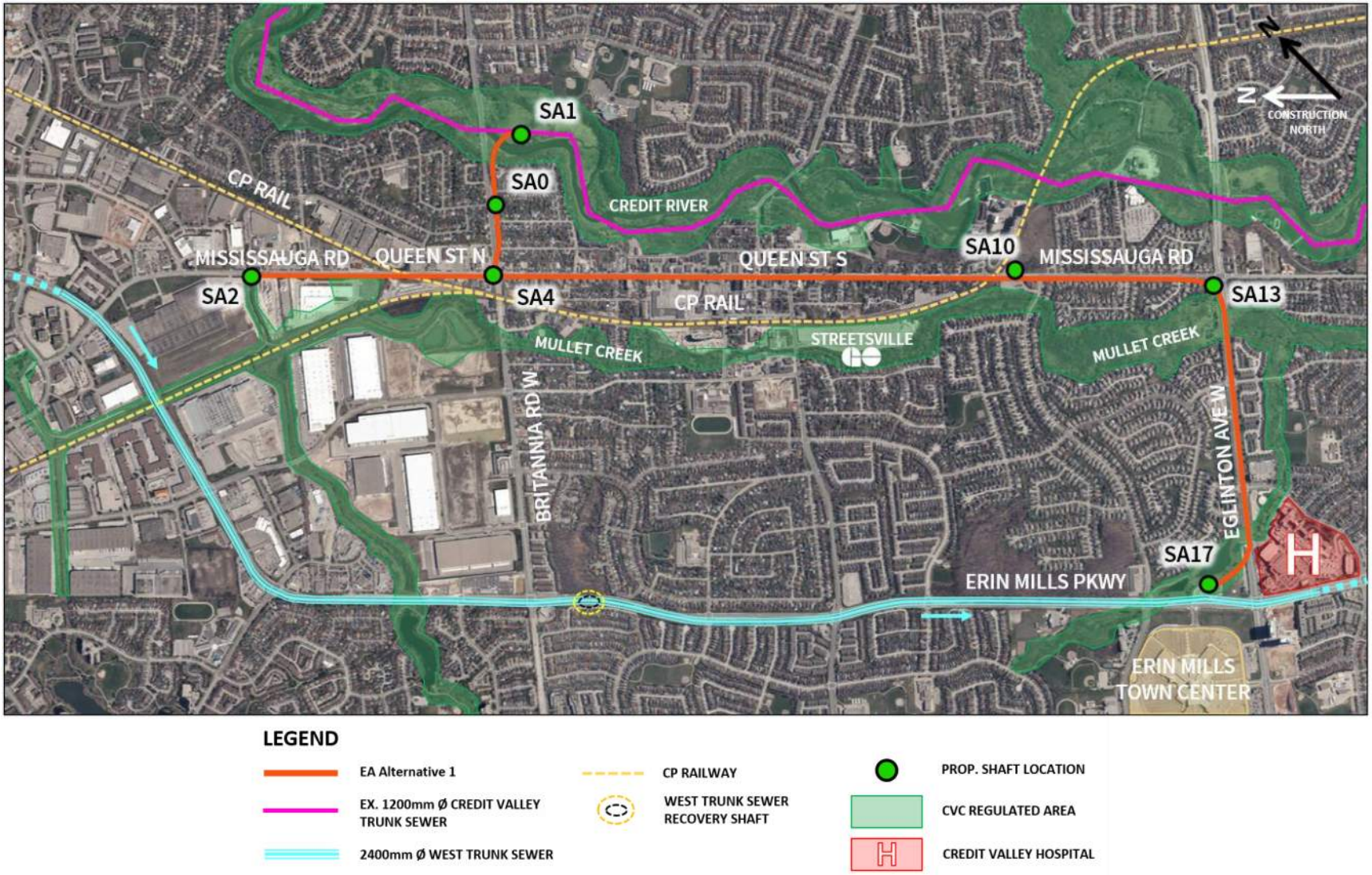

Figure 4-1: Alternative 1 Alignment and Proposed Shaft Sites

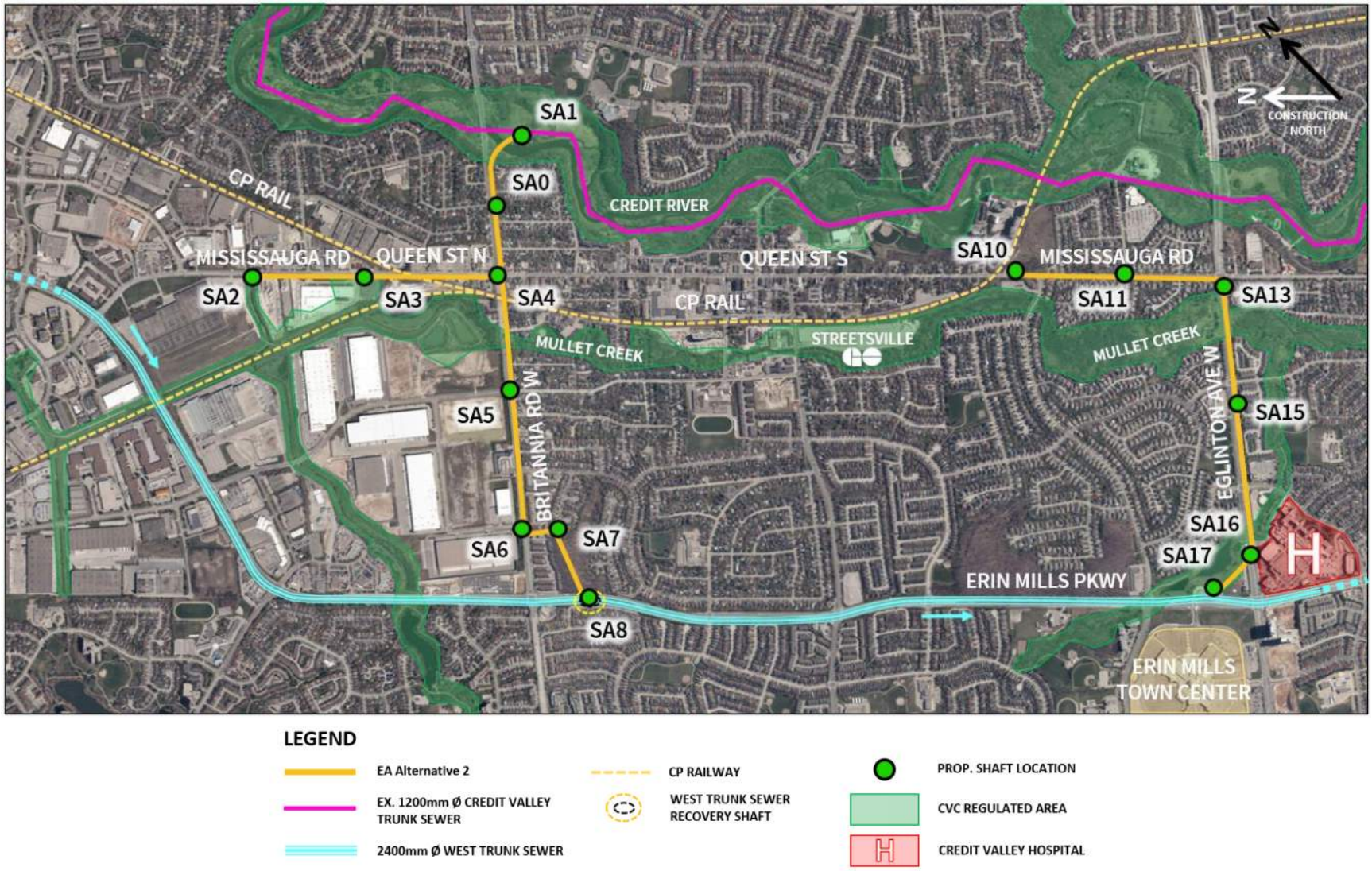

Figure 4-2: Alternative 2 Alignment and Proposed Shaft Sites

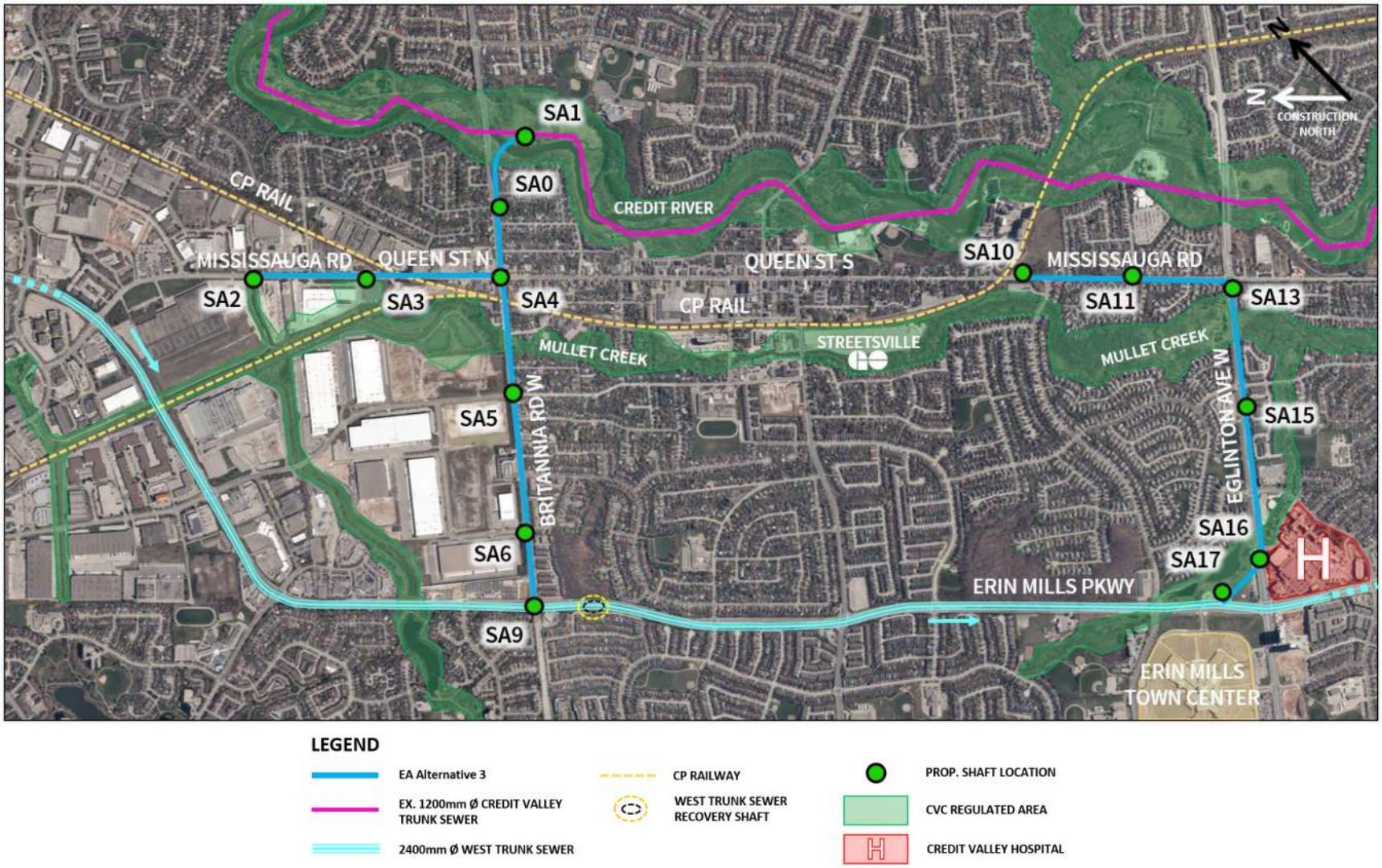

Figure 4-3: Alternative 3 Alignment and Proposed Shaft Sites

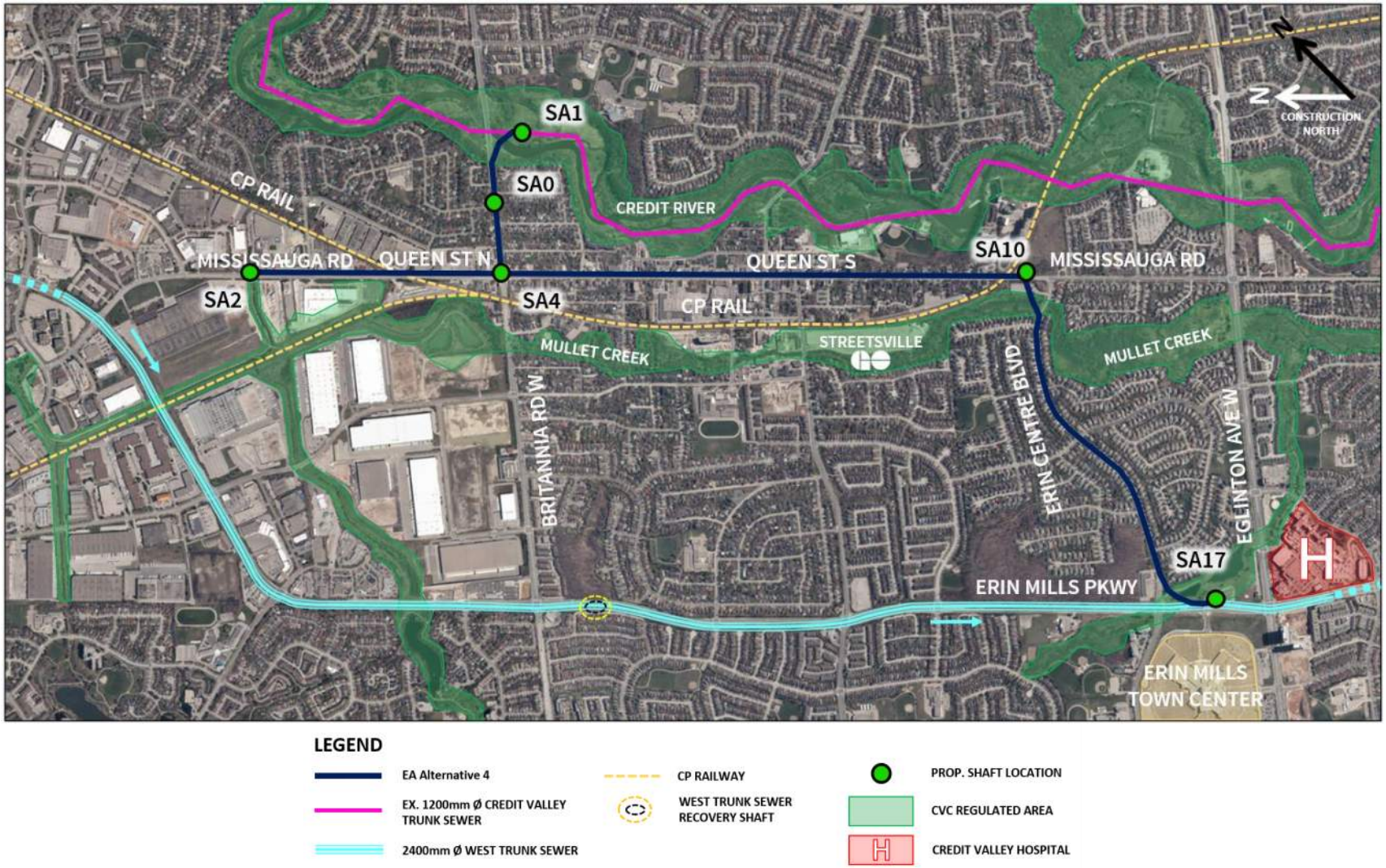

Figure 4-4: Alternative 4 Alignment and Proposed Shaft Sites

4.1.1 EVALUATION OF COMMON ALTERNATIVE SUBCOMPONENTS

Three of the four alternative alignments under consideration feature a common subcomponent being the connection to the WTS at existing MH6 from Eglinton Avenue West in the northeast corner of the Eglinton Avenue West and Erin Mills Parkway intersection. This component is further evaluated within the following section to provide additional context.

4.1.1.1 WEST TRUNK SEWER CONNECTION

The Eglinton Avenue West Diversion is proposed to connect to the WTS at existing MH6, which is located on the east side of Erin Mills Parkway, just north of the Erin Mills Parkway and Eglinton Avenue West intersection. As shown in Figure 4-5, two conceptual alignments for the Eglinton Avenue West Diversion were considered for EA Alternatives 1, 2 and 3. The alternative shown in red proposes that the diversion sewer run along Eglinton Avenue West, crossing Erin Mills Parkway to a shaft on the northwest corner of the Eglinton Avenue West and Erin Mills Parkway intersection in front of Erin Mills Town Centre. The shaft would be utilized to turn the TBM and re-launch it across Erin Mills Parkway to a shaft adjacent to existing MH6.

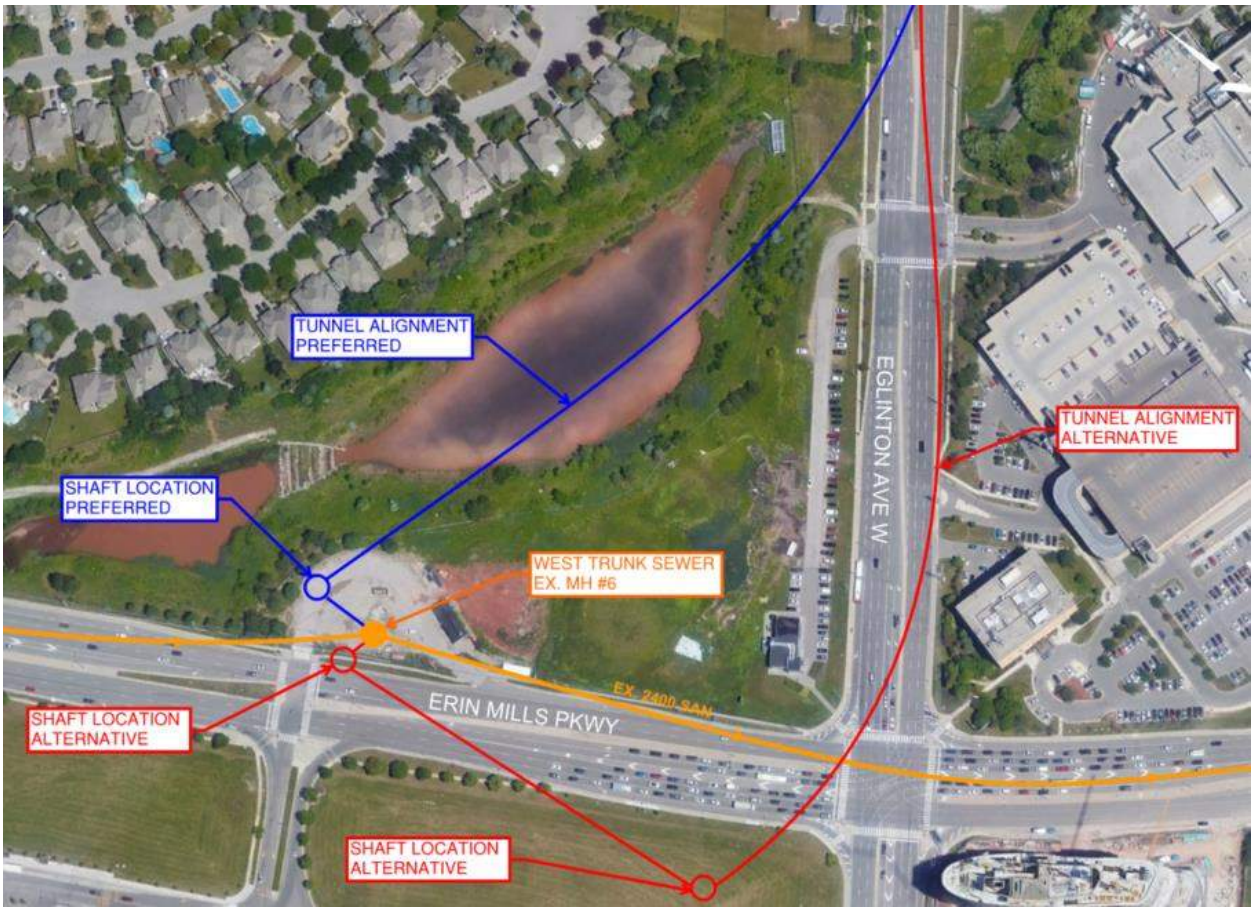

Figure 4-5: Alternative Approaches for West Trunk Sewer Connection

The preferred approach (shown in blue), proposes that the Eglinton Avenue West Diversion alignment stay on the east side of Erin Mills Parkway, leaving Eglinton Avenue West to the east of the Erin Mills Parkway intersection and curving directly towards a shaft adjacent to existing MH6. Under this alternative, the Eglinton Avenue West Diversion would only travel beneath lands owned by the City of Mississauga which are currently occupied by a stormwater management pond. This alternative is preferred for the following additional reasons:

- The preferred alternative is an overall shorter tunnel route that achieves better hydraulic performance by allowing for a more gradual curve leading into the WTS connection point (existing MH6) as compared to the tight curve/bends required for the non-preferred alternative (shown in red).
- The preferred alternative avoids two tunnel crossings of Erin Mills Parkway.
- The preferred alternative places the shaft adjacent to existing MH6 on the east side of the WTS, where shaft construction and connection operations can be completed without impacting traffic on Erin Mills Parkway. The non-preferred alternative would require that the shaft adjacent to existing MH6 be located on the west side of the WTS where shaft construction and connection operations would require lane restrictions/closures on Erin Mills Parkway.
- The non-preferred alternative would require construction of a deep shaft on the northwest corner of the Eglinton Avenue West and Erin Mills Parkway intersection in front of Erin Mills Town Centre. There are three water feedermains (300mm, 900mm, 1050mm) running along the west side of Erin Mills Parkway connecting to the Streetsville Pumping Station. These feedermains would need to be avoided, and would therefore impact the conceptual shaft location and increase the anticipated property requirements.

Based on these evaluations, this preferred alternative alignment for the Eglinton Avenue West Diversion Area and WTS connection has been assumed for three of the EA alternatives detailed above.

4.1.2 TUNNELLING

Due to the depth, diameter and grade sensitivity (gravity-flow nature) of the diversion sewers, tunnelling methods are considered to be the only feasible trenchless technology for all alternative alignments. As a result, surface works will generally be relegated to tunnel compound/shaft construction areas.

In order to identify general tunneling methods for the diversion sewers, two key factors were considered: ground/groundwater conditions and tunnel diameter. The impacts of these two factors are discussed in greater detail below.

4.1.2.1 IMPACT OF GROUND/GROUNDWATER CONDITIONS ON TUNNELLING METHOD

Regarding ground/groundwater conditions, it is noted that all diversion sewers (with the exception of local portions of minor diversion branches) are anticipated to be located at depths ranging from 6 to 42m below ground surface. At these depths, the diversion sewers are anticipated to be below the local groundwater table, and generally within bedrock. The primary concern regarding ground conditions is the noted presence of buried valleys within the study area bedrock. Should a tunnel mine into a buried valley, ground conditions will abruptly change from stable bedrock with minor inflows of groundwater through rock joints and discontinuities, to unstable mixtures of soil, cobbles and boulders of glacial origin, and local bedrock fragments with significant groundwater inflows.

In stable ground and groundwater conditions, “open face” tunnelling methods, which do not actively apply supporting pressure to the ground being mined at the tunnel face, nor attempt to prevent groundwater inflows from entering the tunnel are appropriate. In unstable ground and groundwater conditions, “closed face” tunneling methods, which seal off and actively apply supporting pressure to the ground being mined at the tunnel face, and which attempt to seal the tunnel from groundwater inflows are appropriate.

Buried valley features are known to exist in the study area, based on documented encounters during construction of the nearby/adjacent WTS. Encountering such features in a tunnel boring machine which is not equipped to handle them (i.e., is not closed face, or capable of being quickly converted from open face to closed face), poses potentially significant risks to both the workers within the tunnel, and overlying improvements/infrastructure. While project-specific geophysical and geotechnical investigations will be completed to try and identify the locations of such features in advance of tunneling, these methods are not considered 100% effective at identifying the location and extent of such features.

Because:

1. Project geophysical investigations have identified, and project geotechnical investigations will confirm and possibly identify additional buried valley features or other geohazards, and
2. The risk of encountering such features (buried valley features or other geohazards) even if none are documented during the investigations cannot be eliminated,

it is proposed to require the use of tunneling equipment which is either closed face, or capable of being quickly converted from open face to closed face (closeable face) should buried valley features be encountered.

4.1.2.2 IMPACT OF DIAMETER ON TUNNELLING METHOD

In developing solutions to address the problem statement, two general approaches were taken: a single diversion approach (Alternatives 1 and 4) and a dual diversion approach (Alternatives 2 and 3). Under a single diversion approach, a single connection is made to the WTS, requiring a larger pipe to convey the total anticipated flow volumes. Under a dual diversion approach, two connections are made to the WTS, and smaller pipes can be used as the total flows are divided between the two diversions.

Initial hydraulic analyses of the single diversion approaches have been completed which confirm that with a pipe diameter of 2,400 mm, minimum and maximum (flowing full) velocities will be maintained based on projected 2041 Dry Weather Flow (DWF) and Wet Weather Flow (WWF) conditions. This diameter has been maintained for EA Alternatives 1 and 4 as shown in Figure 4-1 and Figure 4-4.

Initial hydraulic analyses of the dual diversion approaches have been completed which confirm that with pipe diameters ranging from 1,200 mm to 1,500 mm, minimum and maximum (flowing full) velocities will be maintained based on projected 2041 DWF and WWF conditions. These diameters and the WTS connection regime are maintained as part of EA Alternatives 2 and 3 as shown in Figure 4-2 and Figure 4-3.

As a result of the difference in pipe diameters contemplated for the different alternatives, different tunneling technologies are preferred (from both technical and cost perspectives) for their construction.

The 1,200 mm to 1,500 mm diameter sewers for Alternatives 2 and 3, combined with the anticipated ground conditions are preferred for installation via:

1. Pipe jacking using a closed/closeable face TBM in a one pass/direct installation approach.

The 2,400 mm diameter sewer for Alternatives 1 and 4, combined with the anticipated ground conditions are preferred for installation via:

1. Self-propelled, closed/closeable face TBM in a one pass installation approach (using precast concrete tunnel lining as the permanent sewer), or
2. Self-propelled, closed/closeable face TBM in a two pass installation approach.

The key differences between pipe jacked TBMs and self-propelled TBMs are that:

- Pipe jacking TBM's are generally remotely controlled (that is, routine person entry is not required), while self-propelled TBMs generally require personnel within the tunnel and at the TBM at all times.
- Pipe jacking TBMs are limited in the length of tunnel drive they can complete by the frictional resistance of the pipe being jacked behind the TBM. As a result, pipe jacked TBM tunnelling generally requires more shafts. For this reason, Alternatives 2 and 3 require significantly more shafts than Alternatives 1 and 4.
- Self-propelled TBMs are longer in length than pipe jacked TBMs, and generally require larger diameter shafts to accommodate their installation and logistics (spoils removal, etc.).
- Pipe jacked TBM tunnels are fully-supported along their lengths by the jacked pipe, while self-propelled TBM tunnels may have different degrees of support, ranging from full support (such as precast tunnel liner (PCTL) segments), to partial support (such as steel channels and rock bolts in the tunnel crown).

For pipe jacked TBMs, the size of mined tunnel is dependent on the diameter of the pipe being installed, with the mined diameter of tunnel generally only being slightly larger than the outer diameter of the pipe. As such, tunnels ranging in mined diameter from approximately 1200 mm to 1800 mm are anticipated for Alternatives 2 and 3. Larger tunnel diameters may be entertained for constructability reasons.

For self-propelled TBMs, the size of mined tunnel is dependent on whether a one pass or two pass approach is being used. For one pass tunnelling installing PCTL as the tunnel lining and permanent sewer, the diameter of the mined tunnel is only slightly larger than the outer diameter of the assembled lining. For two-pass tunnelling, the size of the mined tunnel is dependent on the size of the pipe to be installed inside it (as the second pass), including the space required to facilitate installation and connection of the pipes within the tunnel. As such, tunnels ranging in mined diameter from a minimum of 3,000 mm (one-pass tunnelling) to 3,600mm (two-pass tunnelling) are anticipated for Alternatives 1 and 4. Larger tunnel diameters may be entertained for constructability reasons.

4.1.3 EVALUATION CRITERIA

The four alternative alignments were evaluated based on the existing conditions present within the study area and how they would be impacted by the construction and operation of the proposed infrastructure improvements. Evaluation criteria were identified as follows:

1. Socio-Economic Environment
2. Natural Environment
3. Cultural Environment
4. Technical
5. Costs

Evaluation criteria for the above categories are further expanded on within Table 4-1. A combination of specialist investigations, desktop reviews and field visits were used to complete the evaluation of the alignment alternatives in the context of the above mentioned criteria as discussed within Section 4.1.4.

Table 4-1: Evaluation Criteria

Criteria	Features	Indicator
Socio-Economic Environment	• Effects on existing land uses • Compliance with planning/environmental policies • Nuisance impacts (vibration, noise, dust) • Vibration effect on existing buildings • Traffic management • Odour management • Land requirement (temporary and permanent)	• Construction impacts causing disruption to local residents, utilities, road infrastructure • Construction nuisance impacts • Consideration for vibration impacts on existing buildings during construction • Construction impacts to traffic/congestion/detours • Potential for release of odours following construction • Amount of land required, both on a temporary (during construction) and permanent (during operation) basis
Natural Environment	• Impact on natural environment (Watercourses, Environmentally Sensitive Areas, Species at Risk, Aquatic Features, Significant Landforms, and Wildlife and Wildlife Habitat) • Impact on street trees • Geology/hydrogeology considerations • Contamination	• Short and long-term impacts to natural environment; proximity to sensitive features; potential to impact sensitive species and habitat, SAR • Impact on street trees located within Project area • Surface water tables, rock characteristics, short and long-term groundwater impacts • Potential impact on contaminated properties
Cultural Environment	• Minimize impact to archaeological resources • Minimize impact to cultural heritage resources	• Potential to impact archaeological sites and heritage sites
Technical	• Shaft locations • Site requirements • Existing utilities • Impact on existing and future wastewater systems • Constructability • Shaft Compound at Major Intersections • Overall project delivery risk • Capacity	• Location of shaft within working compound relative to ROW • Amount of land required at shaft sites • Ability to maintain existing utilities, and/or relocate • Connection points to existing wastewater system • Depth, slope, curvature, ease of construction site access, length of construction, rock excavation • Potential for project risks during construction • Ability to provide additional capacity
Costs	• Construction costs • Operational costs • Land acquisition costs	• Capital construction costs • Cost of operating/maintaining infrastructure • Land acquisition costs

4.1.4 EVALUATION OF ALTERNATIVE SOLUTIONS

The summary of the evaluation of the alternative solutions is presented in Table 4-2. A more detailed evaluation of the four Alternative Solutions is included in Appendix I.

Table 4-2: Evaluation of Alternative Solutions

	Alt 1 - Queen Street	Alt 2 - Britannia Road & Woodlot	Alt 3 - Britannia Road	Alt 4 – Erin Centre Boulevard
Socio-Economic	—	✗	✗	✓
Natural Environment	✓	✗	—	✓
Cultural Heritage	—	—	—	—
Technical	—	✗	✗	✓
Costs	—	✗	✗	—
Overall	—	✗	✗	✓

✓ - Most Preferred ✗ Least Preferred — - Preferred

4.2 SELECTION OF PREFERRED ROUTE AND SHAFT SITES

The preliminary preferred alternative solution is EA Alternative 4 (Erin Centre Boulevard), along Queen Street/Mississauga Road. Overall this alternative will require less shafts along the corridor, and as a result will have less impact on the socio-economic environment. In particular, there will be less impact to residential areas from a shaft construction perspective, and less nuisance impacts related to vibration, noise and dust during construction. There will be fewer intersections impacted by the proposed work, as well as no lane restrictions within the community of Streetsville. This alternative will also have less bends and drops reducing the potential for the release of odourous air. There will be six major staging areas required, which is notably less than EA Alternative Alignments 2 and 3 (15 and 14 staging areas respectively) and preferred versus Alternative Alignment 1 which features seven staging areas, one of which (SA-13) would require lane restrictions at the intersection of Mississauga Road and Eglinton Avenue.

The preferred alternative will have no additional watercourses or natural areas impacted, beyond those that are consistent for all four alternatives. Although there are street trees within the mid-section of Streetsville, none of them will be impacted by the preferred solution as the construction will be via trenchless methods, at an anticipated depth of more than 20 m below ground level. This alternative also avoids crossing the known deep water-bearing buried valley along Erin Mills Parkway. There is a potential to encounter buried valley features along Erin Centre Boulevard east of Erin Mills Parkway, however comparing preliminary EA Alternative 4 tunnel alignments to seismic survey investigation results indicates sufficient clearance under anticipated buried valley features. All four alternatives have the same potential to impact contaminated properties, which are located along Queen Street North, north of Britannia Road, within the industrial area.

Although the alternative passes through the Mississauga Scenic Route and Streetsville Core Area, both of which are Cultural Heritage Landscapes with numerous designated properties, the shaft locations will be positioned outside of the Streetsville Village Core, having minimal impact. In addition, while the preferred alignment will be adjacent to listed properties, they will be avoided by maintaining the alignment within the ROW. Based on the above, the four alternative solutions are considered to have comparable potential to impact cultural heritage and archaeological resources.

The preferred alternative will only require one connection point to the WTS. This single diversion approach also requires/allows for the use of a larger diameter sewer, which provides for proportionally increased sewer capacity. There will be no additional shafts required at major intersections, besides those consistent for the four alternatives (i.e., Britannia Road West/Queen Street North).

As a result of requiring less shafts there will be fewer permanent structures (maintenance holes) to be constructed and maintained with the preferred alternative. Additionally, land acquisition costs and operational costs are significantly lower than EA Alternatives 2 and 3 and comparable to EA Alternative 1.

Based on the above noted summary, the preliminary preferred solution is EA Alternative 4; this single diversion concept is focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West, starting east of the intersection with Queen Street North and another along Erin Centre Boulevard from Mississauga Road to Erin Mills Parkway. The alignment is approximately 3.3 km in length along Mississauga Road/Queen Street North/Queen Street South and 1.7km in length along Erin Centre Boulevard. The alignment branch extends easterly along Britannia Road West for ~620 m toward and across the Credit River.

4.2.1 PRELIMINARY PREFERRED ALTERNATIVE SHAFT LOCATIONS

Property requirements and tunnel shaft staging areas were reviewed for all EA alternatives as part of the Property Impacts and Requirements Report included in Appendix H. A summary of the preferred tunnel compound staging locations for the preliminary preferred alternative are summarized as follows:

SA0 – This staging area is located south of the Britannia Road West and Ellesboro Drive intersection. The staging area will be approximately 3,500 m² and will require no permanent or temporary easements.

SA1 - This staging area is located within a field in the Timothy Street Memorial Park immediately south of Britannia Road West and adjacent to the east bank of the Credit River. The staging area will be approximately 17,000 m², requiring 5,200 m² of permanent easement and 5,200 m² of temporary easement. Access to the Launch Shaft will be via the park road, located along Britannia Road West, east of the Credit River.

SA2 - This staging area is located on Mississauga Road north of Alpha Mills Road. The staging area will be approximately 3,800 m² requiring 850 m² of permanent easement and 1,250 m² of permanent easement. It is anticipated that the adjacent southbound lane on Mississauga Road will be impacted.

SA4 - This staging area is located at the intersection of Queen Street North and Britannia Road West. The staging area will be approximately 1,400 m², requiring 300 m² of permanent easement and 400 m² of temporary easement. It is anticipated that some of the parking space for the Home Hardware will be impacted during construction, as well as the westbound right turn lane on Britannia Road West and northbound lane on Queen Street North.

SA10 - This staging area is located in the open space parcel south of Reid Drive and the CN Rail tracks and east of Mississauga Road. This area will act as the main compound for the construction of the project, providing sufficient space for storage and a site office. The total staging area will be approximately 12,500 m² and is anticipated to impact a portion of the northbound lane on Mississauga Road. This staging area will require 1,200 m² of permanent easement and 9,600 m² of temporary easement.

SA17 - This staging area will make use of the existing compound used for construction of the WTS, located to the east of Erin Mills Parkway across from Erin Mills Town Centre. The total staging area will be approximately 6,000 m².

5. Public, Agency and Indigenous Engagement

Consultation is an integral component to any Class EA process to keep Stakeholders and Indigenous Communities informed of a project, as well as to gain insightful input on existing conditions, and the evaluation process to identify a preferred solution that is acceptable to all Stakeholders.

A Communication and Consultation Plan was prepared at project Kick-Off to outline the proposed consultation to be undertaken throughout the Project. As part of this activity, a Stakeholder Sensitivity Analysis (SSA) was completed to identify those individuals or groups whose cooperation, expertise or influence would be beneficial to the success of the project, and to develop a strategy to involve them. This SSA identified stakeholders who may strongly oppose the project, and whose negative opinions could be “show stoppers” for the project. The SSA reviewed the history of public consultation in the area; determined the level of environmental sensitivity in the area; reviewed the cultural composition, geographic distribution, lifestyle and linguistics of those to be consulted through the creation of a community profile; the stakeholders who may be directly affected; and the stakeholders who may be able to influence the study outcome as a result of knowledge or regulatory, political or legal authority on the Project.

All consultation activities carried out throughout the Study have been documented in a Consultation Activity and Tracking Table, included in Appendix J.

5.1 STUDY COMMENCEMENT

The Notice of Study Commencement was posted in Mississauga News on April 18th, 2019. In addition, an email and the attached Notice was provided to all agencies, utilities and interest groups listed on the Project Contact List during the week of May 13, 2019. Few comments were received as a result of the Notice of Study Commencement.

5.1.1 INDIGENOUS COMMUNITIES

Indigenous Communities were identified based on similar Projects in the study area, as well as confirmed using the Government of Canada’s web-based geographic information system - Aboriginal and Treaty Rights Information System (ATRIS). This system provides maps to assist interested parties in determining and confirming consultation requirements. A letter received back from the MECP confirmed the list of Indigenous Communities who may have an interest in the Project. The following Indigenous Communities were provided a letter during the week of May 27, 2019:

- Mississaugas of the Credit First Nation.
- Six Nations of the Grand River.
- Haudenosaunee Confederacy Chiefs Council.
- Huron-Wendat Nation.

Acknowledgement letters were received from Indigenous Communities as a result of the Notice of Study Commencement. The Huron-Wendat and Mississaugas of the New Credit First Nations requested an opportunity to review the Stage 1 Archaeological Assessment Report. The Stage 1 AA was shared with the two communities. No comments were received. A summary of communications is included in Appendix J.

5.1.2 REGULATORY AGENCY INVOLVEMENT

A list of regulatory agencies has been assembled, including federal department/agencies, provincial ministries/agencies, regional and local municipal departments, and the Credit Valley Conservation Authority (see Table 5-1). The regulatory agency list will continue to be updated throughout the Study.

Table 5-1: Regulatory Agency Contact List

Municipal	Federal
• City of Mississauga - Transportation and Works; Planning and Building; Infrastructure Planning and Engineering; Fire and Emergency Services, MiWay • Regional Municipality of Peel - Environmental, Capital Planning and Delivery; Data and Forecasting; Traffic Signal Operations; Noise Abatement; Streetscaping; Utilities	• CN Rail • Fisheries and Oceans Canada • Health Canada • Transport Canada - Ontario Region • Crown-Indigenous Relations and Northern Affairs Canada • Canada Post
Provincial	**Other**
• Ministry of the Environment, Conservation and Parks • Ministry of Indigenous Affairs • Ministry of Agriculture, Food and Rural Affairs • Ministry of Education • Ministry of Health • Ministry of Municipal Affairs and Housing • Ministry of Northern Development, Mines, Natural Resources and Forestry • Ministry of Heritage, Sport, Tourism and Culture Industries • Ministry of Infrastructure • Metrolinx	• Credit Valley Conservation Authority • Peel Region Catholic School Board • Peel Region District School Board

As part of Study Commencement, the Notice of Study Commencement was emailed to those on the Project contact list, including pertinent review agencies to gather initial feedback on the Project. As a result of the initial contact, there was little input received.

5.1.2.1 MECP CONSULTATION

The MECP (EA Coordinator) was provided with a Notice of Study Commencement as described above. In addition, a Project Information Form (PIF), as requested by the MECP was provided on May 17, 2019.

The MECP provided a response letter to the Notice of Study Commencement on June 12, 2019. The summary of the details are included in Table 1 in Appendix J.

5.1.2.2 CREDIT VALLEY CONSERVATION

The Project team met with the CVC in early June 2019 to discuss the project, and to gather information. The following is a summary of the discussion:

- Hatch provided an overview of the alignments being considered.
- Areas of potential impact were outlined, which may be of interest to the CVC, including:
  - Crossings of Mullet Creek.
  - Crossings of the Credit River.
  - Crossing of an in-line stormwater management pond in proximity to Erin Mills Parkway/Eglinton Avenue West.
  - Trenchless construction beneath a woodlot.
    - CVC advised of an unnamed creek that may be CVC regulated within the woodlot in proximity to the Erin Mills Parkway/Britannia Road intersection; to be confirmed by CVC.
    - CVC doesn't anticipate that crossings will likely an issue considering depths of construction >20 m.

A meeting with the CVC was held on February 11, 2020 to provide an update on the Project. The primary subject of discussion was related to the works anticipated to occur at SA1, and the Credit River crossing(s) into this staging area. Hatch developed a memorandum specifically related to all construction in proximity to the Credit River which expands upon these concepts, and can be found within Appendix K. All minutes of CVC discussion meetings can be found within Appendix J.

5.1.2.3 CITY OF MISSISSAUGA

The Project Team met with the City of Mississauga on June 17, 2019, specifically the Transportation Coordinator, as well as the Stormwater Management and Drainage specialist. They agreed that they would share our presentation with other pertinent groups at the City and provide comments back within four weeks, to ensure incorporation into our evaluation of alternative alignments. The following is a summary of the input which was received:

Transportation and Works

- Two stormwater management facilities within the study area which could potentially be affected by construction activities:
  - Northeast corner Erin Mills Parkway/Eglinton Avenue West.
  - Northwest corner of Britannia Road West/Queen Street North.
- Drawings to be provided to City in event that there are proposed relocations, adjustments or alterations to City's storm sewer network.
- Minimum 0.5 m vertical clearance for all storm sewer crossings and minimum 2.5 m horizontal clearance for utilities adjacent to City's storm sewers.

- If acquisition of new property rights in the way of easements or fee acquisitions, Region to allow a term of 1.5-2 years to acquire necessary property rights.

Transit

- There are existing transit stops with concrete bus pads that will be impacted during construction - drawings shall clearly show bus stop/pads/shelters.
- Mi-Way has guidelines for transit stops that will be impacted by works, related to Temporary Transit Stops; Infrastructure Costs; Lane Disruptions; and Standard Transit Drawings.

Community Services

- Advise of work or access routes that will be within City of Mississauga lands/easements.
- Consent to Enter agreement required for access to City of Mississauga lands.
- Circulate to CVC related to proposed works to determine permits/approvals for impacts and restoration of natural features.
- Construction management drawing package.
- Inform of project schedule and phases.

An update meeting was held with the City of Mississauga on February 21, 2020. A summary of the discussion includes the following:

All records of discussion can be found within Appendix J.

5.2 PUBLIC INFORMATION CENTRE

5.2.1 NOTICE OF PUBLIC INFORMATION CENTRE & POSTPONEMENT

A Notice of Public Information Centre (PIC) was issued to the Project contact list on January 13, 2021 to announce the start of the two-week review period of the PIC material, to commence on January 25, 2021. Two weeks later, it was decided that the PIC should be postponed while the Project Team revisited some additional information. Therefore, on January 24, 2021 a Notice of Postponement of PIC was issued to the Project contact list.

5.2.2 NOTICE OF PUBLIC INFORMATION CENTRE

A PIC was issued on September 16, 2021 to the Project contact list to announce the start of the four-week review of the PIC material from September 20th to October 19th, 2021. The Notice was also placed in the Mississauga News on September 23 and 30, 2021. A Copy of the Notice is included in Appendix J.

5.2.3 OVERVIEW OF PUBLIC INFORMATION CENTRE

The PIC was posted virtually from September 20, 2021 until October 19, 2021. The purpose of the PIC was to provide a summary of the background information, evaluate and identify the preliminary preferred solution. The public, agencies, stakeholders and Indigenous Communities were invited to review the information and provide their comments or ask questions with regards to the Project. Interested persons were encouraged to submit questions to the Region's Project Manager through email.

No comments were received from the public, agencies or Indigenous Communities before October 19th, 2021.

5.2.4 INDIGENOUS COMMUNITIES

A Notice of PIC was provided to the four Indigenous Communities on the Project Contact list on September 16, 2021. No comments were received. Follow-up efforts were undertaken by Hatch with the Six Nations of the Grand River and the Haudenosaunee Confederacy Chiefs Council (HCCC) following the close of the PIC, to inquire if there were other comments regarding the Project. Hatch placed a call to the Lands and Resources department of Six Nations of the Grand River on November 24, 2021. A follow-up email was sent (November 25, 2021) following the phone call, addressed to Lonny Bomberry, the Lands and Resources Manager and included the Notice of PIC for their records. In addition, an email was issued to the HCCC on November 25, 2021, as it was determined that the email point of contact had recently changed. The email included the PIC notice for their record. No follow-up comments were received from either email.

5.3 CONFIRMATION OF TECHNICALLY PREFERRED ALTERNATIVE

As no input has been received from review agencies, stakeholders, the public or Indigenous Communities, and as a result of the consultation to date and the review process undertaken, there are no significant changes to the recommended solution identified through the analysis completed, therefore the preferred solution will be carried forward for implementation pursuant to Phase 5 of the Municipal Class EA process.

The preliminary preferred solution is EA Alternative 4; this single diversion concept is focused on Mississauga Road, Queen Street North, and Queen Street South; with a branch along Britannia Road West, starting east of the intersection with Queen Street North and another along Erin Centre Boulevard from Mississauga Road to Erin Mills Parkway. The alignment is approximately 3.3 km in length along Mississauga Road/Queen Street North/Queen Street South and 1.7 km in length along Erin Centre Boulevard. The alignment branch extends easterly along Britannia Road West for approximately 620 m toward and across the Credit River.

5.4 NOTICE OF COMPLETION

The purpose of the Notice of Completion is to inform stakeholders and Indigenous communities that the PFR is available for review and comment within the at a minimum 30-day review period. Details regarding how to provide comments on the Project are described in Section 1.5 of this PFR.

6. Potential Environmental Effects, Mitigation Measures and Commitments to Further Work

Above-ground disturbance including excavation, grading and staging is anticipated to be confined to the six staging areas within the preferred alignment.

6.1 SOCIAL ENVIRONMENT

6.1.1 PROPERTY IMPACTS

Property will be required at each of the Staging Areas as documented in further detail in Appendix H. A permanent easement will also be required crossing through the back corner of a residential property at the southeast corner of Erin Centre Boulevard and Erin Mills Parkway for EA Alternative 4. Preliminary discussions with property owners commenced prior to the PIC, and will continue as the design progresses.

Peel Region will negotiate with individual landowners to acquire the property required.

6.1.2 NUISANCE IMPACTS

During construction, all applicable noise regulations, guidelines and bylaws will adhered to. Dust mitigation measures will be implemented including mud mats, water spraying/non-chloride dust suppressants, street sweeping, etc.

A process will be established regarding a complaints protocol.

During construction, appropriate mitigation measures will be in place to minimize any potential impacts on air quality based on existing or local air quality conditions. As per MECP recommendations, non-chloride based dust-suppressants will be used. Nearby residential and other sensitive land uses adjacent to and within the study area will not be adversely affected as a result of construction activities. All applicable guidelines and standards for contaminants of concern will be followed.

6.2 PHYSICAL ENVIRONMENT

6.2.1 CONTAMINATED SOILS AND EXCESS MATERIALS MANAGEMENT

Should the removal or movement of excess soils be required, appropriate steps will be taken to determine contaminant levels. Contaminated soils will be managed and disposed of in accordance with O. Reg 153/04: Record of Site Condition and O. Reg 406/19: Excess Soils and Waste Management. Guidance documents such as MECP's "Management of Excess Soil – A Guide for Best Management Practices" (2021) will be consulted. Contact with the MECP district offices may be required depending on the level of contamination that is identified. Locations of any current and historical waste disposal sites, underground storage tanks, and underground transmission lines will be identified within the study area. Mitigation measures such as a spill response plan and consultation with owners will be undertaken to ensure the integrity of the underground storage tanks and transmission lines.

Pre and Post Construction Phase 2 ESAs shall be undertaken at all proposed tunnel shaft locations to further inform of any subsurface contamination and to ascertain whether the Contractor has introduced any contamination as part of their works. The Contractor shall be responsible for all remediation they have been deemed responsible for.

6.2.2 GROUNDWATER

The MECP well records database will be used to identify the status of and any potential impacts to well water supplies within and adjacent to the study area. Existing groundwater conditions within the study area will be defined. Well construction and decommissioning, if required, will be completed in accordance with O. Reg 903: Wells. Potential impacts to groundwater-dependent natural features will be identified and mitigated, as required. Any permits or potential approval requirements for groundwater taking or discharge will be identified and obtained prior to construction.

As recommended by the MECP, further consultation with the Oak Ridges Moraine Groundwater Program will be considered within the detailed design phase. This consultation shall serve as a means to further inform subsurface hydrogeological conditions, and specifically, the delineation of artesian areas within the project area.

6.3 NATURAL ENVIRONMENT

6.3.1 TREE AND VEGETATION

During detailed design, staging areas will be further refined to avoid/minimize impact to tree and vegetation removal. Snow fencing and standard tree protection measures will be implemented as necessary. All disturbed locations will be restored to meet or exceed existing conditions.

The large Willow species appears to be on private property, but due to its large dripline and root spread, it should be avoided by construction work to protect its integrity. The preferred alternative is not expected to impact this tree during construction.

Attention should be paid to street trees during detailed design to avoid unnecessary harm to trees.

6.3.2 WATERCOURSES

The Credit River, Mullet Creek and an Unnamed Tributary of Mullet Creek have been documented to support fish, as defined under the *Fisheries Act* or provide habitat for bait/forage fish species which support fish defined under the *Fisheries Act*. Additionally, MECP has indicated that the Credit River provides potential habitat for American Eel, an endangered species protected under the provincial ESA.

Due to the presence of resident warmwater fish species and migratory coldwater fish species within the Credit River, it is likely that any required in-water works or work on channel banks will only be permitted between July 1 and August 31. Due to the presence of warmwater fish communities within Mullet Creek and the Unnamed Tributary of Mullet Creek it is likely that any in-water works or near water works will only be permitted between July 1 and March 31. In-water construction timing windows (where works are permitted) should be confirmed with MNRF and MECP during the detailed design phase.

As watercourses within the preferred alignment support fish and fish habitat, construction works associated with the alignment include tunnelling of the proposed infrastructure in order to avoid any impacts to fish and fish habitat. If the tunneling entry and exit points do not clear the high water mark of the watercourses, a review of the DFO “measures to protect fish and fish habitat” as well as the steps associated with whether or not the project needs a review should be completed during the detailed design phase. Review of these two DFO webpages will determine the need for DFO project review by DFO under the Fisheries Protection Provisions of the *Fisheries Act*.

No in-water works are anticipated as a result of construction activities, therefore no impacts to American Eel are expected. If work along the channel banks of the Credit River occurs, resulting in a disruption of American Eel habitat, an authorization from MECP under the ESA may be required.

Site alteration is not permitted within watercourses or the associated floodplain or river valley within CVC regulated area unless authorized by CVC and conducted in accordance with provincial and federal requirements. To avoid potential negative impacts of development to fish habitat, it is recommended that a naturally vegetated buffer is maintained and set aside for no development or site alteration. The Credit River Fisheries Management Plan identifies setbacks which protect riparian areas and provide recommended natural buffers for watercourses. For the watercourses, the minimum setback is considered whichever is greater of the watercourse meander belt width or 30 m. If site alteration occurs within the CVC regulation boundary a CVC permit will be required.

Appropriate mitigation measures will be in place prior to construction to prevent negative impacts to watercourses from occurring (i.e., spills, erosion, pollution). As applicable, to ensure that additional stormwater runoff does not impact watercourses within and adjacent to the study area, the MECP’s “Stormwater Management Planning and Design Manual” (2003) shall be referenced as part of the design process. Any permits or potential approval requirements for surface water taking or discharge will be identified and obtained prior to construction. However, surface impacts of construction are expected to be minimal and impacts to watercourses and stormwater infrastructure are not anticipated.

6.3.3 WETLANDS

There are no wetlands within 120 m of chosen alignment.

6.3.4 SIGNIFICANT WOODLANDS

Based on background review and preliminary site screening, Turney Woods Park and the woodland located in the northeast quadrant of the Erin Mills and Erin Centre Boulevard intersection meet the criteria for significant woodland under the City of Mississauga Official Plan and are considered Significant Natural Areas and Natural Green Spaces. Additionally, due to their close proximity to watercourses, the woodland associated with the Credit River and Mullet Creek valley corridors would also be considered significant.

If any areas designated as Greenlands are impacted through development or alteration, the Region of Peel Official Plan requires rehabilitation of the ecological features lost through replacement. Any negative impact that cannot be avoided will require mitigation through replacement.

6.3.5 SIGNIFICANT WILDLIFE HABITAT

Development or site alteration within SWH is not permitted under the PPS unless it can be demonstrated that there will be no negative impacts to the form or function of these areas. The following candidate SWH types have potential within the study area:

- Raptor Wintering Area
- Bat Maternity Colonies
- Amphibian Breeding Habitat (Woodland)
- Turtle Nesting Area
- Special Concern and Rare Wildlife Species

Upon confirmation of SWH during detailed design, a setback of 30 m is recommended for all SWH types.

SWH is also covered under the "Significant Natural Areas" definition in the City of Mississauga Official Plan. The natural corridors associated with the Credit River, Mullet Creek and the Unnamed Tributary of Mullet Creek are designated as 'Significant Natural Areas' under the City's natural heritage system. SWH is covered under the Core Area definition in the Region of Peel Official Plan. The natural corridor associated with the Credit River valley system is designated as a Core Area. These corridors may fall under multiple categories of SWH. Any negative impact that cannot be avoided will require mitigation through replacement.

6.3.6 SPECIES AT RISK

The following species were identified to have potential habitat available within the study area American Ginseng, Nine-spotted Ladybird Beetle, Barn Swallow, Chimney Swift, Little Brown Myotis, Northern Myotis and American Eel.

Section 9 and 10 of the ESA prohibits activities which result in direct impacts to SAR such as killing, harming, harassing and damage or destruction of habitat for SAR. Potential impacts to SAR will need to be dealt with in consultation with MECP during detailed design and permitting. Specific mitigation plans and/or permitting under the *Endangered Species Act* may be required.

If habitat being used by any of the listed species is negatively impacted, a permit from the MECP will be required. The following recommendations are provided for detailed design:

- Recommend a SAR bat habitat assessment and breeding bird survey be conducted should tree removals be needed in the preferred alternative alignment.
- Recommend SAR trees be noted during the detailed inventory.

6.3.7 NATURAL HERITAGE MITIGATION SUMMARY

Mitigation measures to avoid and minimize potential effects to environmental features will be developed for the Single Diversion Concept during detailed design. Mitigation measures for environmental features may include:

- Siting laydown and staging areas to avoid sensitive features (e.g., away from woodlands and watercourses)

- Consideration of construction methods to minimize potential effects.
- For example, construction activities (including permeable/impervious surfaces) will need to consider water quality and quantity and ensure pre-construction pathways and flows are maintained or similar to existing conditions. This will minimize potential impacts to both terrestrial and aquatic resources.
- Implementing setbacks and tree protection zones (e.g., set distance from rooting zone; to be determined in the arborist report).
- Development of the following plans during the detailed design phase:
  - Erosion and Sediment Control Plan
  - Environmental Management Plan
  - Tree Protection Plan
  - Restoration Plan
- Developing a wildlife protocol and rescue plan to educate staff on wildlife occurrences (including SAR) and measures to take to minimize potential for injury and incidental take, including environmental controls such as exclusionary fencing to prevent wildlife from entering the site.
- Implementing construction monitoring to ensure mitigation measures and contingency measures are implemented according to design and that objectives are being met.

6.4 CULTURAL ENVIRONMENT

6.4.1 ARCHAEOLOGY

The property inspection determined that there are parts of the study area that exhibit archaeological potential. Although trenchless construction is proposed, there are surface impacts associated including shaft locations and staging areas that will require Stage 2 survey in advance of construction activities. Any locations of proposed impacts to areas of archaeological potential in which trenchless construction depth is less than five metres below surface, Stage 2 AA will be required. The construction of the alignment (greater than five metres below surface), will not trigger Stage 2 in areas of surface archaeological potential.

Test pit survey is required on terrain where ploughing is not viable. The study area includes the Streetsville Memorial Cemetery at 299 Queen Street South; however surface impacts are not planned within the proposed alignment in the cemetery or immediately adjacent lands. Previous work within the cemetery indicates that there is high potential for burials to extend into the sidewalk and Queen Street South right-of-way. Any future impacts less than five metres below surface within or directly adjacent to the cemetery will require a Stage 3 Cemetery Investigation to be conducted in the sidewalk and Queen Street South right-of-way to confirm the presence or absence of human remains associated with the Streetsville Memorial Cemetery. A Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required for any “invasive” Stage 2-4 field work. If evidence of burials associated with the cemetery are encountered, all work must cease and the MHSTCI and Bereavement Authority of Ontario will

need to be contacted for direction on next steps. Further details regarding the Cemetery Investigation are summarized in the Stage 1 Archaeological Assessment Report (Appendix D).

Part of the study area has been previously assessed and does not require further archaeological assessments. A combination of property inspection and assessment of topographic mapping determined that some of the lands within the study area are sloped in excess of 20 degrees and do not contain potential – these areas do not require further survey. Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

The study area crosses the main branch of the Credit River. If the riverbed will be impacted, the MHSTCI's Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential. The remainder of the study area has been subjected to deep soil disturbance events associated with the surrounding infrastructure construction projects.

The preliminary shaft locations and staging areas which exhibit archaeological potential will require Stage 2 archaeological assessment prior to any construction impacts. The preferred alignment will not require Stage 2 survey. Site AjGw-432 was destroyed during redevelopment, and its locations should be noted during any future Stage 2 Archaeological Assessment on adjacent properties.

The majority of the six Staging Areas to support the construction of the West Trunk Diversion will require Stage 2 Archaeological Assessments prior to detailed design to delineate areas that should be avoided.

Below is a high-level summary of the proposed shafts, Staging Areas and their potential:

- SA0: Previously disturbed – no potential
- SA1: Test pit survey required
- SA2: Previously disturbed – no potential
- SA4: Previously disturbed and previously assessed – no potential
- SA10: Previously disturbed – no potential
- SA17: Previously disturbed – no potential

In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority and Cultural Programs Unit of the MHSTCI should be immediately notified. Should the proposed work extend beyond the current study area, further archaeological assessment will be required to determine the archaeological potential of the surrounding lands. During detailed design, a communication plan should be developed to outline the steps to be undertaken in the event of a stop-work order following the uncovering of human remains and/or any archaeological resources during construction. The communication plan should outline the Indigenous communities to be contacted.

The Stage 1 Archaeological Assessment was submitted to the MHSTCI on November 2, 2021. The Report is now considered filed with the ministry (April 21, 2022). A summary of the communication with the MHSTCI is included in Appendix J.

6.4.2 CULTURAL HERITAGE

There are a number of potential impacts to Cultural Heritage Resources as a result of the preferred alignment. There are direct impacts anticipated for three CHLs (CHL 2, 3 and 4) and indirect impacts anticipated for three CHLS (CHL 1, 2 and 3). The following is a summary of the recommendations:

- Construction activities and staging should be planned and undertaken to avoid impacts to identified cultural heritage resources.
- There are no direct impacts to any properties with identified cultural heritage value anticipated as a result of tunnelling activities, however excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure that all BHRs and CHLs are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. Should this vibration assessment determine that the structures or landscape features within the BHRs or CHLs will be subject to adverse impacts due to vibration, a vibration monitoring plan should be prepared and implemented as part of the detailed design phase of the project to lessen vibration impacts related to construction.
- Direct impacts to CHLs 2, 3 and 4 are anticipated as a result of required staging areas. Where feasible, staging area locations should be revised to prevent impacts to identified cultural heritage resources. Specific properties with potential cultural heritage value within these CHLs anticipated to be directly impacted include:
    - CHL 2: 3 Queen Street North, 5267 Mississauga Road (SA10)
    - CHL 4: 170 Britannia Road West
- The property at 3 Queen Street North (CHL 2) is listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, therefore a resource-specific HIA may be required per the City of Mississauga Official Plan. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.
- As the properties at 5267 Mississauga Road and 1700 Britannia Road West are Listed in the Heritage Register for Mississauga and there are direct impacts anticipated, a resource specific HIA may be required. Although there are no structures or apparent landscape features of significant cultural heritage value, it is recommended that the City of Mississauga consider waiving the requirement for HIAs in this case. As impacts are

anticipated to be temporary, a suitable mitigation strategy include post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

- Direct impacts to CHL 3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL 3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts.
- Indirect impacts to CHL 1, 2 and 3 are anticipated as a result of their location adjacent to Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHLs that are adjacent to staging areas and are anticipated to be indirectly impacted include:
    - CHR 1: 3 Queen St South (Listed)
    - CHR 2: 6300 Mississauga Road (Listed), 3, 4, 6, 14 and 17 Queen St North and 1965 Britannia Road West (Listed); 5235 Mississauga Road, 5306 Mississauga Road and 2125 Erin Centre Boulevard (Listed)
    - CHR 3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River
- Where indirect impacts to properties that are Listed in the Heritage Register for Mississauga are anticipated, a resource-specific HIA may be required as per the City of Mississauga Official Plan, however where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (i.e., 3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14 and 17 Queen Street North, 1965 Britannia Road West, 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.
- Should future work require an expansion of the study area, a qualified heritage consultant should be contacted to confirm impacts of proposed work on potential heritage resources.
- This report was shared with heritage planning staff at the City of Mississauga, the MHSTCI and any other relevant heritage stakeholders that have an interest in the project.

6.5 TRANSPORTATION

A qualitative identification of transportation impacts associated with the preliminary preferred alternative was completed to establish strategies to mitigate potential impacts. Some lane closures, sidewalk closures and relocation of transit stops may be required to accommodate construction of the preliminary preferred alignment of the West Trunk Diversion. The following recommendations are made to minimize impacts to the transportation network in the study area for the duration of construction:

- Maintain pedestrian and cycling facilities whenever possible, and to enact appropriate signage alerting travellers of detours.
- Maintain existing transit stops whenever possible. If maintaining an existing transit stop is not possible, a barrier-free alternate stop shall be provided following consultation with MiWay.
- Advise local residents, businesses, and motorists of proposed changes to road network well in advance of planned construction so they can pre-emptively adjust travel behavior.
- Encourage the public to consider use of alternative modes of travel, such as transit, walking, cycling or carpooling.
- Consider provision of advanced advisory notifications using Portable Variable Message Signs. This will advise local residents and motorists of proposed construction work and closures well in advance of planned construction so they can adjust travelling behavior/route appropriately.
- Consider provision of variable message signs to provide anticipated travel time alerts during construction.
- Schedule a pre-construction planning meeting between the design team, the Contractor, the City, police, fire, emergency medical services (EMS), and MiWay to discuss proposed construction stages, and how it will affect their services.
- Regularly monitor traffic conditions and traffic control devices, replacing any unacceptable devices as required.
- Undertake work zone coordination to identify potential work zone conflicts with other planned roadwork projects.

6.6 PERMITS AND APPROVALS

The following permits and approvals are anticipated following the completion of the Class EA:

Federal:

- Self-Assessment/Letter of Advice or Authorization (*Fisheries Act*)

Provincial:

- Ministry of the Environment, Conservation and Parks
    - Permit or Registry (*Endangered Species Act*)
    - Permit to Take Water (PTTW)
    - Environmental Compliance Approval (ECA)
- Ministry of Heritage, Sport, Tourism and Culture Industries
    - Clearance Letter (*Ontario Heritage Act*) – Archaeology and Cultural Heritage

Municipal and Regional:

- City of Mississauga – Approved rehabilitation, replacement and/or mitigation of Significant Natural Areas, Road occupancy Permit, Noise bylaw exemption, PUCC approval
- Region of Peel – Approved rehabilitation, replacement and/or mitigation of Greenlands and Core Areas; Road Occupancy Permit, Hydrant Permit, Discharge Permit
- Credit Valley Conservation
    - Erosion and Sediment Control Plan and Surface Water Management Plan (*Conservation Authorities Act*)
    - Permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 166/06 under *Conservation Authorities Act*)

Property Agreements:

- Permanent and temporary easements from affected property owners

6.7 CONSTRUCTION AND POST-CONSTRUCTION MONITORING PLANS

During the design phase the Contract Documents shall be structured to ensure that Contractors are made aware of all environmental considerations and to ensure that all environmental standards and commitments for construction are met. To that end, stringent monitoring and mitigation measures shall be implemented before, during and after construction and are described as follows:

- Post-award of the project to the successful Contractor, but prior to any construction efforts beginning, existing site conditions shall be thoroughly documented via pre-construction inspection which shall feature photos and videos of the construction alignment and the interior and exterior of buildings within the construction zone of influence.
- CCTV inspections of existing buried infrastructure will be undertaken where applicable to document their existing conditions prior to any construction occurring within their immediate vicinity. These inspections shall be repeated post-construction. The pre and post-construction footage shall be reviewed and contrasted to identify any potential impacts required to be addressed.
- Pre and Post-construction ESAs in accordance with the latest version of O. Reg. 153 to document existing construction compound conditions and any pre-existing site contamination. The Contractor will be fully liable and responsible for remediating any contamination identified in the post-construction ESA that was not present in the Pre-Construction ESA.
- Extensive erosion and sediment control plans will be developed during design and implemented to ensure no uncontrolled releases of silt or sediment into the natural environment and specifically, watercourses, occur during construction.
- Review and alert limits for noise, vibration and settlement shall be established by subject matter experts and included within the Contract Documents. Stringent monitoring programs will be implemented to ensure exceedances are identified while still providing a sufficient window for mitigation prior to any impacts being observed.

- Mud and Dust Control shall be undertaken for all roads within proximity to any proposed construction compounds.
- Additional details related to construction dust, noise and vibration are also included within Appendix L.
- Peel Region will provide advance warning to residents in advance of construction.

7. References

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APPENDIX A

Phase 1 ESA Reports

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
PROPOSED BRITANNIA ROAD DIVERSION
PEEL WEST TRUNK DIVERSIONS
TORONTO, ONTARIO

for

REGIONAL MUNICIPALITY OF PEEL
C/O HATCH

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PML Ref.: 18TX032
May 17, 2019

EXECUTIVE SUMMARY

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Britannia Road West and Mississauga Road/Queen Street North located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

Within the project limit, the lands on both sides of Britannia Road West and Mississauga Road/Queen Street North are urban development, consisting mostly of industrial/commercial activities.

Based on the evaluation of the historical data and site reconnaissance, fourteen (14) Potential Source of Contaminations (PSCs) were identified along Britannia Road West and Mississauga Road/Queen Street North.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, Canadian Pacific Railway (CPR) tracks and Go Transit Garage.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Recommendation

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Esso gasoline service station and Mr. Lube auto repair and service station at 2520 Britannia Road West
2	Canadian Pacific Railway (CPR) tracks south of Queen Street and Britannia Road intersection

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
3	Streetsville auto sales at 4 Queen Street North
4	Active Green Ross auto service station at 14 Queen Street North
5	Petro Canada gasoline service station at 26 Queen Street North
6	Ken Champ Auto repair station at 40 Queen Street North
7	Mint auto service station, meineke auto service station and Streetsville Gas Station at 57 Queen Street North
8	CPR tracks at Matlock Avenue
9	Go Transit Garage at 6190 Mississauga Road
10	Streetsville Hyundai at 6215 Mississauga Road
11	88 Auto Sales and Flomax Auto Mechanic at 6237 Mississauga Road
12	Integra Tire and Auto Centre at 6325 Mississauga Road

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Drawing 1: Site and Surrounding Area Features

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Appendix A – MECP Well Record Summary

Appendix B – Opta Information Intelligence Report

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Appendix D – Statement of Limitations

1. INTRODUCTION

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Britannia Road and Mississauga Road/Queen Street North located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site source of contaminations (PSCs), if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

1.1 Site Description

The subject site is a roadway alignment and consists of two parts as follows:

- Along Britannia Road West between Erin Mills Parkway to the south and Credit River to the north (About 2.0 km long, Figure 1).
- Along Mississauga Road/Queen Street North between Britannia Road to the east and west of Alpha Mills Road to the west (About 1.0 km, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, industrial/commercial type structures are developed along west of Britannia Road between Erin Mills Parkway and Mississauga Road/Queen Street North.

2. SCOPE OF INVESTIGATION

The Phase One ESA involved the following tasks to assess the road alignment's physical and geoenvironmental setting and to document past and present land use activities.

i) A review of available documents including aerial photographs, topographic, geologic and hydrogeologic maps, city directories, report of previous geotechnical/ geoenvironmental investigations for the subject site prepared by PML, land registry records, Ministry of the Environment, Conservation and Parks (MECP) water well

records and fire insurance plans to evaluate the site physical setting and to document past and present land use activities.

ii) Conducting a walk-through visual inspection along the road alignment and a 250 m area on both sides of the alignment to assess current site and surrounding area conditions and the visual presence of site features or olfactory evidences indicating potential contamination, if any.

iii) Interviews with the knowledgeable individuals regarding the site conditions associated with historical land use activities at the subject site.

iv) Preparation of this report, discussing the information compiled and the pertinent conclusions and recommendations together with the tables, figures, site photographs and drawings as well as other information in Appendices.

3. RECORDS REVIEW

3.1 General

3.1.1 Phase One ESA Study Area Determination and Rationale

The subject site is a roadway alignment and consists of two parts extends along Britannia Road West between Erin Mills Parkway to the south and Credit River to the north, and along Mississauga Road/Queen Street North between Britannia Road West to the east and west of Alpha Mills Road to the west (About 1.0 km, Figure 1). The road alignment is surrounded mostly by commercial land uses.

The Phase One ESA Study Area was determined in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012 to identify and verify the potential on-site and off-site sources of contamination, if any.

3.1.2 First Developed Use Determination and Rationale

Based on information from aerial photographs and available maps, the first developed use of the site was presumably agriculture in the late 1940s.

3.1.3 Fire Insurance Plan

An attempt was made to review the historical Fire Insurance Plans (FIPs) for the site and surrounding areas. However, no FIPs were available to review.

3.1.4 MECP Water Well Records Review

The Ministry of Environment, Conservation and Parks (MECP) Water Well Records database was searched for well records within 250 m radius of the site. One hundred and seventeen (117) recorded wells were located within the 250 m radius of the site. Based on MECP, twelve (12) of the wells were recorded as water supply wells (domestic, public and commercial), installed between 1949 and 1966. A summary of the well record information is included in Appendix A.

3.1.5 Previous Geotechnical Report Summary

Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019.

The findings of the geotechnical report are summarized as follows:

A sanitary sewer replacement will be carried out on various streets in the City of Mississauga, Ontario. The sanitary sewer will be installed by both open cut and trenchless method in an established residential neighbourhood.

Based on a review of drawings dated June 2018 prepared by the Region of Peel, the available information on the proposed sanitary sewer size, alignment and invert levels is summarized below:

The project involves the following components:

i. Construction of approximately 1,100 m of new 1500 mm diameter sanitary sewer consisting of a concrete pressure pipe (CPP) with 450 mm cunette or 600 mm sanitary CPP carrier pipe. The sanitary sewer will be installed by trenchless method along the following segments:

   a. About a 100 m segment from the intersection of Brittania Road West and Joymar Drive to the intersection of Pioneer Drive and Brittania Road West.

   b. About a 960 m segment along Joymar Drive starting from Brittania Road West going eastwards to Tannery Street.

ii. Reconfiguration and replacement of approximately 2,650 m of existing local sewers and laterals on the streets listed below are anticipated to be carried out using open cut method:

- Pioneer Drive
- Andrea Court
- Siberry Road
- Joymar Drive
- Joycelyn Drive
- Theodore Drive
- Donata Drive
- Turney Drive and
- Isherwood Court

iii. Construction of a new 250 mm diameter sanitary sewer on Thomas Street, crossing beneath Mullet Creek and the existing bridge structure by trenchless method.

It is anticipated that the preferred trenchless technology will be microtunneling.

The project area is mainly residential and falls within the Credit River Watershed and smaller surrounding watersheds, which drain directly into Lake Ontario. The sanitary sewer alignment will be along several asphalt paved residential streets located east of Britannia Road and south of Queen Street in Streetsville, Mississauga.

During the investigation for GDR, a total of 29 boreholes were drilled and 10 monitoring wells were installed for the subject project.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m (BH-7) to 5.5 m (BH-17). The fill was encountered in all 29 boreholes. Below the fill material, was encountered a thick deposit of silty clay in BH-3 (thickness about 1.8 m) and BH-19 (thickness about 1.6 m), and clayey silt in BH-28 (thickness about 4.0 m). The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock. For classification purposes, the soils encountered at this site can be divided into six (6) distinct zones:

- Pavement Structure
- Fill (mostly sand and gravel)
- Clayey Silt/Silty Clay
- Clayey Silt Till/Silty Clay Till
- Silty Sand Till/Sand and Silt Till
- Shale Bedrock

The shale bedrock of the Georgian Bay Formation was encountered in boreholes BH-1 to BH-14, BH-17, BH-19, BH-24, BH-25 and BH-29. The depth of the shale bedrock encountered varied from 3.4 m (BH-14) to 8.3 m (BH-19) below ground surface. Rock coring was conducted in boreholes BH-1 to BH-4, BH-6 to BH-14, BH-24, BH-25 and BH-29 following the procedures as described in ASTM D2113–14 using diamond core, double tube, wireline HQ2 with the exception BH-1, BH-2, BH-3 and BH-25, where NQ2 core drilling was performed.

In general, the Georgian Bay Formation consisted of highly weathered to fresh, grey, very fine to fine grained fissile, weak to strong shale partings with occasional widely spaced jointing with sub-horizontal to horizontal bedding planes, interbedded with fresh, dark grey, moderately hard, calcareous, crystalline carbonate.

3.1.6 Previous Geo-Environmental Testing

The geoenvironmental sampling and chemical testing program was conducted in conjunction with a geotechnical investigation referred in Section 3.1.5. For excess soil management and/or off-site disposal options, soil samples were selected for chemical analyses.

Chemical Analyses

Based on the visual examination of soils in the boreholes and the site background information, the retrieved soil samples were submitted to SGS Laboratories Inc. (SGS), located in Lakefield, Ontario for chemical testing. SGS is accredited by the Canadian Association for Laboratory Accreditation (CALA). The soil samples were analyzed for the following parameters.

- Selected discrete soil samples were analyzed for metals, inorganic, benzene, toluene, ethylbenzene and xylenes (BTEX) and F1 through F4 fraction petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) parameters as listed in the Ontario Regulation 153/04 as amended by Ontario Regulation 511/09.
- Selected composite soil samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) for metals and inorganic parameters listed in Schedule 4 of Ontario Regulation 347 as amended by Ontario Regulation 558/00.

Findings of Chemical Analyses

For off-site disposal, the results of the soil chemical analyses were compared with the Ontario Regulation 511/09 Standards (Tables 1, 2 and 3) for residential/parkland and industrial/ commercial property uses in background, potable and non-potable ground water situations.

Comparison with Table 1 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Table 1 background standards for residential/parkland/ institutional property use.

Comparison with Tables 2 and 3 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Tables 2 and 3 standards for residential/parkland/institutional property use.

Comparison with Tables 2 and 3 Industrial/Commercial/Community Property Use Standards

Based on the chemical test results, the analyzed soil samples from sixteen (16) boreholes (BH1, BH3, BH6, BH7, BH9, BH10, BH11, BH12, BH13, BH15, BH20, BH24, BH25, BH26 and BH28) exceeded the Tables 2 and 3 standards for industrial/commercial/community property use.

Leachate Quality (TCLP) Results

The results of the TCLP analyses were compared with Schedule 4, Ontario Regulation 347 as amended by Ontario Reg. 558/00, and found that the analyzed soils are not of leachate toxic nature.

3.2 Environmental Source Information

Environmental source information was obtained from the following sources: Ministry of the Environment, Conservation and Parks (MECP), Toronto Reference Library, Opta Information Intelligence, Technical Standards and Safety Authority (TSSA) and the National Pollutant Release Inventory website. The environmental source information from Opta Information Intelligence and TSSA are attached in Appendices C and D, respectively.

A summary of the environmental source information is presented in Table 1 below.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
1	Opta Information Intelligence	City Directory Information Source	▪ Esso gasoline service station and Mr. Lube auto service station was located at 2520 Britannia Road West. ▪ Active Green & Ross Tire & Auto Centre, Harvey's Tire Centre Ltd. and Sungas were located at 14 Queen Street North. ▪ Bernie's Auto Service, Bernie's Used car Sales and Petro Canada were located at 26 Queen Street North. ▪ Queen Street Auto Sales Ltd. was located at 40 Queen Street North. ▪ AAA Speedy Auto & Window Glass, Excel Service Station and Meineke Discount Mufflers were located at 57 Queen St North. ▪ Wilcox Bodies Limited, and Wilcox Truck Bodies Limited were located at 6215 Mississauga Road. ▪ Credit Valley Auto Sales & Service and Starfield Maintenance were located at 6237 Mississauga Road. ▪ Mississauga Radiator was located at 6325 Mississauga Road.	Yes. Potential impact to soil and ground water.
2	Technical Standards and Safety Authority (TSSA)	Release of Public Information - TSSA	▪ Records of four (4) active fuel storage tanks noted at 2520 Britannia Road West. ▪ Records of ten (10) expired fuel storage tanks noted at 14 Queen St North.	Yes. Potential impact to soil and ground water.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
			▪ Records of six (6) active and two (2) expired fuel storage tanks noted at 26 Queen St North. ▪ Records of four (4) expired fuel storage tanks noted at 40 Queen St North. ▪ Records of five (5) active fuel storage tanks noted at 57 Queen St North.	
3	Ontario Ministry of Environment and Energy (MOEE) July 1993	Ontario Inventory of PCB Storage Sites	No listing was noted within the road alignment and adjacent properties.	None
4	Ontario Ministry of Environment and Energy (MOEE) April 1987 and November 1988	Inventory of Coal Tar Wastes and Coal Gasification Plants	No listing was noted within the road alignment and adjacent properties.	None
5	Ontario Ministry of Environment and Energy (MOEE) June 1991	Waste Disposal Site Inventory of Landfill Sites	No listing was noted within the road alignment and adjacent properties.	None
6	MECP Location of Small Landfill Sites, 2019	http://www.ontario.ca/data/small-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
7	MECP Location of Large Landfill Sites, 2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
8	http://www.ec.gc.ca/inrp-npri/	National Pollutant Release Inventory	No listing found for the road alignment and adjacent properties.	None

3.3 Physical Setting Sources

3.3.1 Aerial Photographs

Historical and recent aerial photographs for the road alignment and vicinity areas were reviewed in order to assess the development sequence of the road alignment and adjacent properties. Based on the availability, the aerial photographs for the years 1960, 1970, 1975, 2004, 2007, 2015 and 2019 were selected for the current investigation and are shown on Figures 2 to 8. The review findings are outlined below.

Based on the aerial photographs of 1960, 1970, 1975, 2004 and 2007, residential developments were noted along the east side of Britannia Road, vacant lands or lands under constructions were noted along west side of Britannia Road between Erin mills Parkway and Queen Street North and commercial type structures were noted along both sides of Mississauga Road/Queen Street North (Figures 2 to 6).

Based on the Google Maps of 2015 and 2019, industrial/commercial type structures are developed along west of Britannia Road between Erin Mills Parkway and Mississauga Road/Queen Street North (Figures 7 and 8).

3.3.2 Topography, Hydrology and Geology

A review of the Ontario Base Map (OBM) was conducted for the site and surrounding areas. Residential properties appear consistently within the area from Queen Street to Credit River and east of Britannia Road between Erin Mills Parkway and Queen Street, with various commercial and industrial properties scattered in the area. Credit River and Mullet Creek crossed the road alignment at about 600 m northeast and about 250 m southwest of Britannia Road West and Queen Street North intersection, respectively. Canadian Pacific Railway (CPR) tracks are located about 100 m southwest of the Queen Street (Figure 9).

The local topography is considered as a rolling terrain with existing ground surface elevation varying approximately between 185 m (amsl) and 152 m (amsl), with topographic relief of approximately 33 m (Figure 9).

According to Chapman and Putnam (Physiography of Southern Ontario, Ministry of Natural Resources, 1984), the project area is in the physiographic region known as the South Slope bordered by Peel Plain to the north and Iroquois Plain to the south. The physiographic landform in the area is defined as Till Moraines.

The OGS Earth Map of Surficial Geology of Southern Ontario (Ontario Geological Survey, 2010), indicates that the project area lies on a region of clay to silt-textured till deposits, derived from glaciolacustrine deposits or shale.

The OGS Earth Map of Paleozoic Geology of Southern Ontario (Armstrong and Dodge, 2007), indicates that the bedrock geology at the project area comprises shale, limestone, dolostone and siltstone of Georgian Bay Formation of the Upper Ordovician Period.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located at the north end of the the project area. Mullet Creek, a tributary of the Credit River, crossed the site at the central portions of the project area. Both watercourses flow south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow towards Credit River and finally southerly towards Lake Ontario.

Previously, Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019. The soil stratigraphy reported on these reports is summarized below.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m to 5.5 m. The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 m thick compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock.

3.3.3 Fill Materials

No fill piles were noticed along the alignment. However, engineered fill materials are expected to be present along the road alignment and adjacent developed sites/properties.

3.3.4 Water Bodies and Areas of Natural Significance

Credit River and Mullet Creek crossed the road alignment at about 600 m northeast and about 250 m southwest of Queen Street, respectively.

Based on the Ontario Ministry of Natural Resources and Forestry (MNRF), no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

4. INTERVIEW

During the course of this assessment, PML interviewed the following persons on April 26, 2019, as outlined in Table 2 below:

TABLE 2

INTERVIEWS SUMMARIZED INFORMATION

PLACE/ METHOD	PERSON INTERVIEWED	RATIONALE	INFORMATION PROVIDED
Esso gas station and Mr. Lube auto service station/ Meeting	Mr. Khalid Yokhanna, 2520 Britannia Road West	Manager for last 10 years	1) The subject site was historically used for gas station. 2) Mr. Yokhanna is not willing to release any further information. 3) However, it is understood that the site is an operational Esso Gas Station with underground storage tanks (USTs) and Mr. Lube auto service station with aboveground storage tanks (ASTs).
Ross Bloom Dry Cleaners/ Meeting	Mr. Ashraf Suliman, 17 Queen Street North, Mississauga	Owner for last 12 years	1) Historical use of the subject property is not known. 2) Ross Bloom Dry Cleaners was in business for the past 12 years. 3) This is a drop-off and pick-up station only, no chemical is used on the property. 4) There is no on-site or off-site environmental concerns.
Meineke Car Care Centre/ Meeting	Mr Ivo Boutros, 57 Queen Street North, Mississauga	Owner of Meineke Car Care Centre	1) The subject site was historically and currently used for auto repair and service station. 2) Waste oils are stored on tanks and are transported off-site by a private company. 3) Mint auto repair station is located adjacent east and Streetsville Gas Station is located adjacent west of the property. 4) The site is connected to the City's water supply and sewer system.
Streetsville Gas Station/ Meeting	Mr. Rasheed Syed, 57 Queen Street North, Mississauga	Owner for Streetsville Gas Station for about 1 year	1) The subject site was historically used for gasoline service station. 2) There are USTs present on the site. There is no AST on the site.

5. SITE RECONNAISSANCE

5.1 General

A site reconnaissance along Britannia Road West and Mississauga Road/Queen Street North was carried out by a Geoscientist (Mr. Shamsul Tarafder) of PML on April 26, 2019.

Selected site photographs were taken at the time of site reconnaissance which are shown on Plates 1 to 6. Drawing 1 shows the site and surrounding features, and potential source of contamination (PSC) along the road alignment as observed during the site reconnaissance.

5.2 The Site Observations

During the site reconnaissance, it was confirmed that the site is located along Britannia Road West and Mississauga Road/Queen Street North in the City of Mississauga, Ontario. The road sections along Britannia Road West and Mississauga Road/Queen Street North are about 2.0 km and 1.0 km, respectively. The subject site and the vicinity are surrounded by mixed residential/ parkland/institutional and commercial properties (Drawing 1).

At present, the site is double lane local roadways having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. During the site visit, normal operation of road like movement of vehicles was noticed.

Fill pile was not noticed along the alignment of Britannia Road West and Mississauga Road/Queen Street North. There were no unusual noise, odour and vibration noted. No unidentified substance was noted at the site. There was no water well noted on the site.

5.3 The Study Area Observations

A visual inspection of the Study Area (250 m on both sides of Britannia Road West and Mississauga Road/Queen Street North) was conducted from the limits of the road alignment and publicly accessible areas to check for potential source of contaminations (PSCs), water bodies and areas of natural significance.

The road alignment along Britannia Road West is surrounded by mixed residential/parkland/ institutional and commercial properties. Esso gasoline service station and Mr. Lube auto repair and service station are located at 2520 Britannia Road West. Canadian Pacific Railway (CPR) tracks are located about 100 m southwest of Queen Street and Britannia Road intersection (Drawing 1).

The road alignment along Mississauga Road/Queen Street North is surrounded by mostly commercial properties. Rose Bloom dry cleaners (drop-off and pick-up center only), Mint auto service station, Meineke Auto Care Centre, Streetsville Gas Station, Streetsville Hyundai, 88 Auto Sales, Flomax Auto Mechanic, and Integra Tire and Auto Centre are located along north shoulder of Mississauga Road/Queen Street North. Streetville auto sales, Active Green Ross auto service station, Petro Canada gasoline service station, Ken Champ Auto repair station and Go Transit Garage are located along south shoulder of Mississauga Road/Queen Street North. CPR tracks are located about 400 m northwest of Queen Street and Britannia Road intersection (Drawing 1).

No Area of Natural Significance (ANS) existed on the road alignment. Credit River and Mullet Creek crossed the road alignment at about 600 m northeast and about 250 m southwest of Britannia Road West and Queen Street North intersection, respectively.

6. REVIEW AND EVALUATION OF INFORMATION

6.1 Potential Source of Contamination (PSCs)

Based on the evaluation of the historical data and site reconnaissance, fourteen (14) Potential Source of Contaminations (PSCs) were identified at twelve (12) locations on the adjacent properties to the road alignment.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, CPR tracks and Go Transit Garage.

The identified PSCs are listed in Table 3 below and shown on attached Drawing 1.

TABLE 3

POTENTIAL SOURCES OF CONTAMINATION (PSCs)
ON / IN / UNDER THE ROAD ALIGNMENT AND ADJACENT PROPERTIES

PSC No.	LOCATION	DESCRIPTION
1	Esso gasoline service station and Mr. Lube auto repair and service station	2520 Britannia Road West
2	About 100 m southeast of Queen Street and Britannia Road intersection	Canadian Pacific Railway (CPR) tracks
3	4 Queen Street North	Streetsville auto sales
4	station14 Queen Street North	Active Green Ross auto service
5	station26 Queen Street North	Petro Canada gasoline service
6	40 Queen Street North	Ken Champ Auto repair station
7	57 Queen Street North	Mint Auto repair and service station, Meineke Auto Care Centre and Streetsville Gas Station
8	About 400 m northwest of Queen Street and Britannia Road intersection	CPR tracks at Matlock Avenue

TABLE 3

POTENTIAL SOURCES OF CONTAMINATION (PSCs)
ON / IN / UNDER THE ROAD ALIGNMENT AND ADJACENT PROPERTIES

PSC No.	LOCATION	DESCRIPTION
9	6190 Mississauga Road	Go Transit Garage
10	6215 Mississauga Road	Streetsville Hyundai
11	6237 Mississauga Road	88 Auto Sales and Flomax Auto Mechanic
12	6325 Mississauga Road	Integra Tire and Auto Centre

6.2 Contaminants of Potential Concern (COPC)

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in gasoline service stations, auto repair stations, auto sales and service dealerships, railway tracks and garage operations, those are considered as COPC as well as background level check for the road alignment.

6.3 Conceptual Site Model (CSM)

A Conceptual Site Model (CSM) is presented to demonstrate the current site geoenvironmental conditions. The subject CSM has been prepared based on the site background information compiled to date and a site reconnaissance.

This CSM consists of Figures 1 to 9 and a plan showing Potential Source of Contaminations (PSCs) along the both sides of Britannia Road West and Mississauga Road/Queen Street North road alignment (Drawing 1), which depict the site conditions including surficial features, and present and past land uses in and around the alignment.

The subject site is a roadway alignment and consists of two parts as follows:

- Along Britannia Road West between Erin Mills Parkway to the south and Credit River to the north (About 2.0 km long, Figure 1).
- Along Mississauga Road/Queen Street North between Britannia Road to the east and west of Alpha Mills Road to the west (About 1.0 km, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, industrial/commercial type structures are developed along west of Britannia Road between Erin Mills parkway and Mississauga Road/Queen Street North.

The road alignment along Britannia Road West is surrounded by mixed residential/parkland/ institutional and commercial properties. Esso gasoline service station and Mr. Lube auto repair and service station are located at 2520 Britannia Road West. Canadian Pacific Railway (CPR) tracks are located about 100 m southwest of Queen Street and Britannia Road intersection.

The road alignment along Mississauga Road/Queen Street North is surrounded by mostly commercial properties. Rose Bloom dry cleaners, Mint auto service station, Meineke Auto Care Centre, Streetsville Gas Station, Streetsville Hyundai, 88 Auto Sales, Flomax Auto Mechanic, and Integra Tire and Auto Centre are located along north shoulder of Mississauga Road/Queen Street North. Streetsville auto sales, Active Green Ross auto service station, Ken Champ Auto repair station, Petro Canada gasoline service station and Go Transit Garage are located along south shoulder of Mississauga Road/Queen Street North. CPR tracks are located about 400 m northwest of Queen Street and Britannia Road intersection.

Based on the evaluation of the historical data and site reconnaissance, fourteen (14) Potential Source of Contaminations (PSCs) were identified at twelve (12) locations on the adjacent properties to the road alignment. The identified PSCs are listed in Section 6.1, Table 3, and shown on attached Drawing 1.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, CPR tracks and Go Transit Garage.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in gasoline service stations, auto repair stations, auto sales and service dealerships, railway tracks and garage operations, those are considered as COPC as well as background level check for the road alignment.

Based on the Ontario Ministry of Natural Resources and Forestry, no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located at the north end of the the project area. Mullet Creek, a tributary of the Credit River, crossed the site at the central portions of the project area. Both watercourses flow south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is inferred to flow towards Credit River and finally southerly towards Lake Ontario.

Since the assessment of PSCs were mostly theoretically based information, there was inherent uncertainty in the conceptual site model. These predictions were mostly based on the information available from database sources. If these predictions are incorrect, evaluation for PSCs could be missed. However, attempts were taken to minimize the uncertainties by field observations.

7. CONCLUSIONS

A Phase One ESA was conducted to assess the potential for contamination of the soil and ground water along Britannia Road West and Mississauga Road/Queen Street North.

Within the project limit of Britannia Road West Diversion potential source of contaminations (PSCs) were identified along the Mississauga Road/Queen Street North and at the south end of the Britannia Road West as shown on Drawing 1.

Based on the evaluation of the historical data and site reconnaissance, fourteen (14) Potential Source of Contaminations (PSCs) were identified at twelve (12) locations on the adjacent properties to the road alignment.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, CPR tracks and Go Transit Garage.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Based on the Phase One ESA findings, it is understood that a soil and ground water sampling and chemical testing programs should be undertaken in some portions of Britannia Road West and Mississauga Road/Queen Street North in order to further assess the soils and ground water environmental quality along the alignment and to delineate potentially impacted areas for the remedial/clean-up measures, if required for the future development.

8. RECOMMENDATIONS

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Esso gasoline service station and Mr. Lube auto repair and service station at 2520 Britannia Road West
2	Canadian Pacific Railway (CPR) tracks south of Queen Street and Britannia Road intersection
3	Streetsville auto sales at 4 Queen Street North
4	Active Green Ross auto service station at 14 Queen Street North
5	Petro Canada gasoline service station at 26 Queen Street North
6	Ken Champ Auto repair station at 40 Queen Street North
7	Mint auto service station, meineke auto service station and Streetsville Gas Station at 57 Queen Street North
8	CPR tracks at Matlock Avenue
9	Go Transit Garage at 6190 Mississauga Road
10	Streetsville Hyundai at 6215 Mississauga Road
11	88 Auto Sales and Flomax Auto Mechanic at 6237 Mississauga Road
12	Integra Tire and Auto Centre at 6325 Mississauga Road

9. STATEMENT OF LIMITATIONS

The assignment is subject to the Statement of Limitations that is included in Appendix C and must be read in conjunction with this report.

10. QUALIFICATIONS OF ENVIRONMENTAL CONSULTANT

PML was established in 1973 as a result of the merger of Peto Associates Ltd., founded in 1956, and the Ontario division of Racey MacCallum and Associates Limited, chartered in 1952. PML is a consulting engineering firm that specializes in the fields of geoenvironmental, hydrogeological and geotechnical engineering, building sciences, construction supervision/inspection and materials engineering/testing. Personnel in our four-branch offices form a network of full time dedicated environmental professionals.

The investigation and report preparation was conducted by Mr. Shamsul Tarafder, MSc. PhD., P.Geo. Mr. Tarafder is a Senior Geoscientist with over fifteen years of experience in geology, geophysics, physical and contaminant hydrology and hydrogeology, hydrogeochemistry and soil contamination chemistry. His experience includes soil and ground water investigations including Phase One and Two ESAs, aquifer characterization, groundwater exploration, soil and groundwater quality assessment, hydrogeological assessment, in-situ remediation of organic contaminants involving LNAPLs and DNAPLs such as petroleum products, VOCs and semi-VOCs, PAHs, BTEX and ether compounds using advanced treatment technologies, and solute transport hybrid numerical and analytical modelling. He has completed hundreds of Phase One and Two ESAs for commercial, industrial, and residential properties. Mr. Tarafder is also author and co-author of a number of peer reviewed scientific articles.

This report was reviewed by Mahaboob Alam, MSc., PhD., P.Geo., a Professional Geoscientist registered with the Association of Professional Geoscientists of Ontario. Mr. Alam is a Director of the firm and Discipline Lead, Geoenvironmental and Hydrogeological services and is a Qualified Person (QP) registered with the MOECC. He has over 30 years of interdisciplinary professional experience specializing in geoenvironmental and hydrogeologic investigations and project management. His main areas of expertise include Phase One and Phase Two ESAs, site

cleanup/remediation planning and supervision, waste management, UST and AST removals, site remediation, Risk Assessment, Records of site Condition and hydrogeologic investigations. He has completed hundreds of Phase One ESAs for commercial, industrial, and residential clients for a wide variety of project types (industrial complexes, commercial developments, entertainment and institutional buildings, and residential development).

11. REFERENCES

The following documents and data were referred to the Phase One ESA Report:

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
1	Aerial Photographs	1960, 1970, and 1975	City of Toronto Online Archives
2	Aerial Photographs	2004, 2007, 2015 and 2019	Google Earth
3	Ontario Base Map (OBM) Map 10 17 6100 48400, 10 17 6100 48450, 10 17 6150 48400, 10 17 6150 48450, 10 17 6150 48500 and 10 17 6200 48450	1982	OBM from PML files
4	The Physiography of Southern Ontario, 3rd Edition	1984	Chapman, L.J., and Putnam, D. F.
5	Bedrock Geology of Ontario, Map 2544	1991	Ministry of Northern Development and Mines
6	Quaternary Geology of Toronto and Surrounding Area, Map 2204	1980	Ministry of Natural Resources
7	Quaternary Geology of Ontario, Southern Sheet, Ontario Geological Survey, Map 2556, Scale 1:1,000,000	1991	Barnett, P.J., W.R. Cowan and A.P. Henry
8	Canadian Standards Association Standard Z768-01 Environmental Technology	2001 (Reaffirmed 2012)	Canadian Standards Association (CSA)
9	MOEE Waste Disposal Inventory	June 1991	MOEE Reference book
10	Inventory of Coal Gasification Plant Waste Sites in Ontario	April 1987	MOEE Reference book
11	Inventory of Industrial Sites Producing Coal or Using Coal Tar and Related Tars Sites in Ontario	November 1988	MOEE Reference book

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
12	Ontario Inventory of PCB Storage Sites	July 1993	MOEE Reference book
13	MECP Location of Small Landfill Sites	2019	http://www.ontario.ca/data/small-landfill-sites
14	MECP Location of Large Landfill Sites	2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites
15	National Pollutant Release Inventory	2019	http://www.ec.gc.ca/inrp-npri/
16	Might's and Criss Cross City Directories	Searched for the years 1935, 1939, 1945, 1950, 1955, 1960, 1970, 1975, 1980, 1985, 1990, 1999, 2008 and 2012	Might's and Criss Cross City Directories at the Toronto Reference Library
17	Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited	January 31, 2019	Peto MacCallum Ltd.
18	Make A Map: Natural Heritage Area	Current	Ontario Ministry of Natural Resources and Forestry

We trust this report is adequate for your present purposes. Should you have any questions or require further informations, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

PROFESSIONAL GEOSCIENTIST
S. A. Tarafder
SHAMSUL A. TARAFDER
PRACTISING MEMBER
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05/17/2019
ONTARIO

Shamsul A. Tarafder, MSc, PhD, P.Geo.
Associate and Senior Geoscientist
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05/17/19
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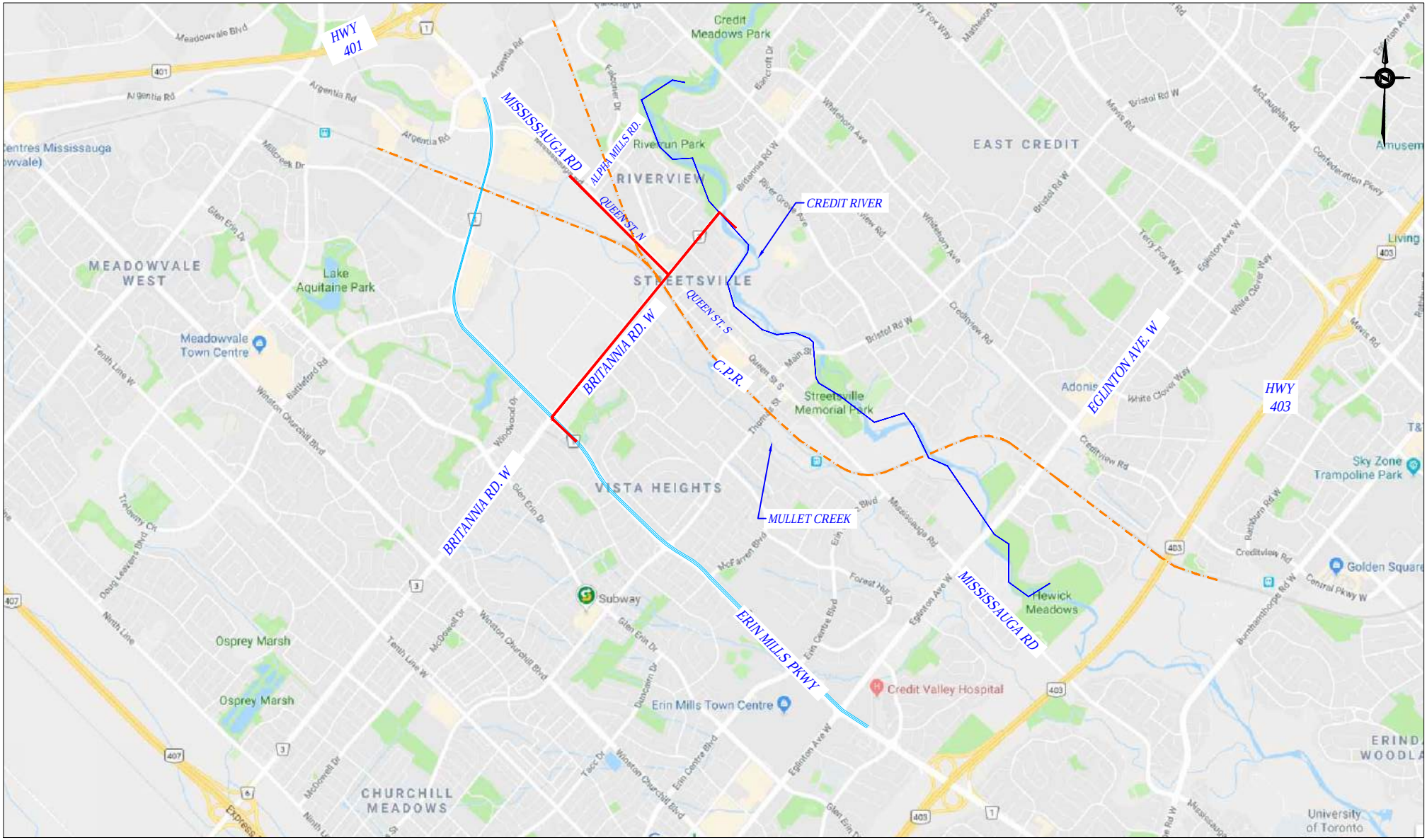
Director
Discipline Lead, Geoenvironmental and Hydrogeological Services

ST/MA:st



REFERENCE:
THIS FIGURE WAS PREPARED FROM GOOGLE MAPS.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

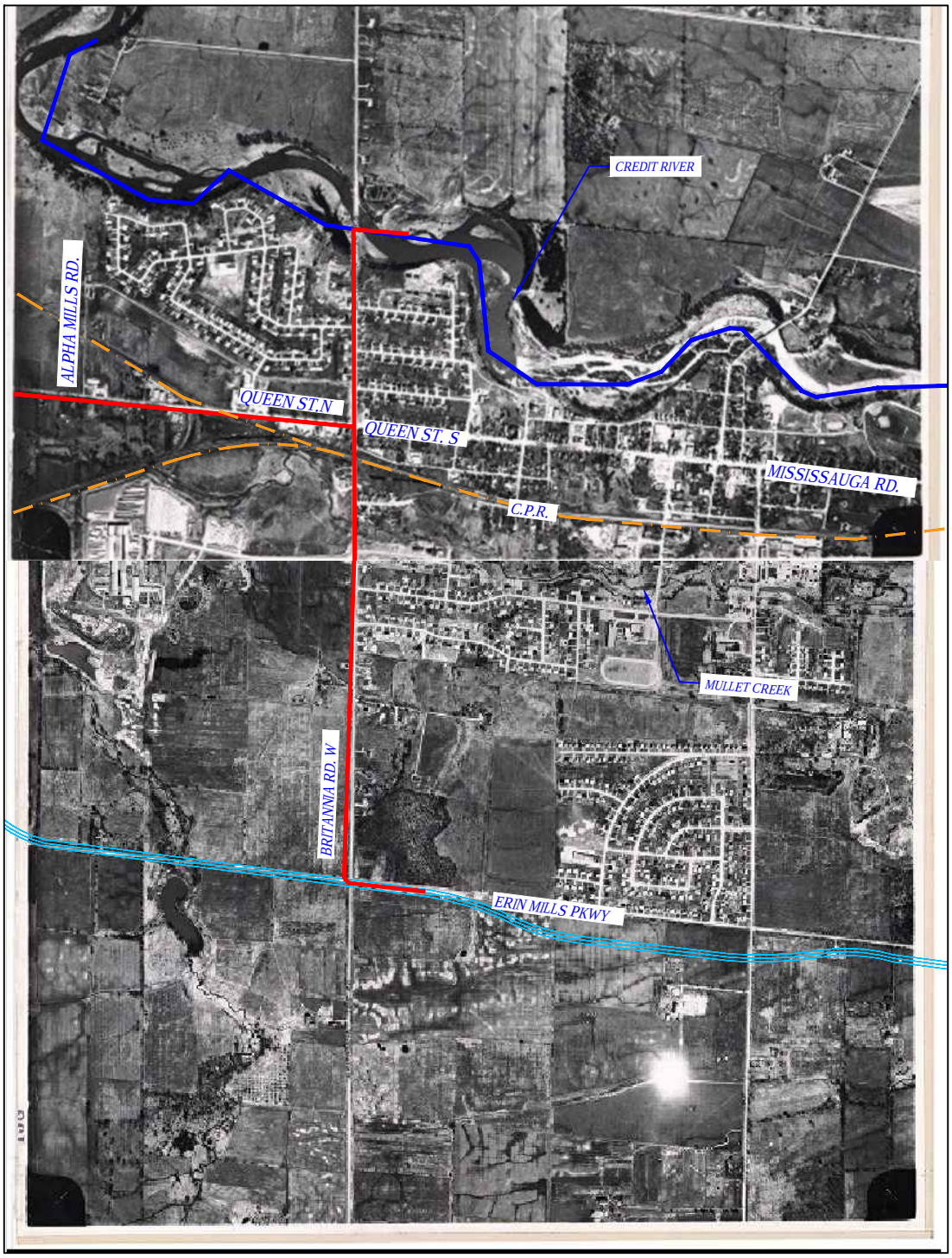
REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

KEY MAP

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY. 2019	1:40,000	19TX032-1	1
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1960, PLATE NOs. 138 & 139.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1960 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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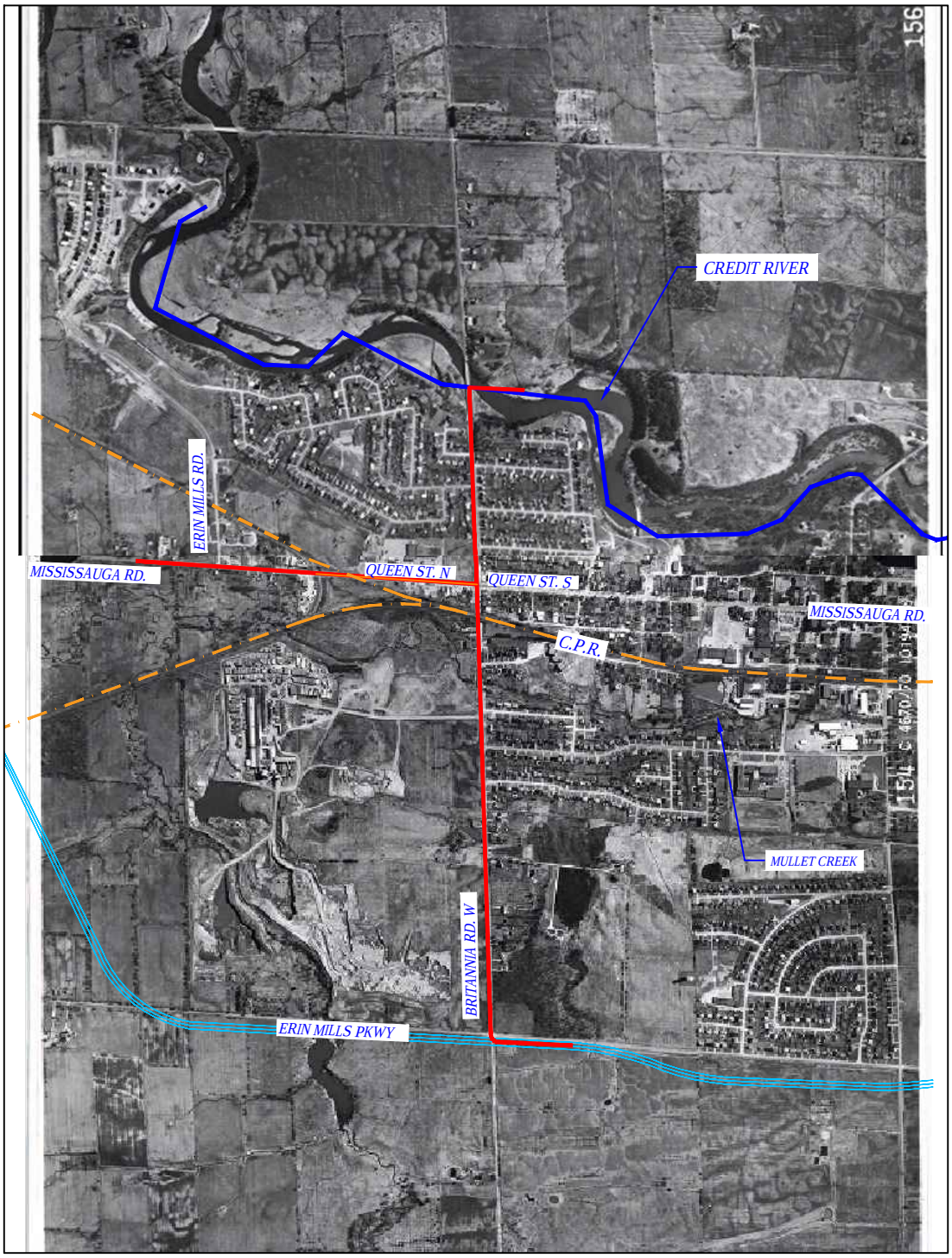
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1970, PLATE NOs. 128 & 127.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1970 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
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DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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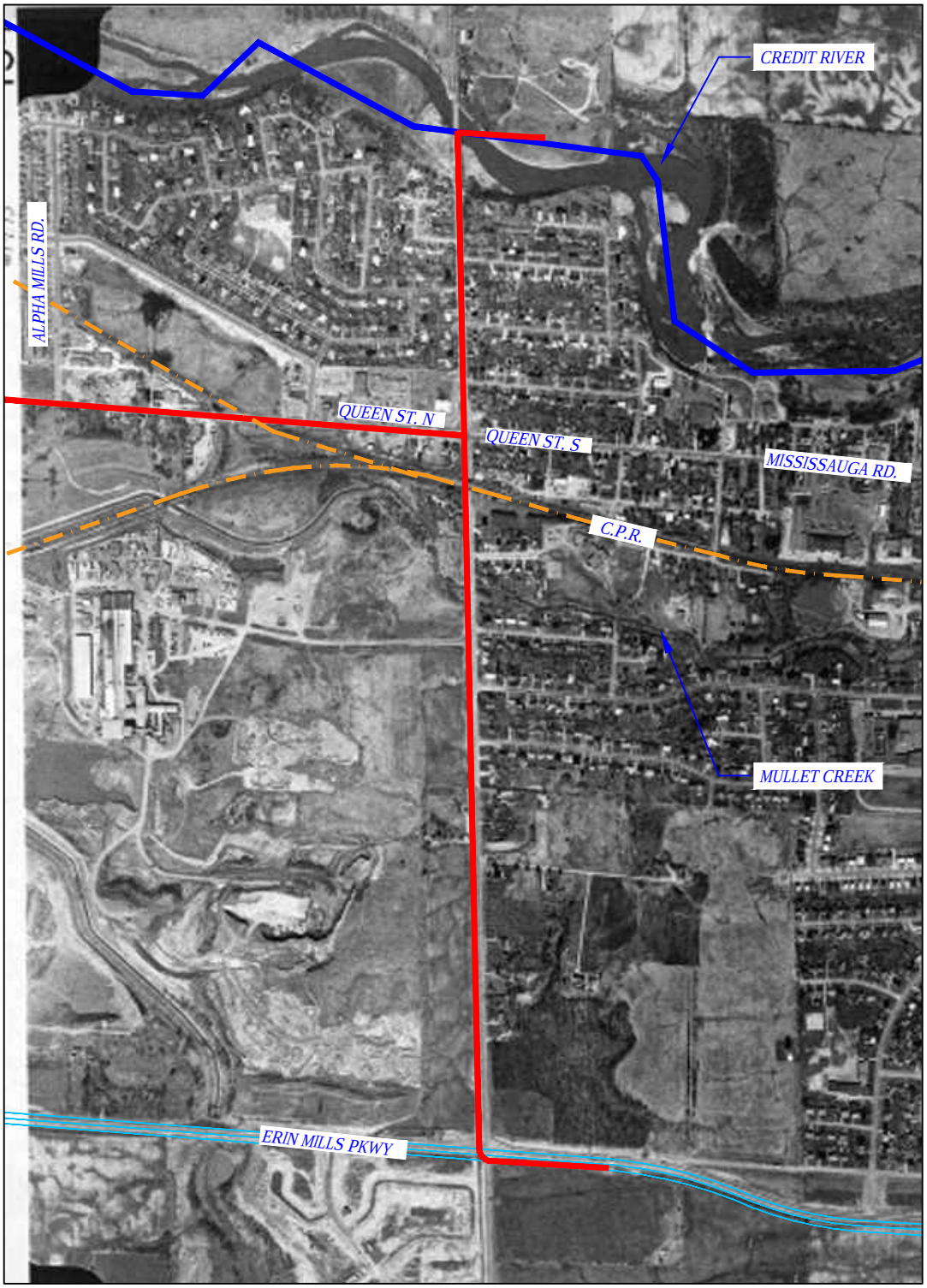

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THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1975, PLATE NO. 134.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- EXIST. WEST TRUNK SEWER
- C.P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1975 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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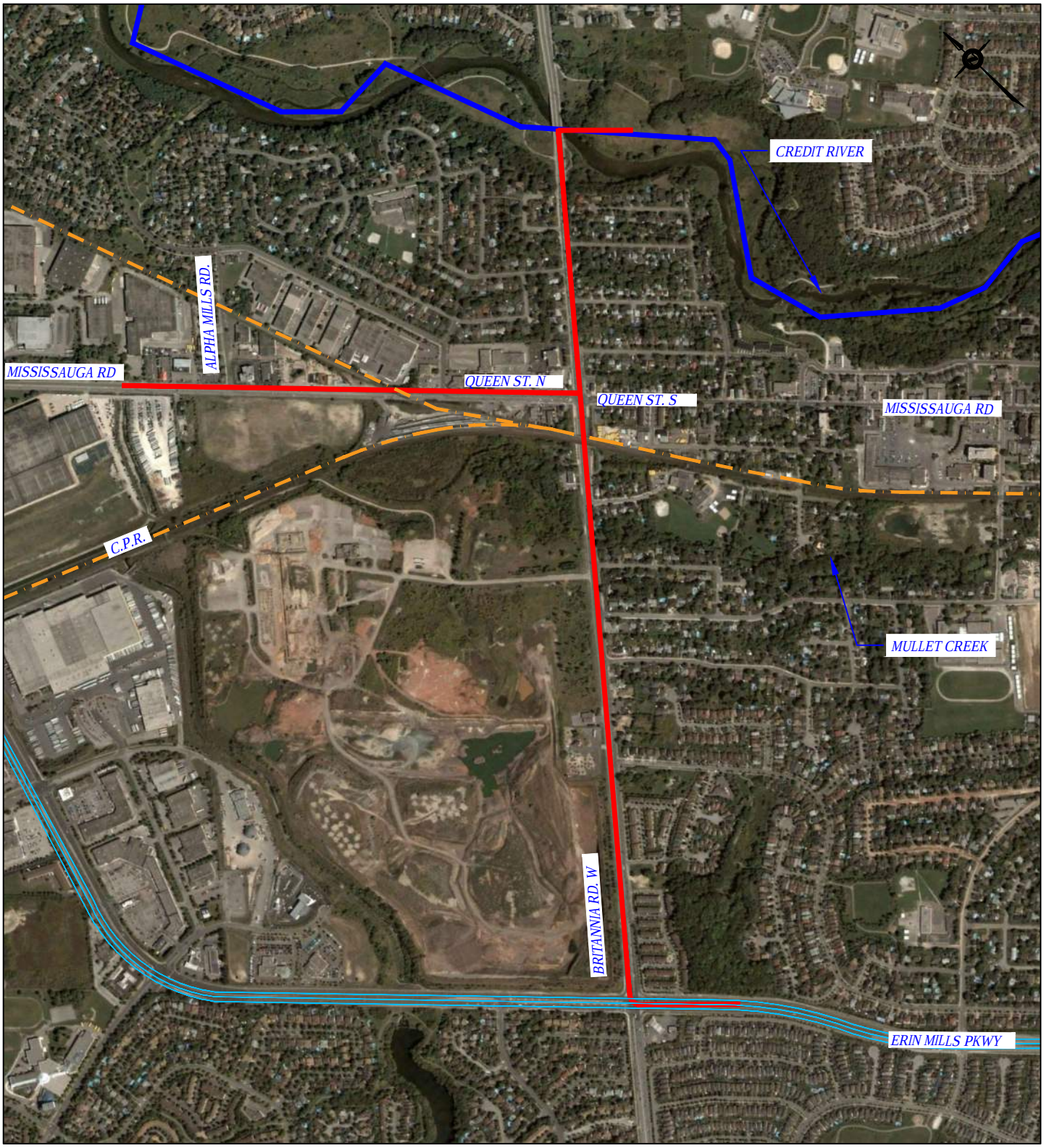

REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2004.

LEGEND:

PROP. BRITANNIA RD. DIVERSION

EXIST. WEST TRUNK SEWER

C.P. RAILWAY

WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2004 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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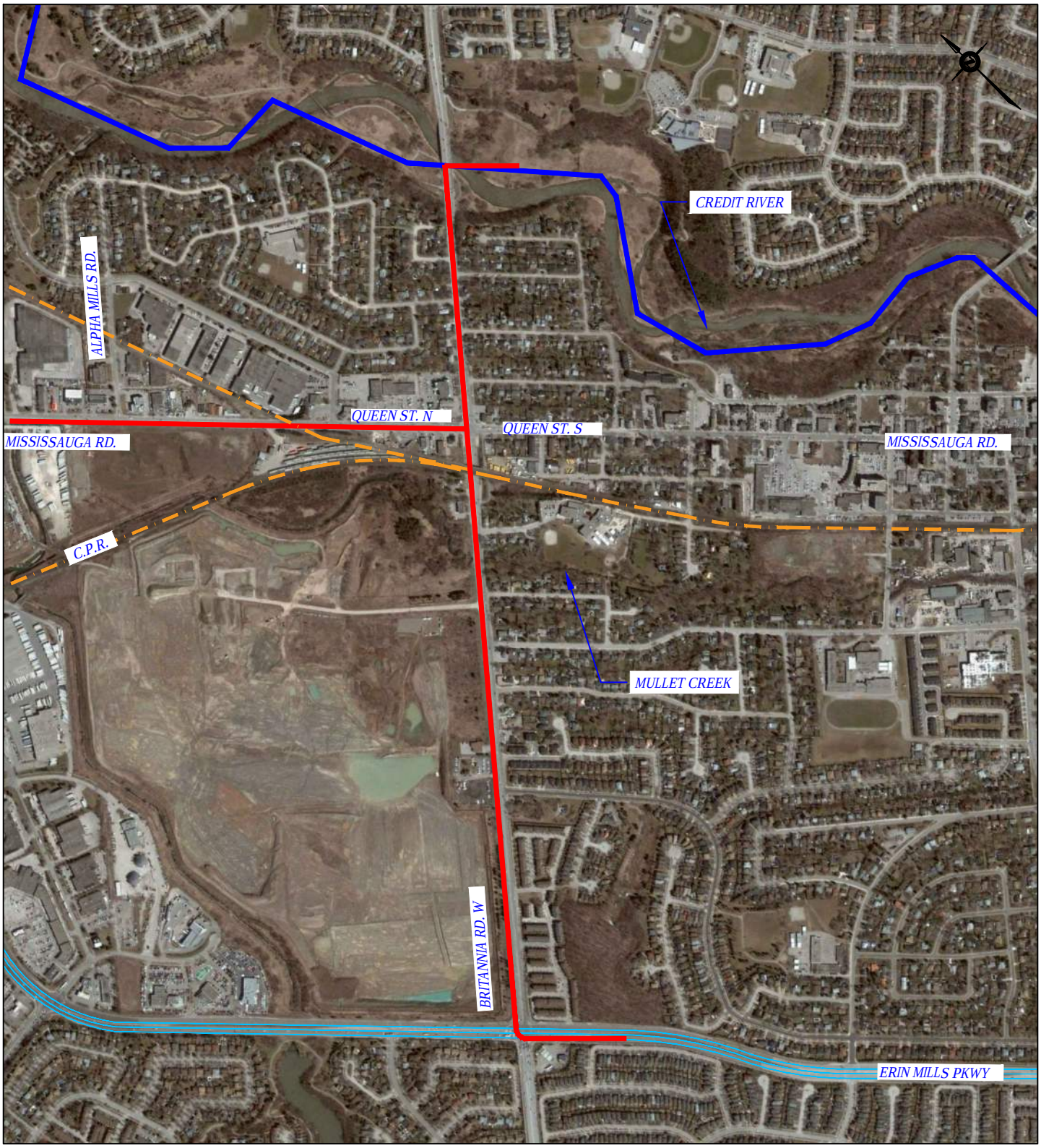
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2007.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- EXIST. WEST TRUNK SEWER
- C. P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2007 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
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DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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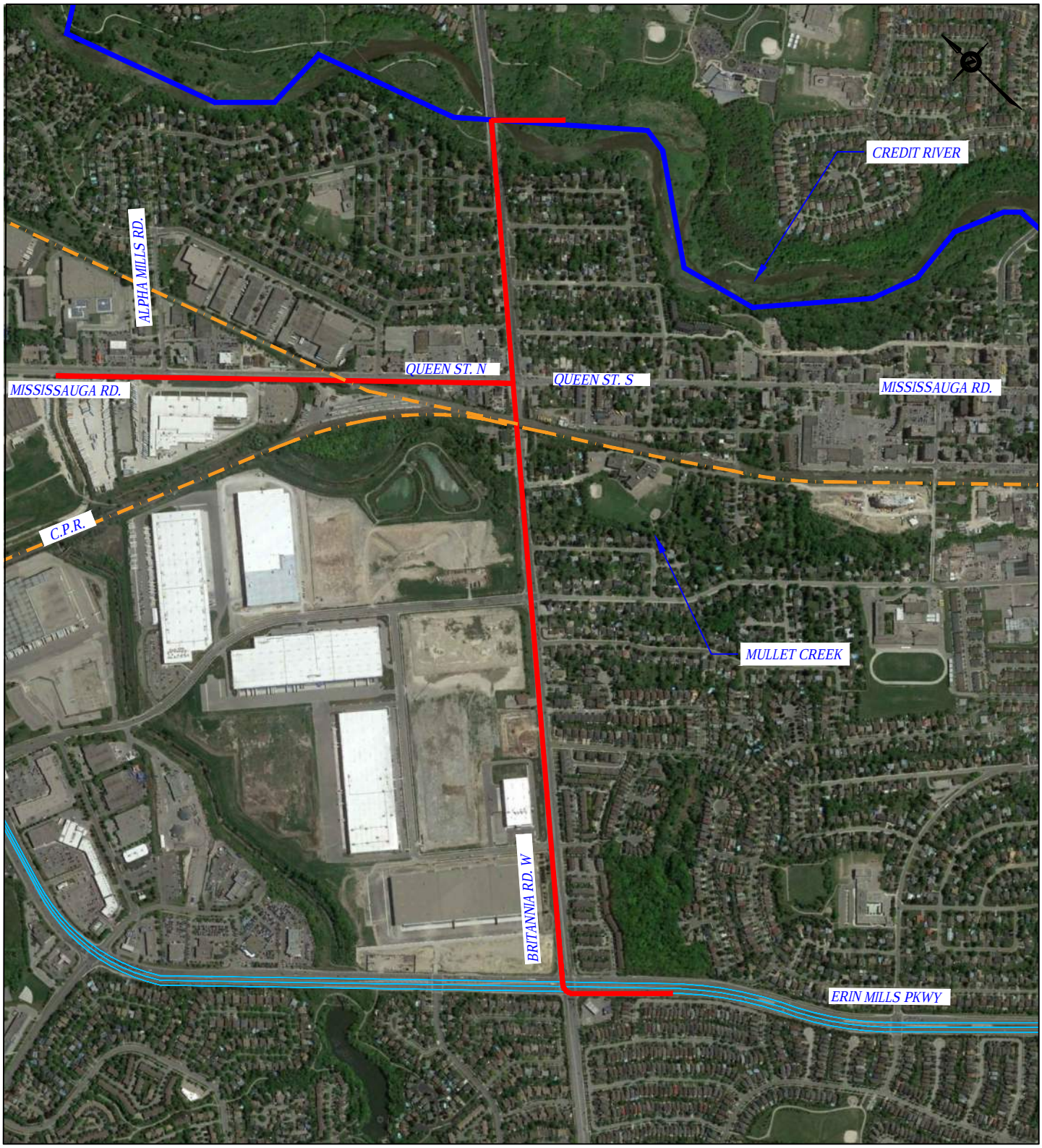
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2015.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- EXIST. WEST TRUNK SEWER
- C.P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2015 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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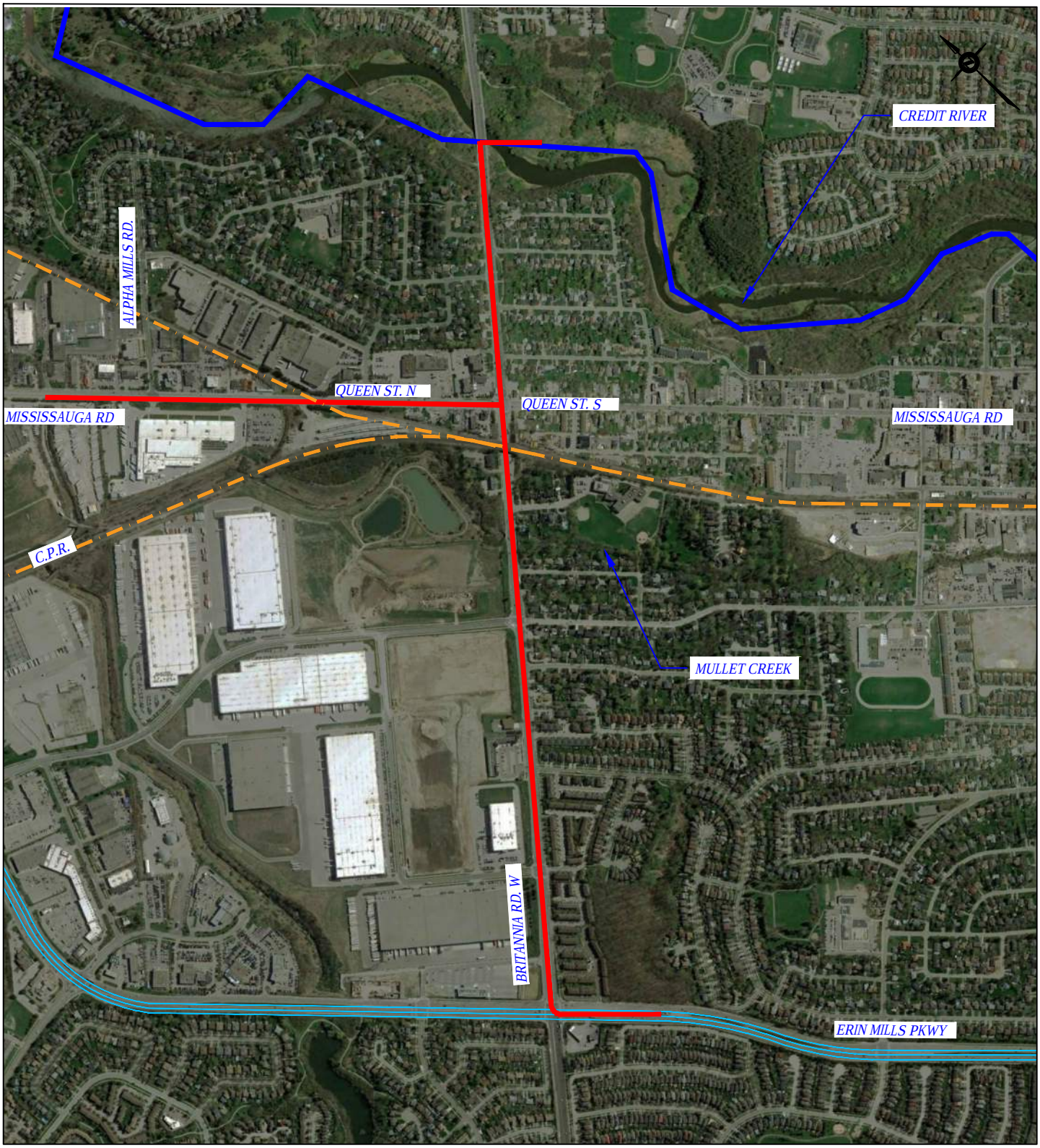
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2019.

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- EXIST. WEST TRUNK SEWER
- CP RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2019 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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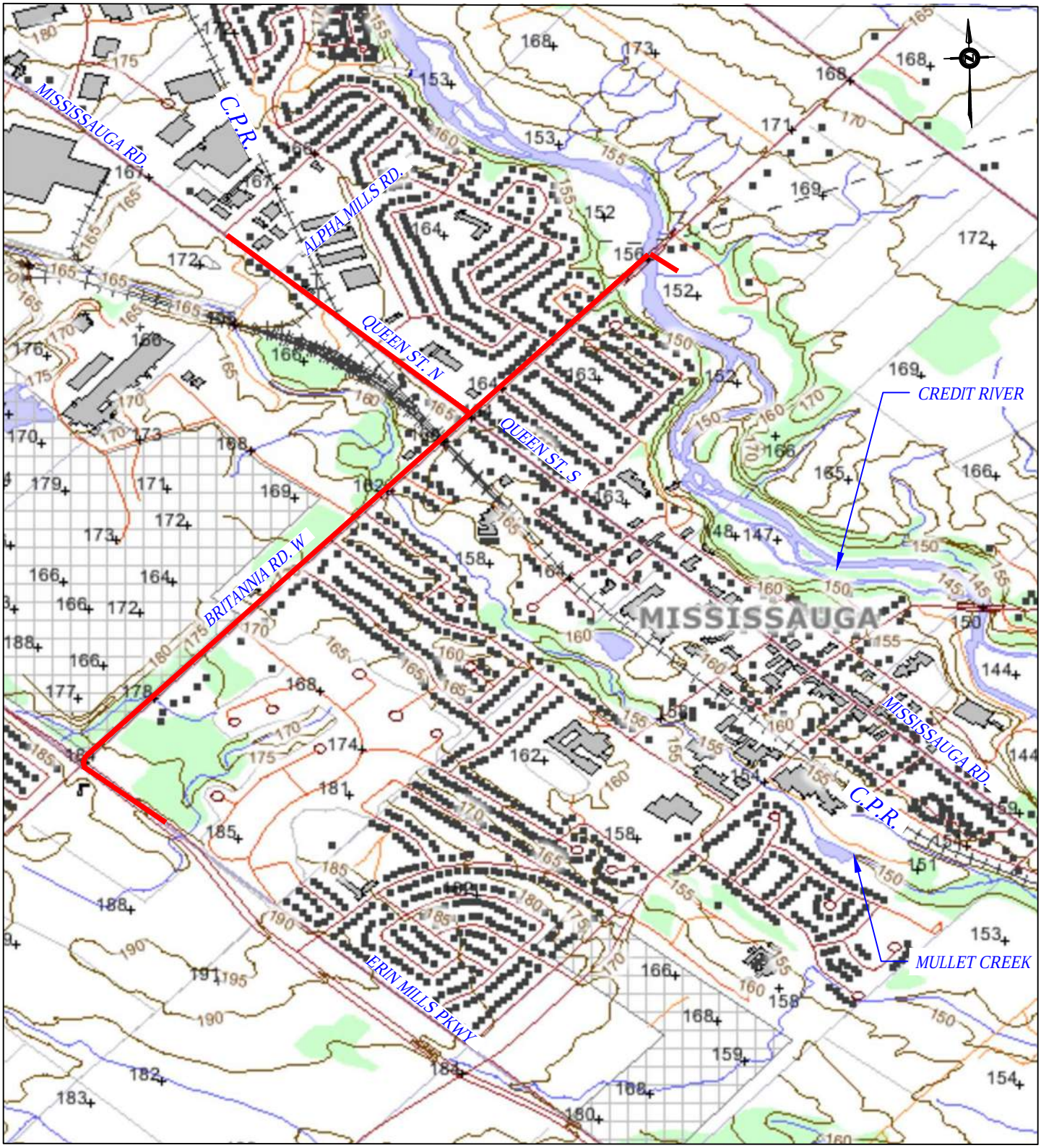
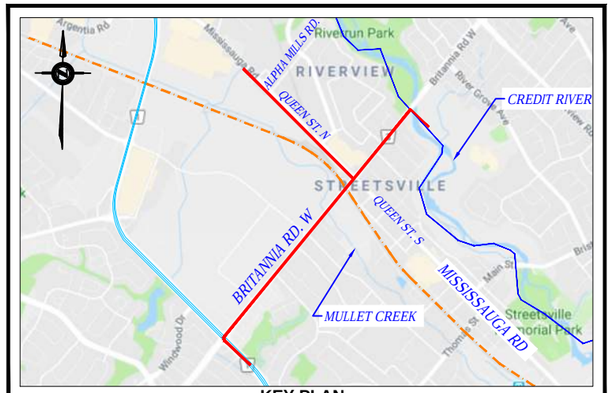
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM OBM ONTARIO WEBSITE www.geographynetwork.ca.
LEGEND:

PROP. BRITANNIA RD. DIVERSION

REGIONAL MUNICIPALITY OF PEEL	Peto MacCallum Ltd. CONSULTING ENGINEERS					
PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION PHASE ONE ENVIRONMENTAL SITE ASSESSMENT MISSISSAUGA, ONTARIO	***DRAWN***	T.C.	***DATE***	***SCALE***	***PML REF.***	***FIG. NO.***
ONTARIO BASE MAP	***CHECKED***	S.T.	MAY 2019	1:12,500	18TX032-1	9
	APPROVED	M.A.				



KEY PLAN
TORONTO, ONTARIO

LEGEND:

- PROP. BRITANNIA RD. DIVERSION
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION
- (1) ESSO GAS STATION AND MR. LUBE AUTO SERVICE
- (2) CANADIAN PACIFIC RAILWAY
- (3) STREET VILLE AUTO SALE
- (4) GREEN ROSS AUTO SERVICE STATION
- (5) PETRO CANADA GAS STATION
- (6) KEN CHAMP AUTO REPAIR STATION
- (7) - MINT AUTO SERVICE STATION
  - MEINEKE AUTO SERVICE / REPAIR STATION
  - STREETSVILLE GAS STATION
- (8) C. P. RAILWAY
- (9) GO TRANSIT GARAGE
- (10) STREETVILLE HYUNDAI
- (11) 88 AUTO SALES AND FLOMAX AUTO MECHANIC
- (12) INTEGRA TIRE AND AUTO CENTRE

REFERENCE:
THIS FIGURE WAS PRODUCED FROM GOOGLE MAPS, IMAGERY DATE MAY, 2018.

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. BRITTANIA RD DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

SITE AND SURROUNDING AREA FEATURES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	DWG. NO.
CHECKED	S.T.	MAY 2019	1:12,500	18TX032-1	1
APPROVED	M.A.				

Plate 1: The Site at Britannia Road West and Queen Street intersection.

Plate 2: Esso gas station and Mr. Lube auto repair centre at 2520 Britannia Road West.

Plate 3: Streetsville auto sales at 4 Queen Street North.

Plate 4: Active Green Ross auto service station at 14 Queen Street North.

Plate 5: Streetsville gas station at 57 Queen Street North.

Plate 6: meineke and Mint auto service stations at 57 Queen Street North.

APPENDIX A

MECP Well Record Summary

MECP WELL RECORD SUMMARY

Proposed Brittania Road West Diversion (Brittania Road West)

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	603005	4827068	W	2017/09 6946						7295290 (C33353) A203398 P	
17	602231	4825890	W	2017/06 2576	10 9	FR 0125	106//30/10:	DE	0125 40	7288978 (Z263733) A223899	0001 BRWN GRVL FILL 0002 BRWN CLAY STNS 0030 BRWN SILT STNS 0039 BRWN SAND GRVL STNS 0095 BRWN SAND GRVL LOOS 0137 BRWN SAND GRVL CMTD 0165 BLUE SHLE 0167
17	602226	4825885	W	2017/06 2576	10	FR 0126	106//30/10:	DE	0121 5 0126 40	7288977 (Z263734) A229943	0001 BRWN GRVL FILL 0002 BRWN CLAY 0025 BRWN SILT STNS 0040 GREY SAND SAND 0092 GREY SAND STNS 0126 BRWN SAND GRVL 0139 GREY SAND STNS LOOS 0166 BLUE SHLE STNS CMTD 0167
17	602232	4825889	W	2017/05 2576	10	FR 0143 UT 0143	143/161/35/1:	DE	0142 20 0162 4	7288050 (Z257226) A223883	CMTD 0001 BRWN GRVL FILL 0002 BRWN CLAY STNS 0027 GREY SILT STNS 0095 BRWN SAND GRVL 0125 GREY SAND STNS 0167 BLUE SHLE
17	602230	4825878	W	2017/03 2576	12 11.5 11.5	FR 0136	90/146/50/5:	DE	0136 20	7288053 (Z255197) A210861	BRWN CLAY GRVL 0019 BRWN SILT 0040 GREY SILT STNS 0092 GREY SAND GRVL 0126 BRWN SAND GRVL 0139 GREY SAND STNS GRVL 0162 BLUE SHLE 0163
17	603754	4825994	W	2017/01 7215						7284560 (C35200) A212567 P	
17	603155	4826776	W	2016/12 7241	2			MT	0014 10	7280173 (Z250944) A203493 A	
17	603158	4826753	W	2016/12 7241	2			MT	0016 11	7280172 (Z250943) A	
17	603165	4826753	W	2016/12 7241	2			MT	0017 10	7280171 (Z250942) A	
17	603159	4826786	W	2016/12 7241	2			MT	0017 10	7280174 (Z250940) A	
17	603127	4826746	W	2016/12 7241	2			MT	0017 10	7280170 (Z250941) A	
17	602194	4825927	W	2016/11 2576	8	FR 0096	42//25/1:	DE	0093 20 0113 20	7278433 (Z248981) A218846	BRWN GRVL BRWN CLAY HARD GREY CLAY GREY SILT GRVL GREY SAND FGRD GREY CGVL FSND GREY SAND MGRD GREY SAND GRVL
17	603429	4826673	W	2016/06 7147	3.53	UT 0015				7267910 (Z228004) A	
17	603647	4825772	W	2016/05 6607	2			MO	0009 8	7263882 (Z223854) A196654	GREY CLAY SILT DNSE 0005 BRWN CLAY SILT DNSE 0013 GREY CLAY SILT DNSE 0016
17	603633	4825780	W	2016/05 6607	2			MO	0009 8	7263881 (Z223853) A192915	GREY CLAY SILT DNSE 0005 BRWN CLAY SILT DNSE 0013 GREY CLAY SILT DNSE 0017
17	603619	4825813	W	2016/05 6607	2			MO	0008 10	7263880 (Z223852) A201580	GREY CLAY SILT DNSE 0002 BRWN CLAY SILT DNSE 0012 GREY CLAY SILT DNSE 0018
17	603515	4825781	W	2016/05 6607	2			MO	0007 10	7263879 (Z223851) A196752	BRWN CLAY SILT DNSE 0003 GREY CLAY SILT DNSE 0017
17	603587	4825765	W	2016/05 6607	2			MO	0007 10	7263878 (Z223850) A201558	BRWN CLAY SILT DNSE 0010 GREY CLAY SILT DNSE 0017
17	602171	4825730	W	2016/03 7190	2			MO	0017 10	7261605 (Z228502) A187128	BRWN SAND GRVL PCKD 0003 BRWN SILT SAND LOOS 0005 GREY SILT SAND HARD 0008 RED SILT SHLE HARD 0020 RED SHLE SILT HARD 0027
17	602188	4825924	W	2016/02 2576	8 7.5 7.5	FR 0113	42//40/1:	DE	0113 10 0123 30	7266440 (Z227083) A200692	---- 0001 GREY GRVL FILL 0003 BRWN CLAY STNS 0019 GREY CLAY 0030 GREY SAND GRVL 0035 GREY SILT CLAY 0090 GREY SAND 0155 GREY SHLE 0157
17	602225	4825896	W	2016/01 2576	8 7.5 7.5	FR 0123	52//60/1:	DE	0122 30 0152 10	7266441 (Z227084) A200693	---- 0001 GREY GRVL FILL 0003 BRWN CLAY STNS 0015 GREY SILT SAND LYRD 0051 GREY SAND GRVL 0161 GREY STNS SAND CMTD 0165 GREY SHLE 0167
17	602252	4825869	W	2016/01 2576	8 7.5 7.5	FR 0114	42//60/1:	DE	0113 30 0143 10	7266442 (Z227085) A200694	---- 0001 GREY GRVL FILL 0003 BRWN CLAY STNS 0017 GREY SILT STNS 0035 GREY SAND GRVL 0134 BRWN SAND STNS 0150 BLUE SHLE CMTD 0157
17	602313	4825892	W	2015/12 7201	0.75			MO	0144 7	7257436 (Z223258) A196045	BRWN SAND GRVL BLDR 0153 GREY SILT TILL BLDR 0160
17	603668	4826339	W	2015/05 7147						7243495 (C28767) A161859 P	
17	603744	4826389	W	2015/03 7424						7239271 (Z184865) A167881 A	
17	603612	4825804	W	2015/01 7215						7239357 (C27828) A176995 P	
17	603603	4825723	W	2015/01 7215						7239356 (C27822) A178737 P	
17	603478	4825902	W	2014/12 7147						7234423 (C26960) A153727 P	
17	603725	4826391	W	2014/10 7215						7232605 (C26232) A169143 P	
17	602719	4827616	W	2014/07 7147	48	FR 0010				7225219 (Z191970) A	
17	603733	4826348	W	2014/06 7241	2			MT	0015 10	7224388 (Z191927) A166997	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	603744	4826388	W	2014/06 7241	2			MT	0013 10	7224392 (Z191926) A166894	BRWN SILT CLAY 0015 GREY SILT CLAY 0023
17	603749	4826362	W	2014/06 7241	2			MT	0015 10	7224393 (Z191928) A166895	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	603704	4826371	W	2014/06 7241	2			MT	0015 10	7224389 (Z191929) A167881	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	603667	4826335	W	2014/03 7230						7219848 (C25589) A161859 P	
17	603624	4825680	W	2014/03 7147						7217882 (C25011) A149705 P	
17	603683	4826028	W	2014/02 7241	2			MT	0014 10	7217447 (Z185550) A160738	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY ROCK 0024
17	603673	4826035	W	2014/02 7241	2			MT	0018 10	7217446 (Z185551) A160739	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0028
17	603664	4826074	W	2014/02 7241	2			MT	0015 10	7217445 (Z185549) A160740	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0025
17	603693	4826034	W	2014/02 7241	2			MT	0015 10	7217448 (Z185552) A160737	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0025
17	603497	4825918	W	2013/12 7230						7218669 (C25331) A153727 P	
17	603469	4826260	W	2013/10 7215						7211531 (C23496) A142339 P	
17	603468	4826255	W	2013/06 7215						7207319 (C22812) A145101 P	
17	603484	4826173	W	2013/05 7215						7207903 (C22779) A142339 P	
17	603478	4826165	W	2013/05 7215						7207318 (C21947) A144993 P	
17	603487	4826202	W	2013/02 7215						7211401 (C21150) A145015 P	
17	602992	4826444	W	2012/11 7147	35.4	FR 0010				7191717 (Z142289) A	
17	602562	4826351	W	2012/08 7147						7188984 (C16659) P	
17	603646	4826120	W	2011/12 7241	1			MT	0004 2	7174624 (Z143396) A126511	GREY GRVL 0000 BRWN CLAY SILT 0006
17	603656	4826133	W	2011/12 7241	1.25			MT	0005 10	7174622 (Z143397) A123805	BRWN FILL LOAM 0005 BRWN CLAY SILT 0010 GREY CLAY SILT 0015
17	603600	4826100	W	2011/12 7241	1			MT	0004 2	7174623 (Z143395) A126488	GREY GRVL 0000 BRWN CLAY SILT 0006
17	602610	4826239	W	2010/08 7360	1.97			MO		7152194 (M08348) A061298	BRWN LOAM LOOS 0003 RED SHLE HARD 0010 RED SHLE HARD 0020
17	602478	4826773	W	2010/08 7241	0.4			MT	0008 5	7151963 (Z121078) A099941	BLCK SOFT 0000 BRWN SILT FSND STNS 0011 GREY SHLE HARD 0012
17	603640	4825640	W	2010/02 7247	2			MO	0010 10	7162891 (Z109765) A095114	BRWN SILT FILL SNDY 0010 BRWN SILT CLAY DNSE 0020
17	602622	4827660	W	2010/01 7241	1.5			MT	0005 10	7140676 (Z111092) A096459	BRWN SAND TILL DNSE 0012 GREY SAND SILT DNSE 0015
17	602590	4827621	W	2010/01 7241	1.5			MT	0005 10	7140677 (Z111091) A096460	BRWN SAND FILL DNSE 0012 GREY SAND SILT DNSE 0015
17	602118	4826986	W	2009/11 7295	1.79			MO		7136511 (Z108031) _NO_TAG A	15
17	602568	4826314	W	2009/11 7241	2.04			MT	0005 10	7136691 (Z108860) A089087	BLCK ---- HARD 0000 BRWN SAND GRVL LOOS 0003 RED SHLE HARD 0015
17	602531	4826299	W	2009/11 7241	2.04			MT	0006 10	7136692 (Z108859) A086644	BLCK ---- HARD 0000 BRWN SAND GRVL LOOS 0003 RED SHLE HARD 0016
17	602118	4826986	W	2009/07 7295	1.98					7136432 (Z108030) _NO_TAG A	
17	603124	4827522	W	2009/07 7241	1.5			MO	0004 10	7127853 (Z102252) A087348	
17	603134	4827524	W	2009/07 7241	1.5			MO	0004 10	7127854 (Z102253) A088993	

MECP WELL RECORD SUMMARY

Proposed Brittania Road West Diversion (Brittania Road West)

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	603143	4827489	W	2009/07 7241	1.5			MO	0005 10	7127852 (Z102193) A088995	
17	603153	4827551	W	2009/07 7241	1.5			MO	0005 10	7127851 (Z102194) A089088	
17	603131	4827515	W	2009/07 7241	1.5			MO	0004 10	7127855 (Z102251) A088994	BRWN TILL DNSE 0008 GREY TILL 0014
17	603564	4826669	W	2009/03 7215						7121844 (Z096334) A056425 A	
17	602572	4827596	W	2009/01 7241	1.5			MT	0005 10	7140678 (Z104802) A084200	BRWN SAND TILL DNSE 0012 GREY SAND SILT DNSE 0015
17	603564	4826657	W	2007/10 7147	1.97			NU		7051510 (Z65769) A056425	BRWN FILL 0001 BRWN SAND 0003 BRWN CLAY 0014
17	602612	4827536	W	2007/06 7215	1			MO		7047575 (Z63029) A055183	
17	602902	4826805	W	2006/11 6607	0.75	0			0015 5	7040781 (Z56649) A046431	BRWN FILL 0002 GREY CLAY SILT HARD 0020
17	602035	4827046	W	2006/08 6809	2				0013 10	4910325 (Z51185) A035685	GREY 0010 GREY GRVL 0012 RED CLAY TILL 0016 RED SHLE 0023
17	602490	4826958	W	2005/11 6607	0.55	3		NU	0005 5	4910090 (Z40308) A018154 A	
17	602739	4827281	W	2005/08 7230	1.97	FR 0022		NU	0018 5	4909962 (Z39673) A027562	BRWN FILL 0004 BRWN CLAY 0010 GREY SAND 0019 RED SHLE 0023
17	602489	4827640	W	2005/05 6607		5		NU		4909804 (Z28222) A021323 A	
17	602498	4827625	W	2005/03 6607	2.35	0			0004 16	4909716 (Z26531) A021323	BRWN SILT SAND FILL 0003 BRWN SILT SHLE TILL 0010 GREY SILT TILL LMSN 0019 GREY SHLE 0020
17	603560	4825949	W	2005/02 7230	1.97			NU	0009 5	4909697 (Z25171) A024778	BRWN FILL 0002 BRWN SILT CLAY SAND 0009 GREY SILT SAND GRVL 0015 GREY SHLE HARD 0016
17	602496	4826966	W	2004/07 7230	0.75	FR 0010		NU	0008 5	4909612 (Z22504) A018154	BRWN FILL SAND 0003 BRWN SILT CLAY 0012 GREY SHLE SILT DNSE 0014
17	603569	4825806	W	2004/07 6607						4909511 (Z15858) A	
17	602429	4825987	W	1966/10 1612	5	FR 0114	9/110/3/2:0	DO		4902678 ()	LOAM 0001 GREY CLAY 0034 MSND GRVL 0114
17	603591	4827418	W	1966/06 5001	36	FR 0007	7//2/:	DO		4902662 ()	LOAM CLAY 0002 CLAY SHLE 0006 SHLE 0014
17	603555	4826133	W	1963/09 3513	8 8	SA 0080	18/125/2/8:0	CO		4902143 ()	LOAM 0001 CLAY STNS 0035 BLUE SHLE 0125
17	602338	4826029	W	1960/12 1612	6 6	FR 0062	12/30/4/0:30	DO		4902679 ()	BRWN CLAY 0008 RED SHLE 0062
17	602596	4827505	W	1959/07 4610	6 6	SA 0045	17/120/0/2:0	PS		4902663 ()	CLAY STNS 0018 SHLE 0120
17	603765	4827638	W	1952/08 4519	5 5	FR 0020	14/82/2/0:30	DO		4902659 ()	CLAY MSND STNS 0014 BLUE LMSN SNDS 0082
17	602922	4826165	L	1952/05 4501	4 4	FR 0050 FR 0055 FR 0060	4/16/5/0:30	DO		4902677 ()	CLAY 0005 RED SHLE 0057 LMSN 0060
17	603635	4827531	W	1951/08 4519	5 5	FR 0022	15///:	DO		4902657 ()	BLUE CLAY 0022 SHLE 0065
17	603643	4827544	W	1950/07 4519	5 5	MN 0031	10///:	DO		4902655 ()	BLUE CLAY 0015 BLDR 0022 BLUE SHLE 0053
17	602519	4827452	W	1949/11 1612	5 5	MN 0032	17///:	DO		4902680 ()	LOAM 0002 CLAY 0015 LMSN 0032
17	602511	4827464	W	1949/11 1612	5 5	MN 0032	17///:	DO		4902681 ()	LOAM 0002 CLAY 0015 SHLE 0032
17	602610	4826239	W	7360	1.97			MO	0020 5	7161734 (Z122272) A061298	
17	603677	4826344	W	7147						7267036 (C32446) A198588 P	
17	603564	4825786	W	7147						7273991 (C34042) A178737 P	

MECP WELL RECORD SUMMARY

Proposed Brittania Road West Diversion (Mississauga Road / Queen Street North)

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	603005	4827068	W	2017/09 6946						7295290 (C33353) A203398 P	
17	603155	4826776	W	2016/12 7241	2			MT	0014 10	7280173 (Z250944) A203493 A	
17	603158	4826753	W	2016/12 7241	2			MT	0016 11	7280172 (Z250943) A	
17	603165	4826753	W	2016/12 7241	2			MT	0017 10	7280171 (Z250942) A	
17	603159	4826786	W	2016/12 7241	2			MT	0017 10	7280174 (Z250940) A	
17	603127	4826746	W	2016/12 7241	2			MT	0017 10	7280170 (Z250941) A	
17	602719	4827616	W	2014/07 7147	48	FR 0010				7225219 (Z191970) A	
17	602134	4827861	W	2011/10 7215	2			TH	0015 10	7179923 (Z143136) A113908	BRWN FILL DRY 0003 BRWN CLAY SILT DRY 0016 BRWN SHLE DRY 0025
17	602478	4826773	W	2010/08 7241	0.4			MT	0008 5	7151963 (Z121078) A099941	BLCK SOFT 0000 BRWN SILT FSND STNS 0011 GREY SHLE HARD 0012
17	602683	4827816	W	2010/08 7215	1.25			TH	0010 10	7151510 (Z116361) A103098	BRWN FILL CGVL LOOS 0002 BRWN TILL SILT 0008 BRWN TILL CLAY 0020
17	602622	4827660	W	2010/01 7241	1.5			MT	0005 10	7140676 (Z111092) A096459	BRWN SAND TILL DNSE 0012 GREY SAND SILT DNSE 0015
17	602590	4827621	W	2010/01 7241	1.5			MT	0005 10	7140677 (Z111091) A096460	BRWN SAND FILL DNSE 0012 GREY SAND SILT DNSE 0015
17	602118	4826986	W	2009/11 7295	1.79			MO		7136511 (Z108031) _NO_TAG A	15
17	602118	4826986	W	2009/07 7295	1.98					7136432 (Z108030) _NO_TAG A	
17	603124	4827522	W	2009/07 7241	1.5			MO	0004 10	7127853 (Z102252) A087348	
17	603134	4827524	W	2009/07 7241	1.5			MO	0004 10	7127854 (Z102253) A088993	
17	603143	4827489	W	2009/07 7241	1.5			MO	0005 10	7127852 (Z102193) A088995	
17	603153	4827551	W	2009/07 7241	1.5			MO	0005 10	7127851 (Z102194) A089088	
17	603131	4827515	W	2009/07 7241	1.5			MO	0004 10	7127855 (Z102251) A088994	BRWN TILL DNSE 0008 GREY TILL 0014
17	602572	4827596	W	2009/01 7241	1.5			MT	0005 10	7140678 (Z104802) A084200	BRWN SAND TILL DNSE 0012 GREY SAND SILT DNSE 0015
17	602612	4827536	W	2007/06 7215	1			MO		7047575 (Z63029) A055183	
17	602902	4826805	W	2006/11 6607	0.75	0			0015 5	7040781 (Z56649) A046431	BRWN FILL 0002 GREY CLAY SILT HARD 0020
17	602490	4826958	W	2005/11 6607	0.55	3		NU	0005 5	4910090 (Z40308) A018154 A	
17	602739	4827281	W	2005/08 7230	1.97	FR 0022		NU	0018 5	4909962 (Z39673) A027562	BRWN FILL 0004 BRWN CLAY 0010 GREY SAND 0019 RED SHLE 0023
17	602489	4827640	W	2005/05 6607		5		NU		4909804 (Z28222) A021323 A	
17	602498	4827625	W	2005/03 6607	2.35	0			0004 16	4909716 (Z26531) A021323	BRWN SILT SAND FILL 0003 BRWN SILT SHLE TILL 0010 GREY SILT TILL LMSN 0019 GREY SHLE 0020
17	602496	4826966	W	2004/07 7230	0.75	FR 0010		NU	0008 5	4909612 (Z22504) A018154	BRWN FILL SAND 0003 BRWN SILT CLAY 0012 GREY SHLE SILT DNSE 0014
17	602596	4827505	W	1959/07 4610	6 6	SA 0045	17/120/0/2:0	PS		4902663 ()	CLAY STNS 0018 SHLE 0120
17	602519	4827452	W	1949/11 1612	5 5	MN 0032	17///:	DO		4902680 ()	LOAM 0002 CLAY 0015 LMSN 0032
17	602511	4827464	W	1949/11 1612	5 5	MN 0032	17///:	DO		4902681 ()	LOAM 0002 CLAY 0015 SHLE 0032

MECP WELL RECORD TABLE ABBREVIATIONS AND DESCRIPTIONS

Header Descriptions

ABBREVIATION	DESCRIPTION
UTM	UTM in Zone, Easting, Northing and Datum is NAD83
LOT	UTM estimated from Centroid of Lot
W	UTM not from Lot Centroid
DATE CNTR	Date Work Completed and Well Contractor Licence Number
CASING DIA	Casing diameter in inches
WATER	Unit of Depth in Feet. See below for Meaning of Code
PUMP TEST	Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour:Minutes
WELL USE	See below for Meaning of Code
SCREEN	Screen Depth and Length in feet
WELL	Well ID, AUDIT #, Well Tag, A for abandonment; P for Partial Data Entry Only
FORMATION	See below for Meaning of Code

Meaning of Core Material and Descriptive Terms

ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION
CLN	CLEAN	FILL	FILL	MARL	MARL	SILT	SILT
DRY	DRY	FLDS	FELDSPAR	MGRD	MEDIUM-GRAINED	SLTE	SLATE
QTZ	QUARTZ	FLNT	FLINT	MGVL	MEDIUM GRAVEL	SLTY	SILTY
BLDR	BOULDERS	FOSS	FOSILIFEROUS	MRBL	MARBLE	SNDS	SANDSTONE
BSLT	BASALT	FSND	FINE SAND	MSND	MEDIUM SAND	SNDY	SAN DY
CGRD	COARSE-GRAINED	GNIS	GNEISS	MUCK	MUCK	SOFT	SOFT
CGVL	COARSE GRAVEL	GRNT	GRANITE	OBDN	OVERBURDEN	SPST	SOAPSTONE
CHRT	CHERT	GRSN	GREENSTONE	PCKD	PACKED	STKY	STICKY
CLAY	CLAY	GRVL	GRAVEL	PEAT	PEAT	STNS	STONES
CLYY	CLAYEY	GRWK	GREYWACKE	PGVL	PEA GRAVEL	STNY	STONEY
CMTD	CEMENTED	GVLY	GRAVELLY	PORS	POROUS	THIK	THICK
CONG	CONGLOMERATE	GYPS	GYPSUM	PRDG	PREVIOUSLY DUG	THIN	THIN
CRYS	CRYSTALLINE	HARD	HARD	PRDR	PREV. DRILLED	TILL	TILL
CSND	COARSE SAND	HPAN	HARDPAN	QRTZ	QUARTZITE	UNKN	UNKNOWN TYPE
DKCL	DARK-COLOURED	IRFM	IRON FORMATION	QSND	QUICKSAND	VERY	VERY
DLMT	DOLOMITE	LIMY	LIMY	ROCK	ROCK	WBRG	WATER-BEARING
DNSE	DENSE	LMSN	LIMESTONE	SAND	SAND	WDFR	WOOD FRAGMENTS
DRTY	DIRTY	LOAM	TOPSOIL	SHLE	SHALE	WTHD	WEATHERED
FCRD	FRACTURED	LOOS	LOOSE	SHLY	SHALY		
FGRD	FINE-GRAINED	LTCL	LIGHT-COLOURED	SHRP	SHARP		
FGVL	FINE GRAVEL	LYRD	LAYERED	SHST	SCHIST		

Core Color

ABBV	DESCRIPTION
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLC K	BLACK
BLGY	BLUE-GREY

Well Use

ABBV	DESCRIPTION
DO	Domestic
ST	Livestock
IR	Irrigation
IN	Industrial
CO	Commercial
MN	Municipal
PS	Public
AC	Cooling And AC
NU	Not Used
OT	Other
TH	Test Hole
DE	Dewatering
MO	Monitoring
MT	Monitoring and Test Hole

Water Kind

ABBV	DESCRIPTION
FR	Fresh
SA	Salty
SU	Sulphur
MN	Minerial
UK	Not Stated
GS	Gas
IR	Iron
UT	Untested
OT	Other

Appendix B

Opta Information Intelligence Report

INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

An SCM Company
www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel Region, Ontario Criss Cross Directory

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 2000	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Multi Tenant Residential
2520 Britannia Road West	-Anthony's Esso -Mr Lube
2450 Hogan Drive	-Address Not Listed

2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1994	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	

Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1989	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1983	
Site Listing:	-Address Not Listed

Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed

2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed

2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	
Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1966	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

PROJECT NUMBER: 60630	

Site Address:	6039 Erin Mills Parkway, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
2275 Britannia Road West	-Address Not Listed
2398 Britannia Road West	-Address Not Listed
2520 Britannia Road West	-Address Not Listed
2450 Hogan Drive	-Address Not Listed
2475 Hogan Drive	-Address Not Listed

*****6039 Erin Mills Parkway, Mississauga, Ontario is not listed within the City Directory Archives*****

opta
INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

An SCM Company
www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel, Ontario Criss-Cross Directory

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 2000	
Site Listing:	-AAA Speedy Auto & Window Glass -Excel Service Station -Meineke Discount Mufflers
Adjacent Properties:	
4 Queen St North	-Streetsville Business Services
14 Queen St North	-Active Green & Ross Tire & Auto Centre -Harvey's Tire Centre Ltd. -Sungas
17 Queen St North	-Carpet & Rug Outlet Inc. -Goulash Hut

	-Interiors By Sophie & Leslie Inc. -L'Express Deli & Rotisserie -Rose Bloom Cleaners -Wing's Rest
20 Queen St North	-Bobby's Hideaway
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales -Petro-Canada (Full-Service Stations)
40 Queen St North	-Queen Street Auto Sales Ltd.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Wilcox Bodies Limited -Wilcox Truck Bodies Limited
6237 Mississauga Road	-Credit Valley Auto Sales & Service -Starfield Maintenance
6325 Mississauga Road	-Mississauga Radiator

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario

Year: 1994	
Site Listing:	-Speedy Auto Glass -Olco Gas Bar -Meineke Discount Mufflers
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Active Tire & Auto Centre -Comet Gas Bar
17 Queen St North	-Cornerock Café -Gold Star Donuts -J & M Chopsticks Inc. -Thrifty Dry Cleaners
20 Queen St North	-Queen's Villa Family Rest
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales -Petro-Canada
40 Queen St North	-Daley's Auto Service -Daley's BC Shell Self Serv. -Shell Canada Products

6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Arctic Snow Plows -Wilcox Truck Bodies Limited
6237 Mississauga Road	-Anthony Fraschetti Ltd. -Dollar Rent A Car -Starfield Maintenance -Randy's Auto Service Centre
6325 Mississauga Road	-Mississauga Radiator

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1989	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Res (1 Tenant)
14 Queen St North	-Active Tire & Auto Centre

17 Queen St North	-Address Not Listed
20 Queen St North	-Quackers Rest
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales
40 Queen St North	-Daley's Auto Service -Daley's BC Shell Self Serv. -Northtown Shell
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Anthony Fraschetti Ltd. -Bill's Auto Repair Centre -Starfield Maintenance -Randy's Auto Service Centre
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1983	

Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-B P Canada Service Stations
17 Queen St North	-Address Not Listed
20 Queen St North	-Muddy Duck Rest & Tavern
26 Queen St North	-Bernie's Auto Service
40 Queen St North	-Shell Canada Ltd.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	

Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Russell's B P
17 Queen St North	-Address Not Listed
20 Queen St North	-Pit Stop Drive-In
26 Queen St North	-Address Not Listed
40 Queen St North	-Daley's BC Shell Self Serv.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed

6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1965	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed
6190 Mississauga Road	-Address Not Listed

6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed

6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

*****57 Queen Street North, Mississauga, Ontario is last listed for 1992 within the city directory archives*****

APPENDIX C

Technical Standards and Safety Authority (TSSA) Responses

From: Jason Noronha
To: Shamsul Tarafder
Subject: Fw: Fuel tank request- 2520 Britannia Rd W, Mississauga- 18TX032
Date: Friday, May 10, 2019 2:28:40 PM
Attachments: image002.png
image003.png
image004.png
image005.png
image006.png
image007.png

From: Public Information Services <publicinformationservices@tssa.org>
Sent: May 10, 2019 2:27 PM
To: Jason Noronha
Subject: RE: Fuel tank request- 2520 Britannia Rd W, Mississauga- 18TX032

Records Found
Hello,
Thank you for your request for confirmation of public information.

- We confirm that there are **fuel storage tanks records** in our database at the subject address(es).

Inst Number	Segment1	Address	City	Status
10074509	FS GASOLINE STATION - SELF SERVE	2520 BRITANNIA RD W	MISSISSAUGA	Active
11443397	FS LIQUID FUEL TANK	2520 BRITANNIA RD W	MISSISSAUGA	Active
11443411	FS LIQUID FUEL TANK	2520 BRITANNIA RD W	MISSISSAUGA	Active
11443419	FS LIQUID FUEL TANK	2520 BRITANNIA RD W	MISSISSAUGA	Active

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Release of Public Information - TSSA

www.tssa.org

Need to confirm the status of a license, certificate or registration? If you need to find out if a technician is certified, a device or business is licensed, or a contractor is registered, please call us at 1-877-682-TSSA (8772).

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.
Kind regards,

Connie Hill | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3383 | Fax: +1-416-231-6183 | E-Mail: publicinformationservices@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: May 10, 2019 11:33 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: Fuel tank request- 2520 Britannia Rd W, Mississauga- 18TX032

Good morning,

I would like to request a list of fuel tanks for the following locations in Mississauga

1) 2520 Britannia Rd W, Mississauga
2) 2475 Hogan Drive, Mississauga
3) 6039 Erin Mills Pky, Mississauga
4) 6133 Glen Erin Dr, Mississauga
5) 89 Vista Blvd, Mississauga
6) 2255 Battleford Rd, Mississauga

Thank you

Regards,

Jason Noronha, BSc
Geoscientist-in-training
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (416) 521-5567
jnoronha@petomaccallum.com

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From: Jason Noronha
To: Shamsul Tarafder
Subject: Fw: Fuel tank request - Record Fuels
Date: Tuesday, May 14, 2019 8:12:36 AM
Attachments: image001.png
image002.png
image004.png
image005.png
image006.png
image007.png

From: Public Information Services <publicinformationservices@tssa.org>
Sent: May 13, 2019 4:17 PM
To: Jason Noronha
Subject: RE: Fuel tank request - Record Fuels

Hello,

I have searched the below noted address (addresses) and I have located the following record:

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
10064114	FS Facility	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
10107223	FS Facility	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
11311074	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235550	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235578	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235606	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235632	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11311052	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11311090	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11423035	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
64758794	-	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS CYLINDER EXCHANGE
9569374	FS Facility	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS GASOLINE STATION - FULL SERVE
27528077	FS Facility	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS CYLINDER EXCHANGE
11496119	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
10986235	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986251	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986266	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986281	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK

Effective November 1, 2017 TSSA requires that any requests for the release of public information, must complete the release for public information form. The release for public information form can be found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392. Please complete the form (1 address per form) and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: May 10, 2019 2:49 PM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: Fuel tank request

Good afternoon,

I would like to request a list of fuel tanks for the following locations in Mississauga

1) 4 Queen Street North, Mississauga
2) 14 Queen Street North, Mississauga
3) 26 Queen Street North, Mississauga

Thank you

Regards,

Jason Noronha, BSc
Geoscientist-in-training
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (647) 401-4604
jnoronha@petomaccallum.com

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From: Jason Noronha
To: Shamsul Tarafder
Subject: Fw: List of fuel tanks-Mississauga - Record Fuels
Date: Tuesday, May 14, 2019 11:01:29 AM
Attachments: image002.png
image003.png
image004.png
image005.png

From: Public Information Services <publicinformationservices@tssa.org>
Sent: May 14, 2019 11:00 AM
To: Jason Noronha
Subject: RE: List of fuel tanks-Mississauga - Record Fuels

Hello,

I have searched the below noted address (addresses) and I have located the following record:

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
9588537	FS Facility	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
10986296	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11449559	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11449573	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK

Inst Number	Context	Address	City	Province	Postal Code	Inventory Item Id SUM	Inststatusname	Segment1
9885940	FS Facility	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6880	Active	FS GASOLINE STATION - FULL SERVE
11096696	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096647	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096664	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096684	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK

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Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: May 14, 2019 10:09 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: List of fuel tanks-Mississauga

Good morning,

I would like to request a list of fuel tanks for the following locations in Mississauga

1) 17 Queen St N, Mississauga
2) 40 Queen St N, Mississauga
3) 57 Queen St N, Mississauga

Thank you

Regards,

Jason Noronha, BSc
Geoscientist-in-training
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
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From:	Public Information Services
To:	Shamsul Tarafder
Subject:	Re: TSSA Registered Sites/Fuel Tank Request (No Record)
Date:	Tuesday, May 14, 2019 11:06:15 AM
Attachments:	image004.png image005.png image006.png image007.png

---

Hello,

Thank you for your inquiry.

We have no record in our database of any fuel storage tanks at the subject address (addresses).

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you and have a great day,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Shamsul Tarafder <starafder@petomaccallum.com>
Sent: May 14, 2019 10:11 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: TSSA Registered Sites/Fuel Tank Request

Good Morning,

Please advise if you have any registered site/fuel tank at the following addresses:

6190 Mississauga Road, Mississauga, ON, and

6215 Mississauga Road, Mississauga, ON

6237 Mississauga Road, Mississauga, ON

6325 Mississauga Road, Mississauga, ON

Best Regards
Shamsul

Shamsul A. Tarafder, MSc, PhD, MEnvSc, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (416) 521-5567
starafder@petomaccallum.com

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APPENDIX D

Statement of Limitations

STATEMENT OF LIMITATIONS

This report is prepared for and made available for the sole use of the client named. Peto MacCallum Ltd. (PML) hereby disclaims any liability or responsibility to any person or entity, other than those for whom this report is specifically issued, for any loss, damage, expenses, or penalties that may arise or result from the use of any information or recommendations contained in this report. The contents of this report may not be used or relied upon by any other person without the express written consent and authorization of PML.

This report shall not be relied upon for any purpose other than as agreed with the client named without the written consent of PML. It shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. A portion of this report may not be used as a separate entity: that is to say the report is to be read in its entirety at all times.

The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time

subsequent to the date of this report and these changes may affect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, groundwater, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in any way connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Groundwater Management Plan Cost Estimate.

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
PROPOSED EGLINTON AVENUE WEST DIVERSION
PEEL WEST TRUNK DIVERSIONS
TORONTO, ONTARIO

for

REGIONAL MUNICIPALITY OF PEEL
C/O HATCH

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario
M6A 1V5
Phone: (416) 785-5110
Fax: (416) 785-5120
Email: toronto@petomaccallum.com

Distribution:
1 cc: Peel Region (email)
1 cc: HATCH (email)
1 cc: PML Toronto

PML Ref.: 18TX032
May 17, 2019

EXECUTIVE SUMMARY

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Mississauga Road between Canadian Pacific Railway (CPR) to the west and Eglinton Avenue West to the east (About 1.5 km long) and Eglinton Avenue West between Erin Mills Parkway to the south and Mississaiga Road to the north (About 1.0 km) located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s. At present, the site is double lane local roadways having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. The subject site and vicinity are surrounded by mixed residential/parkland/institutional and commercial properties.

Based on the evaluation of the historical data and site reconnaissance, two (2) Potential Source Contaminations (PSCs) were identified on the adjacent properties to the road alignment. The PSCs were related to an abandoned auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Recommendation

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Canadian Pacific Railway (CPR) tracks at the west end of the site
2	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road

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Appendix D – Statement of Limitations

1. INTRODUCTION

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) for Eglinton Avenue West Diversion located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

1.1 Site Description

The subject site is a roadway alignment and consists of two parts as follows:

- Along Eglinton Avenue West between Erin Mills Parkway to the south and Mississaiga Road to the north (About 1.5 km long, Figure 1).
- Along Mississauga Road between Canadian Pacific Railway (CPR) tracks to the west and Eglinton Avenue West to the east (About 1.0 km, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, mixed residential and commercial type structures/developments are noted along both the sides of Eglinton Avenue West and Mississauga Road.

2. SCOPE OF INVESTIGATION

The Phase One ESA involved the following tasks to assess the road alignment's physical and geoenvironmental setting and to document past and present land use activities.

i) A review of available documents including aerial photographs, topographic, geologic and hydrogeologic maps, city directories, report of previous geotechnical/geoenvironmental investigations for the subject site prepared by PML, land registry records, Ministry of the Environment, Conservation and Parks (MECP)

water well records and fire insurance plans to evaluate the site physical setting and to document past and present land use activities.

ii) Conducting a walk-through visual inspection along the road alignment and a 250 m area on both sides of the alignment to assess current site and surrounding area conditions and the visual presence of site features or olfactory evidences indicating potential contamination, if any.

iii) Interviews with the knowledgeable individuals regarding the site conditions associated with historical land use activities at the subject site.

iv) Preparation of this report, discussing the information compiled and the pertinent conclusions and recommendations together with the tables, figures, site photographs and drawings as well as other information in Appendices.

3. RECORDS REVIEW

3.1 General

3.1.1 Phase One ESA Study Area Determination and Rationale

The subject site is a roadway alignment and consists of two parts extends along Eglinton Avenue West between Erin Mills Parkway to the south and Mississaiga Road to the north (About 1.5 km long, Figure 1) and along Mississauga Road between Canadian Pacific Railway (CPR) tracks to the west and Eglinton Avenue West to the east (About 1.0 km, Figure 1). The road alignment is surrounded mostly by mixed residential and commercial land uses.

The Phase One ESA study area was determined in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012 to identify and verify the potential on-site and off-site source of contaminations (PSCs), if any.

3.1.2 First Developed Use Determination and Rationale

Based on information from aerial photographs and available maps, the first developed use of the site was presumably agriculture in the late 1940s.

3.1.3 Fire Insurance Plan

An attempt was made to review the historical Fire Insurance Plans (FIPs) for the site and surrounding areas. However, no FIPs were available to review.

3.1.4 MECP Water Well Records Review

The Ministry of Environment, Conservation and Parks (MECP) Water Well Records database was searched for well records within 250 m radius of the site. Thirty eight (38) recorded wells were located within the 250 m radius of the Site. Based on MECP, thirteen (13) of the wells were recorded as water supply wells (domestic and livestock), installed between 1950 and 1956. A summary of the well record information is included in Appendix A.

3.1.5 Previous Geotechnical Report Summary

Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019.

The findings of the geotechnical report are summarized as follows:

A sanitary sewer replacement will be carried out on various streets in the City of Mississauga, Ontario. The sanitary sewer will be installed by both open cut and trenchless method in an established residential neighbourhood.

Based on a review of drawings dated June 2018 prepared by the Region of Peel, the available information on the proposed sanitary sewer size, alignment and invert levels is summarized below:

The project involves the following components:

i. Construction of approximately 1,100 m of new 1500 mm diameter sanitary sewer consisting of a concrete pressure pipe (CPP) with 450 mm cunette or 600 mm sanitary CPP carrier pipe. The sanitary sewer will be installed by trenchless method along the following segments:

   a. About a 100 m segment from the intersection of Brittania Road West and Joymar Drive to the intersection of Pioneer Drive and Brittania Road West.

   b. About a 960 m segment along Joymar Drive starting from Brittania Road West going eastwards to Tannery Street.

ii. Reconfiguration and replacement of approximately 2,650 m of existing local sewers and laterals on the streets listed below are anticipated to be carried out using open cut method:

- Pioneer Drive
- Andrea Court
- Siberry Road
- Joymar Drive
- Joycelyn Drive
- Theodore Drive
- Donata Drive
- Turney Drive and
- Isherwood Court

iii. Construction of a new 250 mm diameter sanitary sewer on Thomas Street, crossing beneath Mullet Creek and the existing bridge structure by trenchless method.

It is anticipated that the preferred trenchless technology will be microtunneling.

The project area is mainly residential and falls within the Credit River Watershed and smaller surrounding watersheds, which drain directly into Lake Ontario. The sanitary sewer alignment will be along several asphalt paved residential streets located east of Britannia Road and south of Queen Street in Streetsville, Mississauga.

During the investigation for GDR, a total of 29 boreholes were drilled and 10 monitoring wells were installed for the subject project.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m (BH-7) to 5.5 m (BH-17). The fill was encountered in all 29 boreholes. Below the fill material, was encountered a thick deposit of silty clay in BH-3 (thickness about 1.8 m) and BH-19 (thickness about 1.6 m), and clayey silt in BH-28 (thickness about 4.0 m). The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock. For classification purposes, the soils encountered at this site can be divided into six (6) distinct zones:

- Pavement Structure
- Fill (mostly sand and gravel)
- Clayey Silt/Silty Clay
- Clayey Silt Till/Silty Clay Till
- Silty Sand Till/Sand and Silt Till
- Shale Bedrock

The shale bedrock of the Georgian Bay Formation was encountered in boreholes BH-1 to BH-14, BH-17, BH-19, BH-24, BH-25 and BH-29. The depth of the shale bedrock encountered varied from 3.4 m (BH-14) to 8.3 m (BH-19) below ground surface. Rock coring was conducted in boreholes BH-1 to BH-4, BH-6 to BH-14, BH-24, BH-25 and BH-29 following the procedures as described in ASTM D2113–14 using diamond core, double tube, wireline HQ2 with the exception BH-1, BH-2, BH-3 and BH-25, where NQ2 core drilling was performed.

In general, the Georgian Bay Formation consisted of highly weathered to fresh, grey, very fine to fine grained fissile, weak to strong shale partings with occasional widely spaced jointing with sub-horizontal to horizontal bedding planes, interbedded with fresh, dark grey, moderately hard, calcareous, crystalline carbonate.

3.1.6 Previous Geo-Environmental Testing

The geoenvironmental sampling and chemical testing program was conducted in conjunction with a geotechnical investigation referred in Section 3.1.5. For excess soil management and/or off-site disposal options, soil samples were selected for chemical analyses.

Chemical Analysis

Based on the visual examination of soils in the boreholes and the site background information, the retrieved soil samples were submitted to SGS Laboratories Inc. (SGS), located in Lakefield, Ontario for chemical testing. SGS is accredited by the Canadian Association for Laboratory Accreditation (CALA). The soil samples were analyzed for the following parameters.

- Selected discrete soil samples were analyzed for metals, inorganic, benzene, toluene, ethylbenzene and xylenes (BTEX) and F1 through F4 fraction petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) parameters as listed in the Ontario Regulation 153/04 as amended by Ontario Regulation 511/09.
- Selected composite soil samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) for metals and inorganic parameters listed in Schedule 4 of Ontario Regulation 347 as amended by Ontario Regulation 558/00.

Findings of Chemical Analyses

For off-site disposal, the results of the soil chemical analyses were compared with the Ontario Regulation 511/09 Standards (Tables 1, 2 and 3) for residential/parkland and industrial/ commercial property uses in background, potable and non-potable ground water situations.

Comparison with Table 1 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Table 1 background standards for residential/parkland/ institutional property use.

Comparison with Tables 2 and 3 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Tables 2 and 3 standards for residential/parkland/institutional property use.

Comparison with Tables 2 and 3 Industrial/Commercial/Community Property Use Standards

Based on the chemical test results, the analyzed soil samples from sixteen (16) boreholes (BH1, BH3, BH6, BH7, BH9, BH10, BH11, BH12, BH13, BH15, BH20, BH24, BH25, BH26 and BH28) exceeded the Tables 2 and 3 standards for industrial/commercial/community property use.

Leachate Quality (TCLP) Results

The results of the TCLP analyses were compared with Schedule 4, Ontario Regulation 347 as amended by Ontario Reg. 558/00, and found that the analyzed soils are not of leachate toxic nature.

3.2 Environmental Source Information

Environmental source information was obtained from the following sources: Ministry of the Environment, Conservation and Parks (MECP), Toronto Reference Library, Opta Information Intelligence, Technical Standards and Safety Authority (TSSA) and the National Pollutant Release Inventory website. The environmental source information from Opta Information Intelligence and TSSA are attached in Appendices C and D, respectively.

A summary of the environmental source information is presented in Table 1 below.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
1	Opta Information Intelligence	City Directory Information Source	Johnny's Auto Center was located at 5235 Mississauga Road.	Yes. Potential impact to soil and ground water.
2	Technical Standards and Safety Authority (TSSA)	Release of Public Information - TSSA	No listing was noted within the road alignment and adjacent properties.	None
3	Ontario Ministry of Environment and Energy (MOEE) Jul 1993	Ontario Inventory of PCB Storage Sites	No listing was noted within the road alignment and adjacent properties.	None
4	Ontario Ministry of Environment and Energy (MOEE) Apr 1987 and Nov 1988	Inventory of Coal Tar Wastes and Coal Gasification Plants	No listing was noted within the road alignment and adjacent properties.	None
5	Ontario Ministry of Environment and Energy (MOEE) Jun 1991	Waste Disposal Site Inventory of Landfill Sites	No listing was noted within the road alignment and adjacent properties.	None
6	MECP Location of Small Landfill Sites, 2019	http://www.ontario.ca/data/small-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
7	MECP Location of Large Landfill Sites, 2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
8	http://www.ec.gc.ca/inrp-npri/	National Pollutant Release Inventory	No listing found for the road alignment and adjacent properties.	None

3.3 Physical Setting Source

3.3.1 Aerial Photograph

Historical and recent aerial photographs for the road alignment and vicinity areas were reviewed in order to assess the development sequence of the road alignment and adjacent properties. Based on the availability, the aerial photographs for the years 1960, 1970, 1975, 2004, 2007, 2015 and 2019 were selected for the current investigation and are shown on Figures 2 to 8. The review findings are outlined below.

Based on the aerial photographs of 1960, 1970 and 1975, rural residential and agricultural lands were noted along both the sides of Eglinton Avenue West and Mississauga Road (Figures 2 to 4). Based on the aerial photographs/Google Maps of 2004, 2007, 2015 and 2019, residential and commercial type structures/developments were noted along both the sides of Eglinton Avenue West and Mississauga Road (Figures 5 and 8).

3.3.2 Topography, Hydrology and Geology

A review of the Ontario Base Map (OBM) was conducted for the site and surrounding areas. Scattered commercial type properties are noted along the Eglinton Avenue West and Mississauga Road within the project limit. Credit River locating in the north runs parallel and Mullet Creek locating in the south runs parallel to the Mississauga Road. Mullet Creek crossed Eglinton Avenue West in the northern portion of the site. CPR tracks crossed the road alignment at the west end of the project area (Figure 9).

The local topography is considered as a rolling terrain with existing ground surface elevation varying approximately between 163 m (amsl) and 145 m (amsl), with topographic relief of approximately 18 m (Figure 9).

According to Chapman and Putnam (Physiography of Southern Ontario, Ministry of Natural Resources, 1984), the project area is in the physiographic region known as the South Slope

bordered by Peel Plain to the north and Iroquois Plain to the south. The physiographic landforms in the area are defined as Till Plains (Drumlinized) in the northern portion and Till Moraines in the southern portion of the site.

The OGS Earth Map of Surficial Geology of Southern Ontario (Ontario Geological Survey, 2010), indicates that the project area lies on a region of modern alluvial deposits and clay to silt-textured till deposits, derived from glaciolacustrine deposits or shale.

The OGS Earth Map of Paleozoic Geology of Southern Ontario (Armstrong and Dodge, 2007), indicates that the bedrock geology at the project area comprises shale, limestone, dolostone and siltstone of Georgian Bay Formation of the Upper Ordovician Period.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located about 300-500 m north/northeast of Mississauga Road. Mullet Creek, a tributary of Credit River, is located about 200-300m south/southwest of Mississauga Road. Both watercourses flow south/south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow southerly towards Mullet Creek and finally towards Credit River.

Previously, Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019. The soil stratigraphy reported on these reports is summarized below.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m to 5.5 m. The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2

to 4.3 m thick compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock.

3.3.3 Fill Material

No fill piles were noticed along the alignment. However, engineered fill materials are expected to be present along the road alignment and adjacent developed sites/properties.

3.3.4 Water Bodies and Areas of Natural Significance

Credit River is located about 300-500 m north/northeast of Mississauga Road. Mullet Creek, a tributary of Credit River, is located about 200-300m south/southwest of Mississauga Road and crossed the Eglinton Avenue West in northern portion of the site. Both watercourses flow south/south-easterly.

Based on the Ontario Ministry of Natural Resources and Forestry (MNRF), no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

4. INTERVIEW

During the course of this assessment, PML interviewed the following person on April 26, 2019, as outlined in Table 2 below:

TABLE 2

INTERVIEW SUMMARIZED INFORMATION

PLACE/ METHOD	PERSON INTERVIEWED	RATIONALE	INFORMATION PROVIDED
Cleaner, Flawless Repairs & Alteration/ Meeting	Mr. Adam Ibrahim, 1675 The Chase, Unit 37	Owner for last 13 years	1) The subject site was historically and currently used for dry cleaning. 2) This is a drop-off and pick-up station only, no chemical is used on the property.

5. SITE RECONNAISSANCE

5.1 General

A site reconnaissance along Queen Street South was carried out by a Geoscientist (Mr. Shamsul Tarafder) of PML on April 26, 2019.

Selected site photographs were taken at the time of site reconnaissance which are shown on Plates 1 to 4. Drawing 1 shows the site and surrounding features, and potential source of contaminations (PSCs) along the road alignments as observed during the site reconnaissance.

5.2 The Site Observation

During the site reconnaissance, it was confirmed that the site is located along Mississauga Road and Eglinton Avenue West in the City of Mississauga, Ontario. The road sections along Mississauga Road and Eglinton Avenue West are about 1.0 km and 1.5 km, respectively. The subject site and vicinity are surrounded by mixed residential/parkland/institutional and commercial properties (Drawing 1).

At present, the site is double lane local roadways having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. During the site visit, normal operation of road like movement of vehicles was noticed.

Fill pile was not noticed along the alignments of Mississauga Road and Eglinton Avenue West. There were no unusual noise, odour and vibration noted. No unidentified substance was noted at the site. There was no water well noted on the site.

5.3 The Study Area Observation

A visual inspection of the study area (250 m on both sides of Mississauga Road and Eglinton Avenue West) was conducted from the limits of the road alignment and publicly accessible areas to check for potential source of contaminations (PSCs), water bodies and areas of natural significance (ANS).

The road alignment along Eglinton Avenue West and Mississauga Road is surrounded by mixed residential/parkland/ institutional and commercial properties. CPR tracks crossed the subject alignment at the west end of the project limit. L. A. Auto Repairs station is located at 5235 Mississauga Road (Drawing 1).

No Area of Natural Significance (ANSI) existed on the road alignment. Mullet Creek, a tributary of Credit River, is located about 200-300m south/southwest of Mississauga Road, which crossed the Eglinton Avenue West in the northern portion of the Site. Both watercourses flow south/south-easterly.

6. REVIEW AND EVALUATION OF INFORMATION

6.1 Potential Source of Contamination (PSCs)

Based on the evaluation of the historical data and site reconnaissance, two (2) Potential Source Contaminations (PSCs) were identified on the adjacent properties to the road alignment.

The PSCs were related to Canadian Pacific Railway (CPR) tracks and an abandoned auto repair station.

The identified PSCs are listed in Table 3 below and shown on attached Drawing 1.

TABLE 3

POTENTIAL SOURCES OF CONTAMINATION (PSCs)
ON / IN / UNDER THE ROAD ALIGNMENT AND ADJACENT PROPERTIES

PSC No.	LOCATION	DESCRIPTION
1	West end of the project limit	CPR tracks crossings
2	5235 Mississauga Road	L. A. Auto Repairs (Abandoned)

6.2 Contaminants of Potential Concern (COPC)

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in auto repair stations and railway tracks, those are considered as COPC as well as background level check for the road alignment.

6.3 Conceptual Site Model (CSM)

A Conceptual Site Model (CSM) is presented to demonstrate the current site geoenvironmental conditions. The subject CSM has been prepared based on the site background information compiled to date and a site reconnaissance.

This CSM consists of Figures 1 to 9 and a plan showing Potential Source of Contaminations (PSCs) along the both sides of Queen Street South road alignment (Drawing 1), which depict the site conditions including surficial features, and present and past land uses in and around the alignment.

The subject site is a roadway alignment and consists of two parts as follows:

- Along Eglinton Avenue West between Erin Mills Parkway to the south and Mississaiga Road to the north (About 1.5 km long, Figure 1).
- Along Mississauga Road between Canadian Pacific Railway (CPR) tracks to the west and Eglinton Avenue West to the east (About 1.0 km, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, the road alignment along Eglinton Avenue West and Mississauga Road is surrounded by mixed residential/parkland/institutional and commercial properties. CPR tracks crossed the subject alignment at the west end of the project limit. L. A. Auto Repairs station is located at 5235 Mississauga Road (Drawing 1).

Based on the evaluation of the historical data and site reconnaissance, two (2) Potential Source of Contaminations (PSCs) were identified on the adjacent properties to the road alignment. The identified PSCs are listed in Section 6.1, Table 3, and shown on attached Drawing 1.

The PSCs were related to auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in auto repair stations and railway tracks, those are considered as COPC as well as background level check for the road alignment.

Based on the Ontario Ministry of Natural Resources and Forestry, no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located about 300-500 m north/northeast of Mississauga Road. Mullet Creek, a tributary of Credit River, is located about 200-300m south/southwest of Mississauga Road. Both watercourses flow south/south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow southerly towards Mullet Creek and finally towards Credit River.

Since the assessment of PSCs were mostly theoretically based information, there was inherent uncertainty in the conceptual site model. These predictions were mostly based on the information available from database sources. If these predictions are incorrect, evaluation for PSCs could be missed. However, attempts were taken to minimize the uncertainties by field observations.

7. CONCLUSION

A Phase One ESA was conducted to assess the potential for contamination of the soil and ground water along Mississauga Road between Canadian Pacific Railway (CPR) to the west and Eglinton Avenue West to the east (About 1.5 km long) and along Eglinton Avenue West between Erin Mills Parkway to the south and Mississaiga Road to the north (About 1.0 km).

Within the project limit of Eglinton Avenue West Diversion potential source of contaminations (PSCs) were identified along the Mississauga Road as shown on Drawing 1.

Based on the evaluation of the historical data and site reconnaissance, two (2) Potential Source Contaminations (PSCs) were identified on the adjacent properties to the road alignment.

The PSCs were related to an abandoned auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Based on the Phase One ESA findings, it is understood that a soil and ground water sampling and chemical testing programs should be undertaken in some portions of Queen Street South in order to further assess the soils and ground water environmental quality along the alignment and to delineate potentially impacted areas for the remedial/clean-up measures, if required for the future development.

8. RECOMMENDATION

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Canadian Pacific Railway (CPR) tracks at the west end of the site
2	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road

9. STATEMENT OF LIMITATION

The assignment is subject to the Statement of Limitations that is included in Appendix C and must be read in conjunction with this report.

10. QUALIFICATION OF ENVIRONMENTAL CONSULTANT

PML was established in 1973 as a result of the merger of Peto Associates Ltd., founded in 1956, and the Ontario division of Racey MacCallum and Associates Limited, chartered in 1952. PML is a consulting engineering firm that specializes in the fields of geoenvironmental, hydrogeological and geotechnical engineering, building sciences, construction supervision/inspection and materials engineering/testing. Personnel in our four-branch offices form a network of full time dedicated environmental professionals.

The investigation and report preparation was conducted by Mr. Shamsul Tarafder, MSc. PhD., P.Geo. Mr. Tarafder is a Senior Geoscientist with over fifteen years of experience in geology, geophysics, physical and contaminant hydrology and hydrogeology, hydrogeochemistry and soil contamination chemistry. His experience includes soil and ground water investigations including Phase One and Two ESAs, aquifer characterization, groundwater exploration, soil and groundwater quality assessment, hydrogeological assessment, in-situ remediation of organic

contaminants involving LNAPLs and DNAPLs such as petroleum products, VOCs and semi-VOCs, PAHs, BTEX and ether compounds using advanced treatment technologies, and solute transport hybrid numerical and analytical modelling. He has completed hundreds of Phase One and Two ESAs for commercial, industrial, and residential properties. Mr. Tarafder is also author and co-author of a number of peer reviewed scientific articles.

This report was reviewed by Mahaboob Alam, MSc., PhD., P.Geo., a Professional Geoscientist registered with the Association of Professional Geoscientists of Ontario. Mr. Alam is a Director of the firm and Discipline Lead, Geoenvironmental and Hydrogeological services and is a Qualified Person (QP) registered with the MOECC. He has over 30 years of interdisciplinary professional experience specializing in geoenvironmental and hydrogeologic investigations and project management. His main areas of expertise include Phase One and Phase Two ESAs, site cleanup/remediation planning and supervision, waste management, UST and AST removals, site remediation, Risk Assessment, Records of site Condition and hydrogeologic investigations. He has completed hundreds of Phase One ESAs for commercial, industrial, and residential clients for a wide variety of project types (industrial complexes, commercial developments, entertainment and institutional buildings, and residential development).

11. REFERENCE

The following documents and data were referred to the Phase One ESA Report:

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
1	Aerial Photographs	1960, 1970, and 1975	City of Toronto Online Archives
2	Aerial Photographs	2004, 2007, 2015 and 2019	Google Earth
3	Ontario Base Map (OBM) Map 10 17 6100 48400, 10 17 6100 48450, 10 17 6150 48400, 10 17 6150 48450, 10 17 6150 48500 and 10 17 6200 48450	1982	OBM from PML files
4	The Physiography of Southern Ontario, 3rd Edition	1984	Chapman, L.J., and Putnam, D. F.

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
5	Bedrock Geology of Ontario, Map 2544	1991	Ministry of Northern Development and Mines
6	Quaternary Geology of Toronto and Surrounding Area, Map 2204	1980	Ministry of Natural Resources
7	Quaternary Geology of Ontario, Southern Sheet, Ontario Geological Survey, Map 2556, Scale 1:1,000,000	1991	Barnett, P.J., W.R. Cowan and A.P. Henry
8	Canadian Standards Association Standard Z768-01 Environmental Technology	2001 (Reaffirmed 2012)	Canadian Standards Association (CSA)
9	MOEE Waste Disposal Inventory	June 1991	MOEE Reference book
10	Inventory of Coal Gasification Plant Waste Sites in Ontario	April 1987	MOEE Reference book
11	Inventory of Industrial Sites Producing Coal or Using Coal Tar and Related Tars Sites in Ontario	November 1988	MOEE Reference book
12	Ontario Inventory of PCB Storage Sites	July 1993	MOEE Reference book
13	MECP Location of Small Landfill Sites	2019	http://www.ontario.ca/data/small-landfill-sites
14	MECP Location of Large Landfill Sites	2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites
15	National Pollutant Release Inventory	2019	http://www.ec.gc.ca/inrp-npri/
16	Might's and Criss Cross City Directories	Searched for the years 1935, 1939, 1945, 1950, 1955, 1960, 1970, 1975, 1980, 1985, 1990, 1999, 2008 and 2012	Might's and Criss Cross City Directories at the Toronto Reference Library
17	Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited	January 31, 2019	Peto MacCallum Ltd.
18	Make A Map: Natural Heritage Area	Current	Ontario Ministry of Natural Resources and Forestry

We trust this report is adequate for your present purposes. Should you have any questions or require further informations, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

PROFESSIONAL GEOSCIENTIST
S.A. Tarafder
SHAMSUL A. TARAFDER
PRACTISING MEMBER
2594
ONTARIO

Shamsul A. Tarafder, MSc, PhD, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

PROFESSIONAL GEOSCIENTIST
Mahaboob Alam
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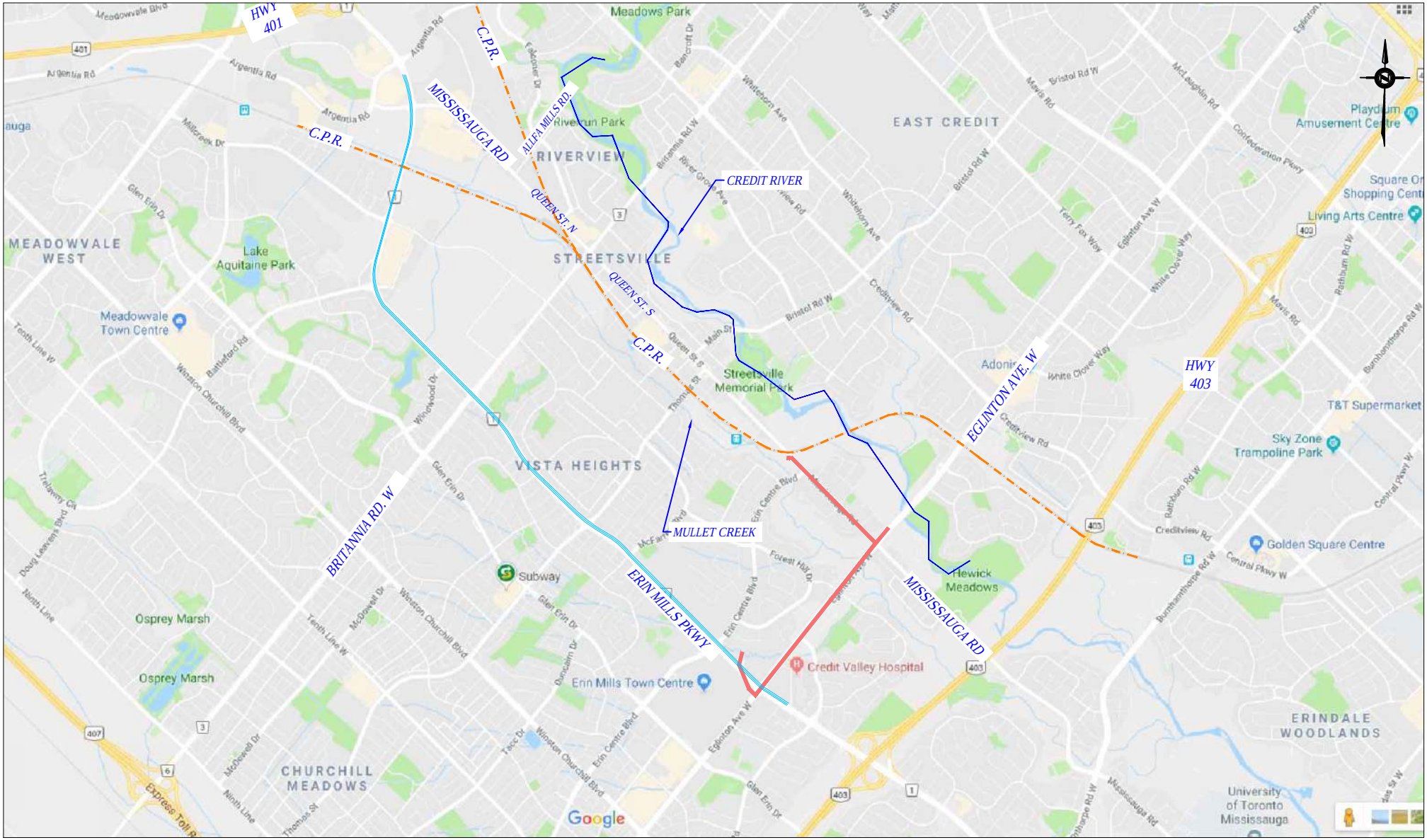
PRACTISING MEMBER
0692
05/17/19
ONTARIO

Mahaboob Alam, MSc, PhD, P.Geo.
Director
Discipline Lead, Geoenvironmental and Hydrogeological Services

ST/MA:st



REFERENCE:
THIS FIGURE WAS PREPARED FROM GOOGLE MAPS.

LEGEND:

- PROP. EGLINTON RD. DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

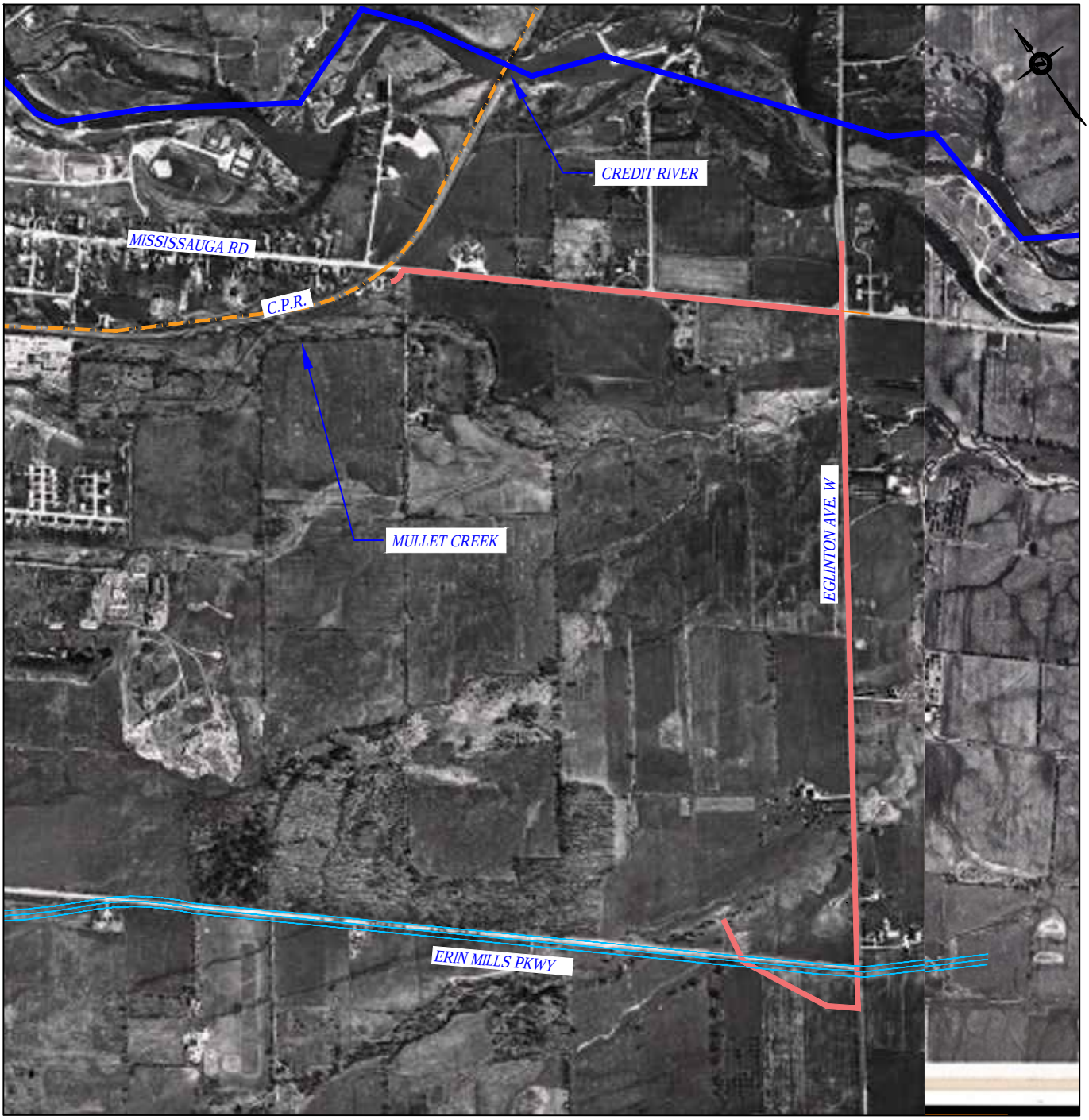
REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

KEY MAP

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY. 2019	1:40,000	19TX032-4	1
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1960, PLATE NOs. 116 & 89.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

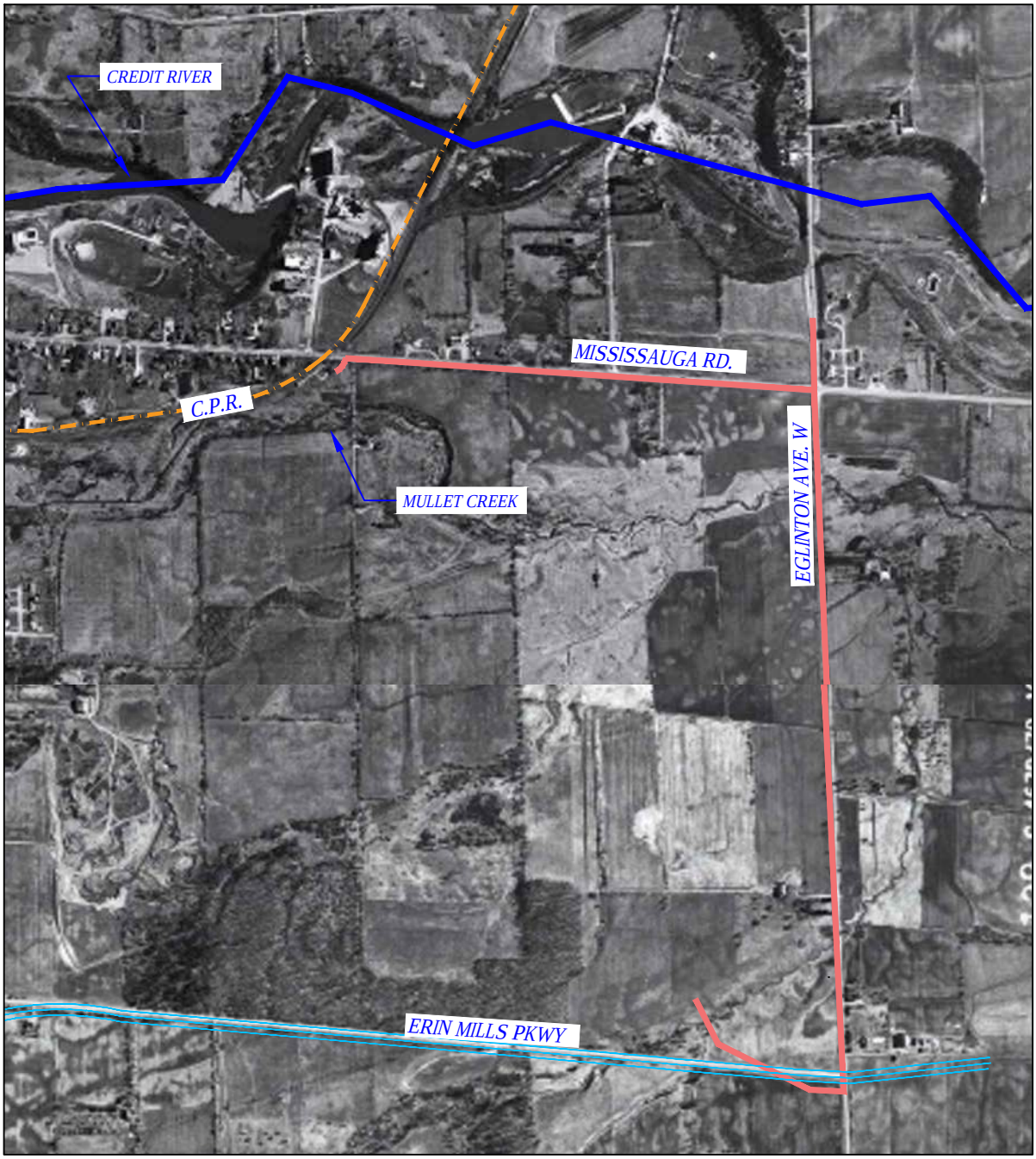
REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1960 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY 2019	1:8,000	18TX032-4	2
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1970, PLATE NOs. 99 & 100.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1970 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY 2019	1:12.500	18TX032-4	3
APPROVED	M.A.				

REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1975, PLATE NOs. 105 & 106.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1975 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY 2019	1:12.500	18TX032-4	4
APPROVED	M.A.				

REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2004.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- EXIST. WEST TRUNK SEWER
- C.P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2004 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	MAY 2019	1:12.500	18TX032-4	5
APPROVED	M.A.				

REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2007.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- EXIST. WEST TRUNK SEWER
- C.P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2007 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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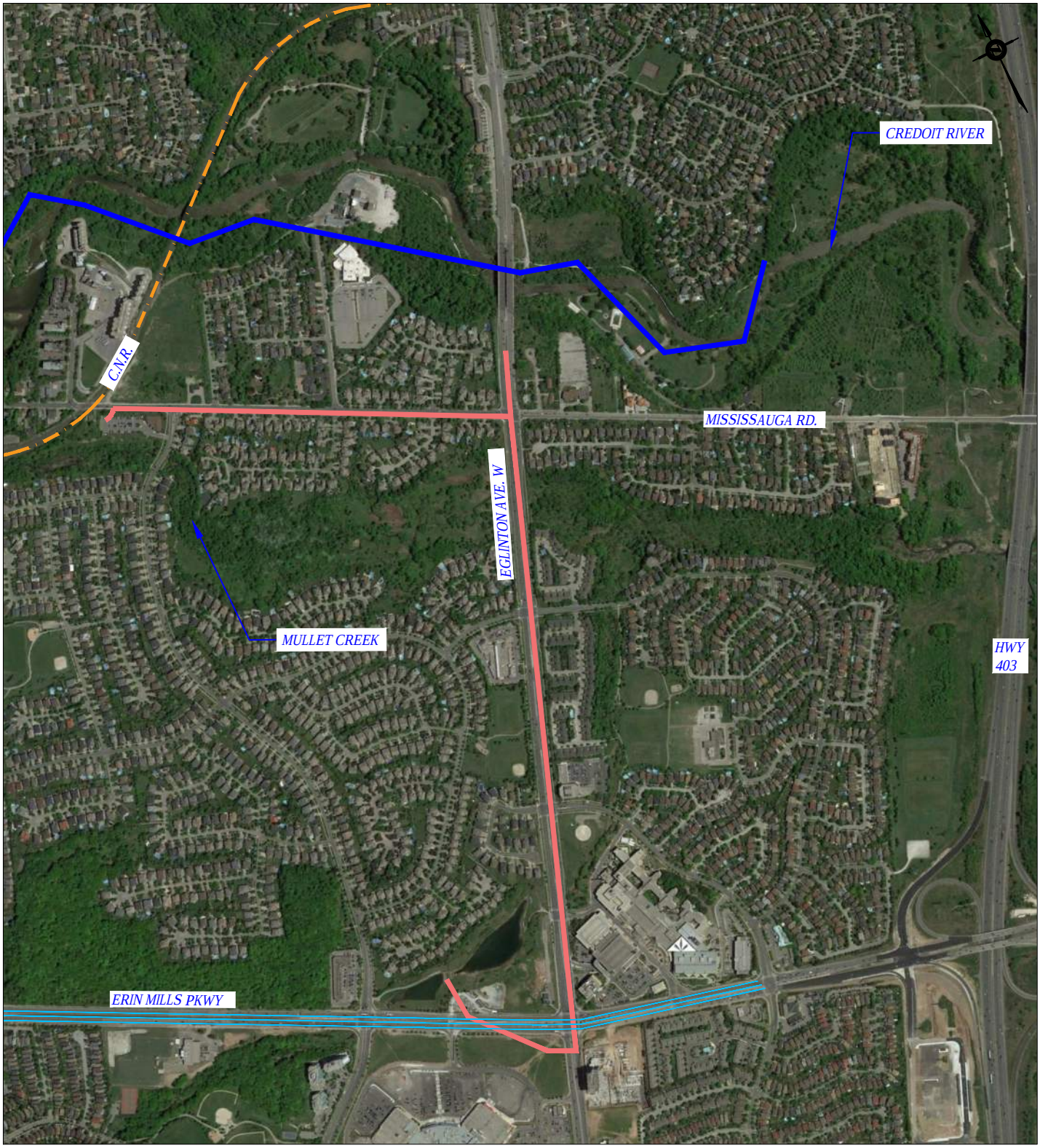
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2015.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- EXIST. WEST TRUNK SEWER
- C.P. RAILWAY
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2015 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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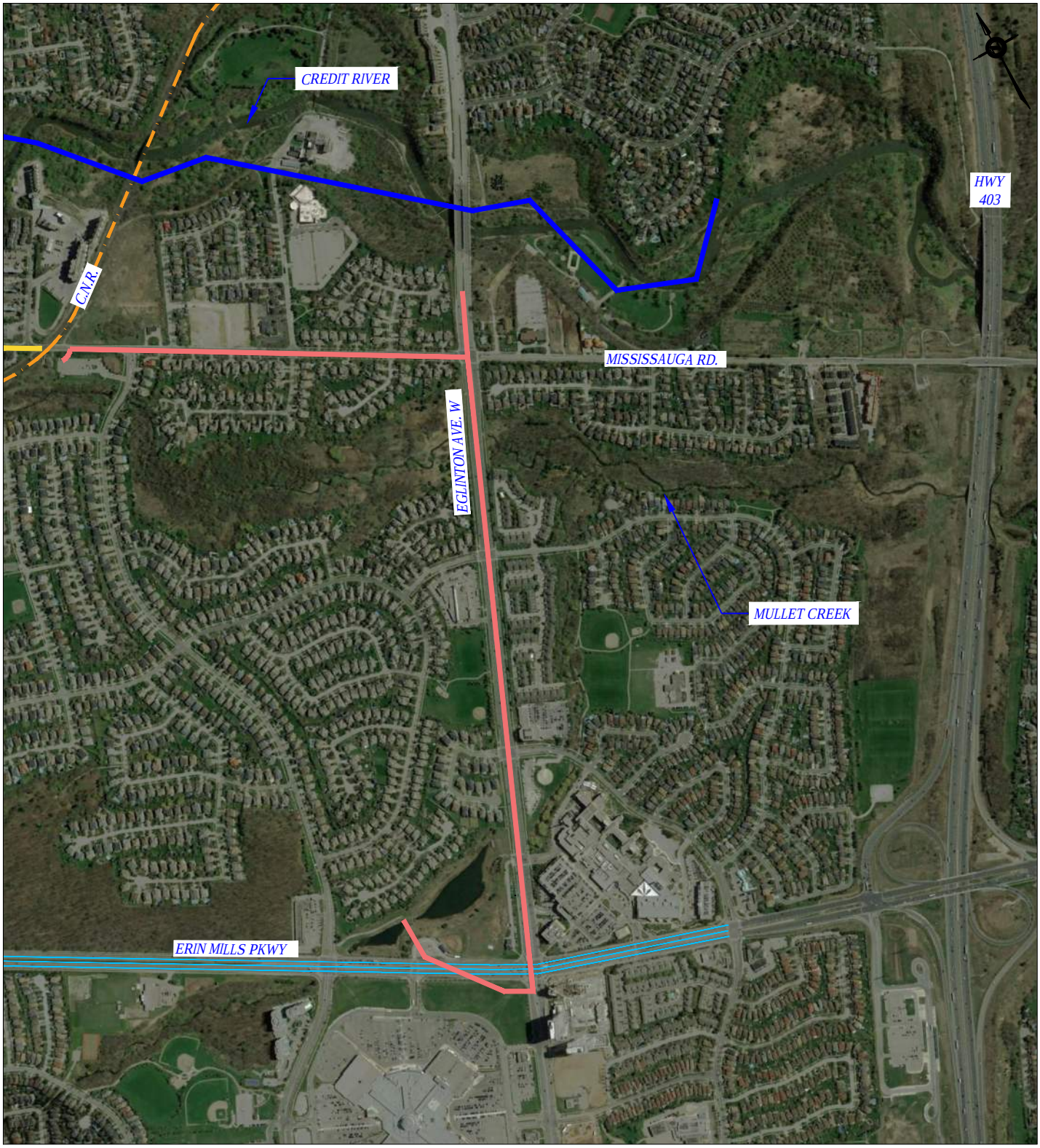
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2019.

LEGEND:

- PROP. EGLINTON AVE.W DIVERSION
- C.P. RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2019 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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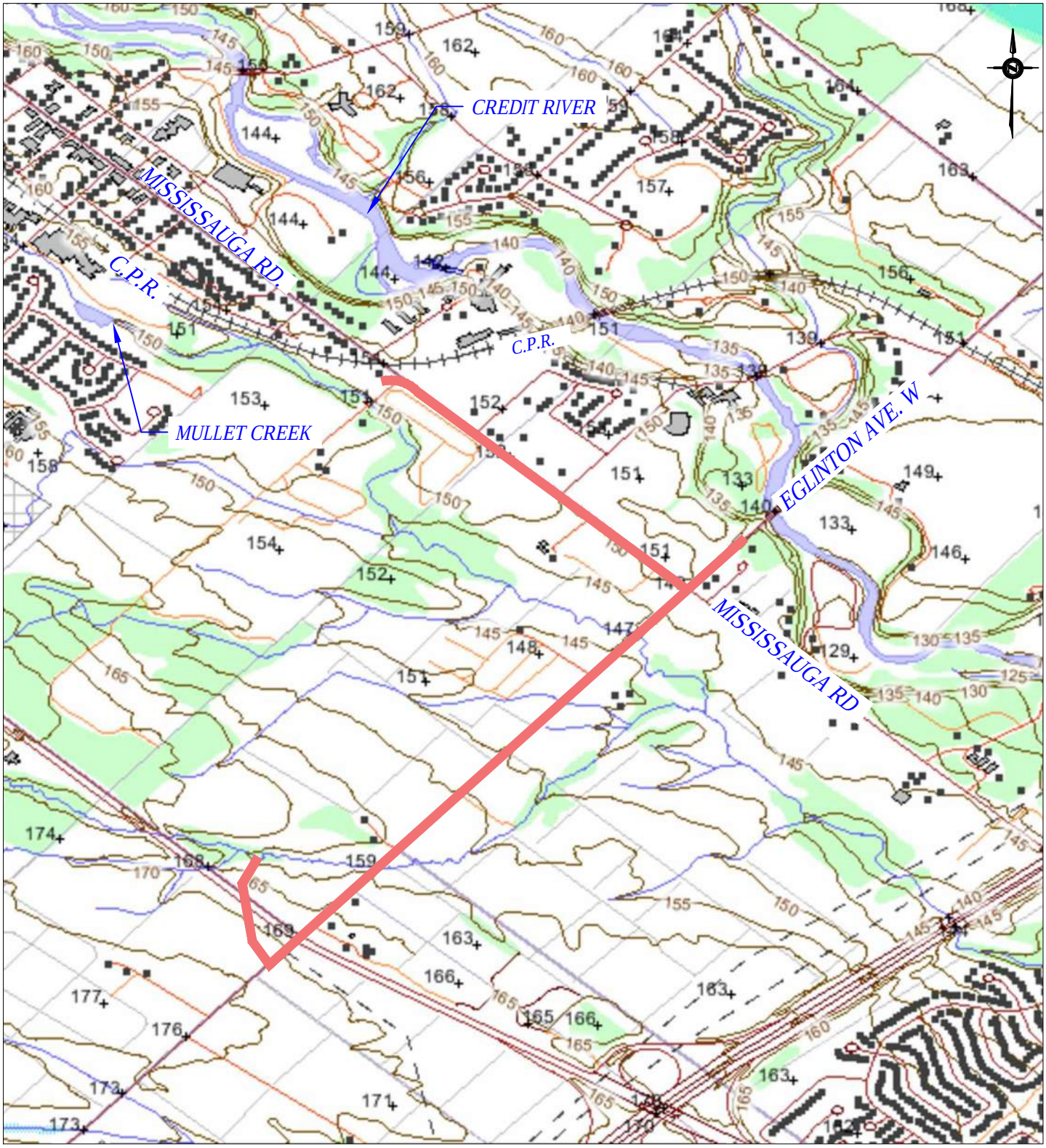
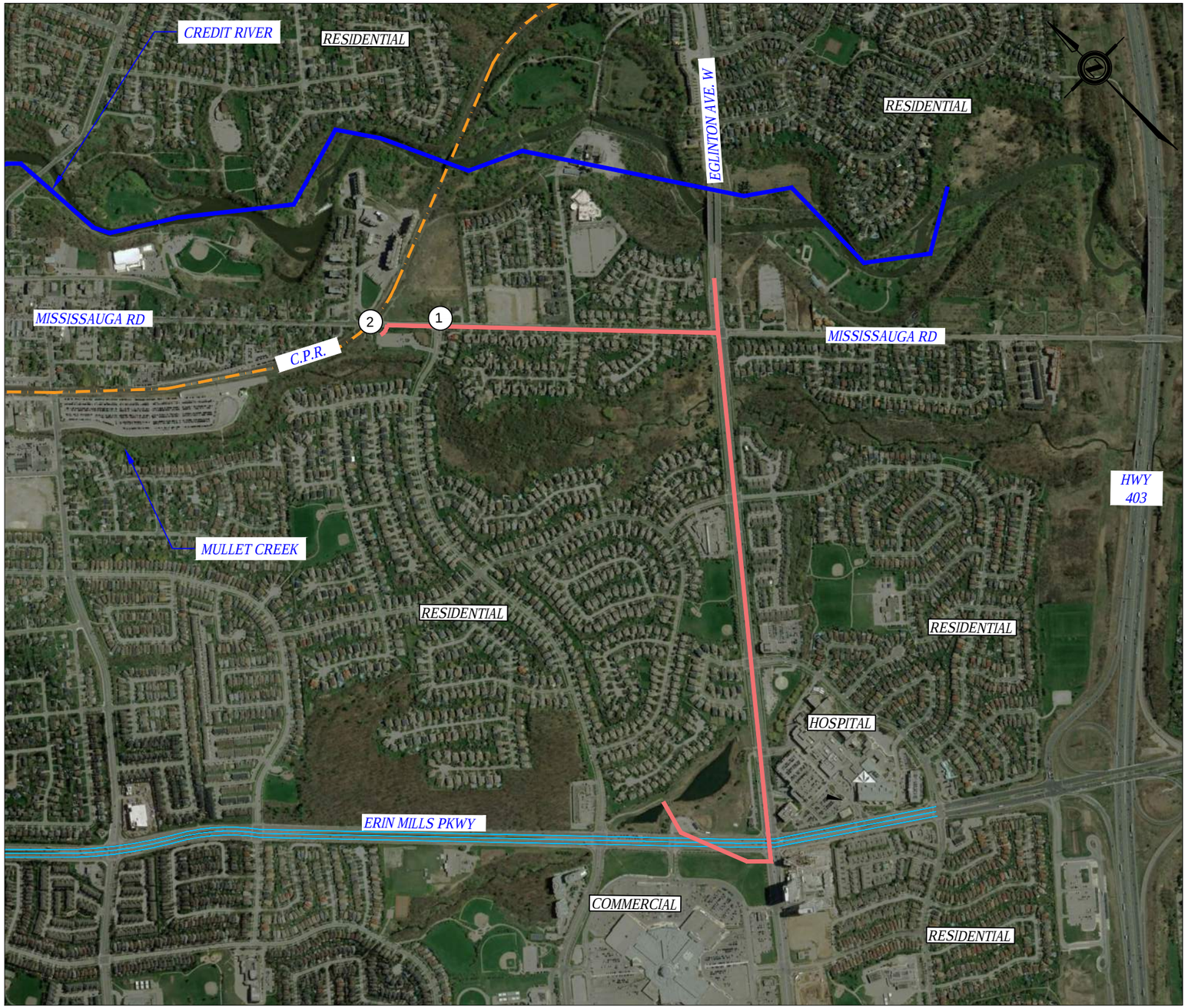
APPROVED	M.A.				

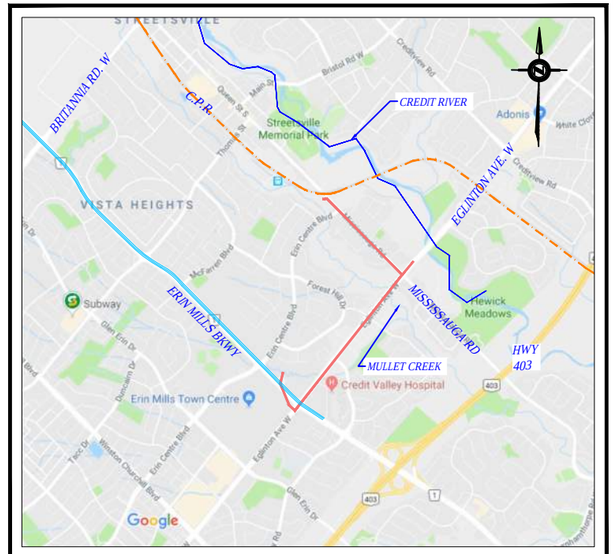


REFERENCE:
THIS FIGURE WAS PREPARED FROM OBM ONTARIO WEBSITE www.geographynetwork.ca.
LEGEND:

PROP. EGLINTON AVE. W DIVERSION

REGIONAL MUNICIPALITY OF PEEL	Peto MacCallum Ltd. CONSULTING ENGINEERS					
PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION PHASE ONE ENVIRONMENTAL SITE ASSESSMENT MISSISSAUGA, ONTARIO	DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
ONTARIO BASE MAP	CHECKED	S.T.	MAY2019	1:12,500	18TX032-4	9
	APPROVED	M.A.				





KEY PLAN

TORONTO, ONTARIO

LEGEND:

- PROP. EGLINTON AVE. W DIVERSION
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION
- (1) L.A. AUTO REPAIR
- (2) C. P. RAILWAY

REFERENCE:

THIS FIGURE WAS PRODUCED FROM GOOGLE MAPS, IMAGERY DATE MAY 7, 2018.

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROP. EGLINTON AVE. W DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

SITE AND SURROUNDING AREA FEATURES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	DWG. NO.
CHECKED	S.T.	MAY. 2019	1:12,500	18TX032-4	1
APPROVED	M.A.				

Plate 1: The site at the Chase and Eglinton Avenue West.

Plate 2: CPR tracks and Queen Street South intersection at the site west end.

Plate 3: L. A. Auto Repairs (abandoned) at 5235 Mississauga Road.

Plate 4: Commercial structures along Eglinton Avenue West.

APPENDIX A

MECP Well Record Summary

MECP WELL RECORD SUMMARY

Proposed Eglinton Avenue West Diversion (Eglinton Avenue West)

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	605535	4824741	W	2015/11 7230						7259697 (C30323) A194798 P	
17	604419	4823628	W	2015/08 7472						7250860 (Z219770) A	
17	604948	4823751	W	2015/08 7472						7250861 (Z219769) A	
17	604301	4823895	W	2013/09 2576	1.25		31///:	MO		7214240 (Z175790) A100106 A	
17	604417	4823857	W	2013/06 7241	2			MT	0008 10	7204508 (Z162932) A098668	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0018
17	604305	4823884	W	2013/06 7241	2			MT	0008 10	7204509 (Z162931) A146517	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0018
17	604384	4823809	W	2013/06 7241	2			MT	0010 5	7204510 (Z162930) A098669	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0014
17	605344	4824780	W	1956/08 2909	6 6	FR 0031 FR 0060	9/52/4/24:0	DO		4902161 ()	FILL CLAY 0004 BRWN CLAY 0015 BRWN CLAY STNS 0019 GREY CLAY MSND GRVL 0021 SHLE 0062
17	605388	4824818	W	1956/07 2909	6 6	FR 0048	6/41/8/48:0	DO		4902160 ()	FILL CLAY 0002 BRWN CLAY 0012 BLDR CLAY 0015 GREY CLAY STNS 0017 SHLE 0051
17	605406	4824776	W	1955/11 2909	6 6	FR 0022	20/55/2/3:0	DO		4902159 ()	BRWN CLAY 0015 BLUE SHLE 0060
17	605384	4824743	W	1955/11 2909	6 6	FR 0030	20/55/2/3:0	DO		4902158 ()	BRWN CLAY 0012 BLUE CLAY 0020 BLUE SHLE 0060
17	605430	4824699	W	1953/07 1429	6 6	FR 0050	9/55/5/24:0	DO		4902157 ()	CLAY 0009 SHLE 0060
17	605358	4824603	W	1953/07 1429	6 6	FR 0040	9/42/2/:	DO		4902156 ()	CLAY 0008 SHLE 0042
17	605655	4824383	W	1950/09 4805	5 5	FR 0054	20/54/3/:	ST DO		4902155 ()	CLAY 0019 BLUE SHLE 0054

MECP WELL RECORD SUMMARY

Proposed Eglinton Avenue West Diversion (Mississauga Road)

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	605248	4825636	W	2016/08 6988						7274935 (C31390) A194633 P	
17	604752	4825603	W	2016/01 7147	0.93 5					7257464 (Z218319) A	
17	605535	4824741	W	2015/11 7230						7259697 (C30323) A194798 P	
17	604647	4825518	W	2015/09 7320						7249688 (Z212740) A186039 A	
17	604937	4825583	W	2015/09 7320						7249689 (Z214204) A186041 A	
17	604805	4825633	W	2015/09 7320						7249690 (Z214206) A186043 A	
17	604877	4825657	W	2015/09 7320						7249687 (Z214203) A186040 A	
17	604957	4825223	W	2015/07 7147	35.4	FR				7246817 (Z203344) A	
17	604923	4825216	W	2015/07 6714	35.4	FR				7246818 (Z203345) A	
17	604937	4825583	W	2015/06 7320	2	UT 0015		TH	0012 5	7244089 (Z212670) A186041	BRWN CLAY GRVL SOFT 0002 BRWN CLAY SILT DNSE 0014 GREY SHLE 0017
17	604647	4825518	W	2015/06 7320	2	UT 0018		TH	0017 5	7244090 (Z212669) A186093	BRWN CLAY GRVL SOFT 0002 BRWN CLAY SILT DNSE 0017 GREY SHLE 0021
17	604805	4825633	W	2015/06 7320	2	UT 0015		TH	0011 5	7244091 (Z212671) A186043	BRWN CLAY GRVL SOFT 0005 BRWN CLAY SILT DNSE 0012 GREY SHLE 0016
17	604877	4825657	W	2015/06 7320	2	UT 0015		TH	0012 5	7244092 (Z212668) A186040	BRWN CLAY SILT SOFT 0005 BRWN CLAY SILT DNSE 0012 GREY SHLE 0017
17	604605	4825626	W	2012/06 6032	1.79			MO	0005 10	7185305 (Z131689) A116361	BLCK SAND GRVL LOOS 0002 BRWN SILT SAND PCKD 0009 GREY SILT GRVL DNSE 0015
17	604614	4825543	W	2009/09 7215	2			TH	0010 10	7132903 (Z104616) A090814	BRWN FILL WBRG 0004 BRWN CLAY DRY 0012 BRWN CLAY WBRG 0016 GREY SHLE DRY 0020
17	604400	4825598	W	2008/11 7247	2			MO	0010 10	7122385 (Z93981) A066719	BLCK 0000 BRWN FILL SAND GRVL 0000 BRWN CLAY TILL SLTY 0015 GREY SHLE LMSN LYRD 0020
17	605378	4825305	W	1967/06 1612	6 6	FR 0027	11/12/2/14:0	IN		4902642 ()	FILL BLDR 0014 BLUE SHLE 0029
17	605436	4825318	W	1967/06 1612	6	SA		NU		4902643 () A	FILL BLDR 0022 BLUE SHLE 0044
17	605344	4824780	W	1956/08 2909	6 6	FR 0031 FR 0060	9/52/4/24:0	DO		4902161 ()	FILL CLAY 0004 BRWN CLAY 0015 BRWN CLAY STNS 0019 GREY CLAY MSND GRVL 0021 SHLE 0062
17	605388	4824818	W	1956/07 2909	6 6	FR 0048	6/41/8/48:0	DO		4902160 ()	FILL CLAY 0002 BRWN CLAY 0012 BLDR CLAY 0015 GREY CLAY STNS 0017 SHLE 0051
17	605406	4824776	W	1955/11 2909	6 6	FR 0022	20/55/2/3:0	DO		4902159 ()	BRWN CLAY 0015 BLUE SHLE 0060
17	605384	4824743	W	1955/11 2909	6 6	FR 0030	20/55/2/3:0	DO		4902158 ()	BRWN CLAY 0012 BLUE CLAY 0020 BLUE SHLE 0060
17	605430	4824699	W	1953/07 1429	6 6	FR 0050	9/55/5/24:0	DO		4902157 ()	CLAY 0009 SHLE 0060
17	605358	4824603	W	1953/07 1429	6 6	FR 0040	9/42/2/:	DO		4902156 ()	CLAY 0008 SHLE 0042

MECP WELL RECORD TABLE ABBREVIATIONS AND DESCRIPTIONS

Header Descriptions

ABBREVIATION	DESCRIPTION
UTM	UTM in Zone, Easting, Northing and Datum is NAD83
LOT	UTM estimated from Centroid of Lot
W	UTM not from Lot Centroid
DATE CNTR	Date Work Completed and Well Contractor Licence Number
CASING DIA	Casing diameter in inches
WATER	Unit of Depth in Feet. See below for Meaning of Code
PUMP TEST	Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour:Minutes
WELL USE	See below for Meaning of Code
SCREEN	Screen Depth and Length in feet
WELL	Well ID, AUDIT #, Well Tag, A for abandonment; P for Partial Data Entry Only
FORMATION	See below for Meaning of Code

Meaning of Core Material and Descriptive Terms

ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION
CLN	CLEAN	FILL	FILL	MARL	MARL	SILT	SILT
DRY	DRY	FLDS	FELDSPAR	MGRD	MEDIUM-GRAINED	SLTE	SLATE
QTZ	QUARTZ	FLNT	FLINT	MGVL	MEDIUM GRAVEL	SLTY	SILTY
BLDR	BOULDERS	FOSS	FOSILIFEROUS	MRBL	MARBLE	SNDS	SANDSTONE
BSLT	BASALT	FSND	FINE SAND	MSND	MEDIUM SAND	SNDY	SAN DY
CGRD	COARSE-GRAINED	GNIS	GNEISS	MUCK	MUCK	SOFT	SOFT
CGVL	COARSE GRAVEL	GRNT	GRANITE	OBDN	OVERBURDEN	SPST	SOAPSTONE
CHRT	CHERT	GRSN	GREENSTONE	PCKD	PACKED	STKY	STICKY
CLAY	CLAY	GRVL	GRAVEL	PEAT	PEAT	STNS	STONES
CLYY	CLAYEY	GRWK	GREYWACKE	PGVL	PEA GRAVEL	STNY	STONEY
CMTD	CEMENTED	GVLY	GRAVELLY	PORS	POROUS	THIK	THICK
CONG	CONGLOMERATE	GYPS	GYPSUM	PRDG	PREVIOUSLY DUG	THIN	THIN
CRYS	CRYSTALLINE	HARD	HARD	PRDR	PREV. DRILLED	TILL	TILL
CSND	COARSE SAND	HPAN	HARDPAN	QRTZ	QUARTZITE	UNKN	UNKNOWN TYPE
DKCL	DARK-COLOURED	IRFM	IRON FORMATION	QSND	QUICKSAND	VERY	VERY
DLMT	DOLOMITE	LIMY	LIMY	ROCK	ROCK	WBRG	WATER-BEARING
DNSE	DENSE	LMSN	LIMESTONE	SAND	SAND	WDFR	WOOD FRAGMENTS
DRTY	DIRTY	LOAM	TOPSOIL	SHLE	SHALE	WTHD	WEATHERED
FCRD	FRACTURED	LOOS	LOOSE	SHLY	SHALY		
FGRD	FINE-GRAINED	LTCL	LIGHT-COLOURED	SHRP	SHARP		
FGVL	FINE GRAVEL	LYRD	LAYERED	SHST	SCHIST		

Core Color

ABBV	DESCRIPTION
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLC K	BLACK
BLGY	BLUE-GREY

Well Use

ABBV	DESCRIPTION
DO	Domestic
ST	Livestock
IR	Irrigation
IN	Industrial
CO	Commercial
MN	Municipal
PS	Public
AC	Cooling And AC
NU	Not Used
OT	Other
TH	Test Hole
DE	Dewatering
MO	Monitoring
MT	Monitoring and Test Hole

Water Kind

ABBV	DESCRIPTION
FR	Fresh
SA	Salty
SU	Sulphur
MN	Minerial
UK	Not Stated
GS	Gas
IR	Iron
UT	Untested
OT	Other

Appendix B

Opta Information Intelligence Report

INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

An SCM Company
www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel Region, Ontario Criss Cross Directory

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 2000	
Site Listing:	-Nabisco Milling Company -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-City West Towing -Credit Mills Auto center Ltd

6553 Mississauga Road	-Ashmeade Insurance Brokers Ltd -Knapp & Associates Design Inc
371 Queen Street South	-Sunoco Inc; Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1994	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc -In Harmony Resources Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-National Propane Service
6553 Mississauga Road	-King Adjusters Ltd

	-RR Enterprises Ltd -Schering Canada Inc -Res (3 Tenants)
371 Queen Street South	-Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1989	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Tartan Color & Chemical Inc

	-Schering Canada Inc
371 Queen Street South	-Suncorp Inc

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1983	
Site Listing:	-Reid Milling Div of Christie Brown & Co Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (Street)	-Johnny's Auto Center
6553 Mississauga Road (Street)	-Eraco International Trading Inc -Erin Realty Inc -McCullough Lisa-Barr -Schering Canada Inc

371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-SMS Petroleum

PROJECT NUMBER: 60629	

Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Res (4 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1966	
Site Listing:	-Reid Milling Ltd

Adjacent Properties:	
24 Reid Drive	-Res (3 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
24 Reid Drive	-Address Not Listed

2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

*****27 Reid Drive, Mississauga, Ontario is last listed in 1965 within the City Directory Archives*****

APPENDIX C

Technical Standards and Safety Authority (TSSA) Responses

From:	Public Information Services
To:	Shamsul Tarafder
Subject:	Re: TSSA Registered Sites/Fuel Tank Request (No Record)
Date:	Thursday, May 16, 2019 11:08:01 AM
Attachments:	image004.png image005.png image006.png image007.png

---

Hello,

Thank you for your inquiry.

We have no record in our database of any fuel storage tanks at the subject address (addresses).

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you and have a great day,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Shamsul Tarafder <starafder@petomaccallum.com>
Sent: May 15, 2019 2:46 PM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: TSSA Registered Sites/Fuel Tank Request

Good afternoon,

Please advise if you have any registered site/fuel tank at the following address:

1675 The Chase, Streetsville, Mississauga, ON, and

Best Regards
Shamsul

Shamsul A. Tarafder, MSc, PhD, MEnvSc, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (416) 521-5567
starafder@petomaccallum.com

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APPENDIX D

Statement of Limitations

STATEMENT OF LIMITATIONS

This report is prepared for and made available for the sole use of the client named. Peto MacCallum Ltd. (PML) hereby disclaims any liability or responsibility to any person or entity, other than those for whom this report is specifically issued, for any loss, damage, expenses, or penalties that may arise or result from the use of any information or recommendations contained in this report. The contents of this report may not be used or relied upon by any other person without the express written consent and authorization of PML.

This report shall not be relied upon for any purpose other than as agreed with the client named without the written consent of PML. It shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. A portion of this report may not be used as a separate entity: that is to say the report is to be read in its entirety at all times.

The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time

subsequent to the date of this report and these changes may affect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, groundwater, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in any way connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Groundwater Management Plan Cost Estimate.

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
PROPOSED QUEEN STREET SOUTH DIVERSION
PEEL WEST TRUNK DIVERSIONS
TORONTO, ONTARIO

for

REGIONAL MUNICIPALITY OF PEEL
C/O HATCH

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario
M6A 1V5
Phone: (416) 785-5110
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Distribution:
1 cc: Peel Region (email)
1 cc: HATCH (email)
1 cc: PML Toronto

PML Ref.: 18TX032
May 17, 2019

EXECUTIVE SUMMARY

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Queen Street South located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

The road section along Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east is about 2.1 km long. The subject site and vicinity are surrounded by mixed residential/parkland/institutional and commercial properties.

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s. At present, the site is double lane local roadways having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement.

Based on the evaluation of the historical data and site reconnaissance, three (3) Potential Source of Contaminations (PSCs) were identified along Queen Street South. The PSCs were related to a gasoline service station, an auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Recommendation

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Husky gasoline service station at 371 Queen Street South

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
2	Canadian Pacific Railway (CPR) tracks at the east end of the site
3	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road, about 200 m east of the project limit within the study area

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Figure 2 – 1960 Aerial Photograph

Figure 3 – 1970 Aerial Photograph

Figure 4 – 1975 Aerial Photograph

Figure 5 – 2004 Aerial Photograph

Figure 6 – 2007 Aerial Photograph

Figure 7 – 2015 Aerial Photograph

Figure 8 – 2019 Aerial Photograph

Figure 9 – Ontario Base Map

Drawing 1: Site and Surrounding Area Features

Plates 1 through 4 – Site Photographs

Appendix A – MECP Well Record Summary

Appendix B – Opta Information Intelligence Report

Appendix C –Technical Standards and Safety Authority (TSSA) Responses

Appendix D – Statement of Limitations

1. INTRODUCTION

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Queen Street South located in the City of Mississauga, Ontario.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

1.1 Site Description

The subject site is a roadway alignment and consists of a part of Queen Street South as follows:

- Along Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east (About 2.1 km long, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, mixed residential and commercial type structures/developments are noted along Queen Street South.

2. SCOPE OF INVESTIGATION

The Phase One ESA involved the following tasks to assess the road alignment's physical and geoenvironmental setting and to document past and present land use activities.

i) A review of available documents including aerial photographs, topographic, geologic and hydrogeologic maps, city directories, report of previous geotechnical/geoenvironmental investigations for the subject site prepared by PML, land registry records, Ministry of the Environment, Conservation and Parks (MECP) water well records and fire insurance plans to evaluate the site physical setting and to document past and present land use activities.

ii) Conducting a walk-through visual inspection along the road alignment and a 250 m area on both sides of the alignment to assess current site and surrounding area conditions and the visual presence of site features or olfactory evidences indicating potential contamination, if any.

iii) Interviews with the knowledgeable individuals regarding the site conditions associated with historical land use activities at the subject site.

iv) Preparation of this report, discussing the information compiled and the pertinent conclusions and recommendations together with the tables, figures, site photographs and drawings as well as other information in Appendices.

3. RECORDS REVIEW

3.1 General

3.1.1 Phase One ESA Study Area Determination and Rationale

The subject site is a roadway alignment and consists of a part of Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east (About 2.1 km long, Figure 1). The road alignment is surrounded by mixed residential and commercial land uses.

The Phase One ESA study area was determined in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012 to identify and verify the potential on-site and off-site source of contaminations (PSCs), if any.

3.1.2 First Developed Use Determination and Rationale

Based on information from aerial photographs and available maps, the first developed use of the site was presumably agriculture in the late 1940s.

3.1.3 Fire Insurance Plan

An attempt was made to review the historical Fire Insurance Plans (FIPs) for the site and surrounding areas. However, no FIPs were available to review.

3.1.4 MECP Water Well Records Review

The Ministry of Environment, Conservation and Parks (MECP) Water Well Records database was searched for well records within 250 m radius of the site. Eighty seven (87) recorded wells were located within the 250 m radius of the site. Based on MECP, five (5) of the wells were recorded as water supply wells (domestic and public), installed between 1948 and 1967. A summary of the well record information is included in Appendix A.

3.1.5 Previous Geotechnical Report Summary

Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019.

The findings of the geotechnical report are summarized as follows:

A sanitary sewer replacement will be carried out on various streets in the City of Mississauga, Ontario. The sanitary sewer will be installed by both open cut and trenchless method in an established residential neighbourhood.

Based on a review of drawings dated June 2018 prepared by the Region of Peel, the available information on the proposed sanitary sewer size, alignment and invert levels is summarized below:

The project involves the following components:

i. Construction of approximately 1,100 m of new 1500 mm diameter sanitary sewer consisting of a concrete pressure pipe (CPP) with 450 mm cunette or 600 mm sanitary CPP carrier pipe. The sanitary sewer will be installed by trenchless method along the following segments:

a. About a 100 m segment from the intersection of Brittania Road West and Joymar Drive to the intersection of Pioneer Drive and Brittania Road West.

b. About a 960 m segment along Joymar Drive starting from Brittania Road West going eastwards to Tannery Street.

ii. Reconfiguration and replacement of approximately 2,650 m of existing local sewers and laterals on the streets listed below are anticipated to be carried out using open cut method:

- Pioneer Drive
- Andrea Court
- Siberry Road
- Joymar Drive
- Joycelyn Drive
- Theodore Drive
- Donata Drive
- Turney Drive and
- Isherwood Court

iii. Construction of a new 250 mm diameter sanitary sewer on Thomas Street, crossing beneath Mullet Creek and the existing bridge structure by trenchless method.

It is anticipated that the preferred trenchless technology will be microtunneling.

The project area is mainly residential and falls within the Credit River Watershed and smaller surrounding watersheds, which drain directly into Lake Ontario. The sanitary sewer alignment will be along several asphalt paved residential streets located east of Britannia Road and south of Queen Street in Streetsville, Mississauga.

During the investigation for GDR, a total of 29 boreholes were drilled and 10 monitoring wells were installed for the subject project.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m (BH-7) to 5.5 m (BH-17). The fill was encountered in all 29 boreholes. Below the fill material, was encountered a thick deposit of silty clay in BH-3 (thickness about 1.8 m) and BH-19 (thickness about 1.6 m), and clayey silt in BH-28 (thickness about 4.0 m). The fill material was underlain by 0.6 m to 5.5 m thick

very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock. For classification purposes, the soils encountered at this site can be divided into six (6) distinct zones:

- Pavement Structure
- Fill (mostly sand and gravel)
- Clayey Silt/Silty Clay
- Clayey Silt Till/Silty Clay Till
- Silty Sand Till/Sand and Silt Till
- Shale Bedrock

The shale bedrock of the Georgian Bay Formation was encountered in boreholes BH-1 to BH-14, BH-17, BH-19, BH-24, BH-25 and BH-29. The depth of the shale bedrock encountered varied from 3.4 m (BH-14) to 8.3 m (BH-19) below ground surface. Rock coring was conducted in boreholes BH-1 to BH-4, BH-6 to BH-14, BH-24, BH-25 and BH-29 following the procedures as described in ASTM D2113–14 using diamond core, double tube, wireline HQ2 with the exception BH-1, BH-2, BH-3 and BH-25, where NQ2 core drilling was performed.

In general, the Georgian Bay Formation consisted of highly weathered to fresh, grey, very fine to fine grained fissile, weak to strong shale partings with occasional widely spaced jointing with sub-horizontal to horizontal bedding planes, interbedded with fresh, dark grey, moderately hard, calcareous, crystalline carbonate.

3.1.6 Previous Geo-Environmental Testing

The geoenvironmental sampling and chemical testing program was conducted in conjunction with a geotechnical investigation referred in Section 3.1.5. For excess soil management and/or off-site disposal options, soil samples were selected for chemical analyses.

Chemical Analysis

Based on the visual examination of soils in the boreholes and the site background information, the retrieved soil samples were submitted to SGS Laboratories Inc. (SGS), located in Lakefield, Ontario for chemical testing. SGS is accredited by the Canadian Association for Laboratory Accreditation (CALA). The soil samples were analyzed for the following parameters.

- Selected discrete soil samples were analyzed for metals, inorganic, benzene, toluene, ethylbenzene and xylenes (BTEX) and F1 through F4 fraction petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) parameters as listed in the Ontario Regulation 153/04 as amended by Ontario Regulation 511/09.
- Selected composite soil samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) for metals and inorganic parameters listed in Schedule 4 of Ontario Regulation 347 as amended by Ontario Regulation 558/00.

Findings of Chemical Analyses

For off-site disposal, the results of the soil chemical analyses were compared with the Ontario Regulation 511/09 Standards (Tables 1, 2 and 3) for residential/parkland and industrial/ commercial property uses in background, potable and non-potable ground water situations.

Comparison with Table 1 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Table 1 background standards for residential/parkland/ institutional property use.

Comparison with Tables 2 and 3 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Tables 2 and 3 standards for residential/parkland/institutional property use.

Comparison with Tables 2 and 3 Industrial/Commercial/Community Property Use Standards

Based on the chemical test results, the analyzed soil samples from sixteen (16) boreholes (BH1, BH3, BH6, BH7, BH9, BH10, BH11, BH12, BH13, BH15, BH20, BH24, BH25, BH26 and BH28) exceeded the Tables 2 and 3 standards for industrial/commercial/community property use.

Leachate Quality (TCLP) Results

The results of the TCLP analyses were compared with Schedule 4, Ontario Regulation 347 as amended by Ontario Reg. 558/00, and found that the analyzed soils are not of leachate toxic nature.

3.2 Environmental Source Information

Environmental source information was obtained from the following sources: Ministry of the Environment, Conservation and Parks (MECP), Toronto Reference Library, Opta Information Intelligence, Technical Standards and Safety Authority (TSSA) and the National Pollutant Release Inventory website. The environmental source information from Opta Information Intelligence and TSSA are attached in Appendices C and D, respectively.

A summary of the environmental source information is presented in Table 1 below.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
1	Opta Information Intelligence	City Directory Information Source	Sunoco gasoline service station was located at 371 Queen Street South and Johnny's Auto Center was located at 5235 Mississauga Road (Eastern portion of the site).	Yes. Potential impact to soil and ground water.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
2	Technical Standards and Safety Authority (TSSA)	Release of Public Information - TSSA	Records of five (5) active and five (2) expired fuel storage tanks noted at 371 Queen Street South.	Yes. Potential impact to soil and ground water.
3	Ontario Ministry of Environment and Energy (MOEE) Jul 1993	Ontario Inventory of PCB Storage Sites	No listing was noted within the road alignment and adjacent properties.	None
4	Ontario Ministry of Environment and Energy (MOEE) Apr 1987 and Nov 1988	Inventory of Coal Tar Wastes and Coal Gasification Plants	No listing was noted within the road alignment and adjacent properties.	None
5	Ontario Ministry of Environment and Energy (MOEE) Jun 1991	Waste Disposal Site Inventory of Landfill Sites	No listing was noted within the road alignment and adjacent properties.	None
6	MECP Location of Small Landfill Sites, 2019	http://www.ontario.ca/data/small-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
7	MECP Location of Large Landfill Sites, 2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
8	http://www.ec.gc.ca/inrp-npri/	National Pollutant Release Inventory	No listing found for the road alignment and adjacent properties.	None

3.3 Physical Setting Source

3.3.1 Aerial Photograph

Historical and recent aerial photographs for the road alignment and vicinity areas were reviewed in order to assess the development sequence of the road alignment and adjacent properties. Based on the availability, the aerial photographs for the years 1960, 1970, 1975, 2004, 2007, 2015 and 2019 were selected for the current investigation and are shown on Figures 2 to 8. The review findings are outlined below.

Based on the aerial photographs of 1960, 1970 and 1975, mixed residential and commercial type structures/developments were noted along both sides of Queen Street South, further north and south of Queen Street South vacant lands or lands under constructions were noted (Figures 2 to 4).

Based on the Google Maps of 2004, 2007 2015 and 2019, mixed residential and commercial type structures/developments extended further north and south areas of the Queen Street South (Figures 5 and 8).

3.3.2 Topography, Hydrology and Geology

A review of the Ontario Base Map (OBM) was conducted for the site and surrounding areas. Residential properties appear consistently within the area from Britannia Road West to the west to Canadian Pacific Railway (CPR) tracks to the east, with various commercial properties scattered in the area. Credit River locating in the north runs parallel and Mullet Creek locating in the south runs parallel to the road alignment. CPR tracks crossed the road alignment at the east end of the project area (Figure 9).

The local topography is considered as a rolling terrain with existing ground surface elevation varying approximately between 164 m (amsl) and 150 m (amsl), with topographic relief of approximately 14 m (Figure 9).

According to Chapman and Putnam (Physiography of Southern Ontario, Ministry of Natural Resources, 1984), the project area is in the physiographic region known as the South Slope bordered by Peel Plain to the north and Iroquois Plain to the south. The physiographic landforms in the area are defined as Till Moraines in the western portion and Till Plains (Drumlinized) in the eastern portion of the site.

The OGS Earth Map of Surficial Geology of Southern Ontario (Ontario Geological Survey, 2010), indicates that the project area lies on a region of clay to silt-textured till deposits, derived from glaciolacustrine deposits or shale.

The OGS Earth Map of Paleozoic Geology of Southern Ontario (Armstrong and Dodge, 2007), indicates that the bedrock geology at the project area comprises shale, limestone, dolostone and siltstone of Georgian Bay Formation of the Upper Ordovician Period.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about 150-300m south/southwest of the site. Both watercourses flow south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow southerly towards Mullet Creek and finally towards Credit River.

Previously, Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019. The soil stratigraphy reported on these reports is summarized below.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m to 5.5 m. The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 m thick compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock.

3.3.3 Fill Material

No fill piles were noticed along the alignment. However, engineered fill materials are expected to be present along the road alignment and adjacent developed sites/properties.

3.3.4 Water Bodies and Areas of Natural Significance

Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about 150-300m south/southwest of the site.

Based on the Ontario Ministry of Natural Resources and Forestry (MNRF), no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

4. INTERVIEW

During the course of this assessment, PML interviewed the following person on April 26, 2019, as outlined in Table 2 below:

TABLE 2

INTERVIEW SUMMARIZED INFORMATION

PLACE/ METHOD	PERSON INTERVIEWED	RATIONALE	INFORMATION PROVIDED
Husky gas station/ Meeting	Mr. Raza Shehzab, 371 Queen Street South	Retailer for last 7 years	1) The subject site was historically used for gasoline service station. Sunoco gasoline service station was located at the site. 2) Currently, the site is an operational Husky gasoline service station having USTs.

5. SITE RECONNAISSANCE

5.1 General

A site reconnaissance along Queen Street South was carried out by a Geoscientist (Mr. Shamsul Tarafder) of PML on April 26, 2019.

Selected site photographs were taken at the time of site reconnaissance which are shown on Plates 1 to 4. Drawing 1 shows the site and surrounding features, and potential source of contaminations (PSCs) along the road alignment as observed during the site reconnaissance.

5.2 The Site Observation

During the site reconnaissance, it was confirmed that the site is located along Queen Street South in the City of Mississauga, Ontario. The road section along Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east is about 2.1 km long. The subject site and vicinity are surrounded by mixed residential/parkland/institutional and commercial properties (Drawing 1).

At present, the site is double lane local roadways having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. During the site visit, normal operation of road like movement of vehicles was noticed.

Fill pile was not noticed along the alignment of Queen Street South. There were no unusual noise, odour and vibration noted. No unidentified substance was noted at the site. There was no water well noted on the site.

5.3 The Study Area Observation

A visual inspection of the study area (250 m on both sides of Queen Street South) was conducted from the limits of the road alignment and publicly accessible areas to check for potential source of contaminations (PSCs), water bodies and areas of natural significance (ANS).

The road alignment along Queen Street South is surrounded by mixed residential/parkland/ institutional and commercial properties. A Husky gasoline service station with underground storage tanks (USTs) is located at 371 Queen Street South and CPR tracks crossed the subject alignment at the east end of the project limit. L. A. Auto Repairs station is located at 5235 Mississauga Road, about 200 m east of the project limit within the study area (Drawing 1).

No Area of Natural Significance (ANSI) existed on the road alignment. Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about 150-300m south/southwest of the site.

6. REVIEW AND EVALUATION OF INFORMATION

6.1 Potential Source of Contamination (PSCs)

Based on the evaluation of the historical data and site reconnaissance, three (3) Potential Source Contaminations (PSCs) were identified on the adjacent properties to the road alignment.

The PSCs were related to a gasoline service station, Canadian Pacific Railway (CPR) tracks and an auto repair station.

The identified PSCs are listed in Table 3 below and shown on attached Drawing 1.

TABLE 3

POTENTIAL SOURCES OF CONTAMINATION (PSCs)
ON / IN / UNDER THE ROAD ALIGNMENT AND ADJACENT PROPERTIES

PSC No.	LOCATION	DESCRIPTION
1	371 Queen Street South	Husky gasoline service station
2	East end of the project limit	CPR tracks crossings
3	5235 Mississauga Road, about 200 m east of the project limit within the study	L. A. Auto Repairs (Abandoned)

6.2 Contaminants of Potential Concern (COPC)

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in gasoline service stations, auto repair stations and railway tracks, those are considered as COPC as well as background level check for the road alignment.

6.3 Conceptual Site Model (CSM)

A Conceptual Site Model (CSM) is presented to demonstrate the current site geoenvironmental conditions. The subject CSM has been prepared based on the site background information compiled to date and a site reconnaissance.

This CSM consists of Figures 1 to 9 and a plan showing Potential Source of Contaminations (PSCs) along the both sides of Queen Street South road alignment (Drawing 1), which depict the site conditions including surficial features, and present and past land uses in and around the alignment.

The subject site is a roadway alignment and consists of a part of Queen Street South as follows:

- Along Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east (About 2.1 km long, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early-1950s.

Currently, the road alignment along Queen Street South is surrounded by mixed residential/parkland/institutional and commercial properties. A Husky gasoline service station with underground storage tanks (USTs) is located at 371 Queen Street South and CPR tracks crossed the subject alignment at the east end of the project limit. L. A. Auto Repairs station is located at 5235 Mississauga Road, about 200 m east of the project limit within the study area (Drawing 1).

Based on the evaluation of the historical data and site reconnaissance, three (3) Potential Source of Contaminations (PSCs) were identified on the adjacent properties to the road alignment. The identified PSCs are listed in Section 6.1, Table 3, and shown on attached Drawing 1.

The PSCs were related to a gasoline service station, an auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in gasoline service stations, auto repair stations and railway tracks, those are considered as COPC as well as background level check for the road alignment.

Based on the Ontario Ministry of Natural Resources and Forestry, no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

According to Credit River Conservation Authority, the project area is located within the Credit River Watershed. Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about 150-300m south/southwest of the site. Both watercourses flow south-easterly.

The hydrogeology of the road alignment and the vicinity is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow southerly towards Mullet Creek and finally towards Credit River.

Since the assessment of PSCs were mostly theoretically based information, there was inherent uncertainty in the conceptual site model. These predictions were mostly based on the information available from database sources. If these predictions are incorrect, evaluation for PSCs could be missed. However, attempts were taken to minimize the uncertainties by field observations.

7. CONCLUSION

A Phase One ESA was conducted to assess the potential for contamination of the soil and ground water along Queen Street South between Britannia Road West to the west and Canadian Pacific Railway (CPR) tracks to the east (About 2.1 km long, Figure 1).

Within the project limit of Queen Street South Diversion potential source of contaminations (PSCs) were identified at the eastern portion of the road alignment as shown on Drawing 1.

Based on the evaluation of the historical data and site reconnaissance, three (3) Potential Source Contaminations (PSCs) were identified on the adjacent properties to the road alignment.

The PSCs were related to a gasoline service station, an auto repair station and railway tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Based on the Phase One ESA findings, it is understood that a soil and ground water sampling and chemical testing programs should be undertaken in some portions of Queen Street South in order to further assess the soils and ground water environmental quality along the alignment and to delineate potentially impacted areas for the remedial/clean-up measures, if required for the future development.

8. RECOMMENDATION

Based on the findings of Phase One ESA, geoenvironmental sampling and chemical testing programs of soil and ground water are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	Husky gasoline service station at 371 Queen Street South
2	Canadian Pacific Railway (CPR) tracks at the east end of the site
3	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road, about 200 m east of the project limit within the study area

9. STATEMENT OF LIMITATION

The assignment is subject to the Statement of Limitations that is included in Appendix C and must be read in conjunction with this report.

10. QUALIFICATION OF ENVIRONMENTAL CONSULTANT

PML was established in 1973 as a result of the merger of Peto Associates Ltd., founded in 1956, and the Ontario division of Racey MacCallum and Associates Limited, chartered in 1952. PML is a consulting engineering firm that specializes in the fields of geoenvironmental, hydrogeological and geotechnical engineering, building sciences, construction supervision/inspection and materials engineering/testing. Personnel in our four-branch offices form a network of full time dedicated environmental professionals.

The investigation and report preparation was conducted by Mr. Shamsul Tarafder, MSc. PhD., P.Geo. Mr. Tarafder is a Senior Geoscientist with over fifteen years of experience in geology, geophysics, physical and contaminant hydrology and hydrogeology, hydrogeochemistry and soil contamination chemistry. His experience includes soil and ground water investigations including Phase One and Two ESAs, aquifer characterization, groundwater exploration, soil and groundwater quality assessment, hydrogeological assessment, in-situ remediation of organic

contaminants involving LNAPLs and DNAPLs such as petroleum products, VOCs and semi-VOCs, PAHs, BTEX and ether compounds using advanced treatment technologies, and solute transport hybrid numerical and analytical modelling. He has completed hundreds of Phase One and Two ESAs for commercial, industrial, and residential properties. Mr. Tarafder is also author and co-author of a number of peer reviewed scientific articles.

This report was reviewed by Mahaboob Alam, MSc., PhD., P.Geo., a Professional Geoscientist registered with the Association of Professional Geoscientists of Ontario. Mr. Alam is a Director of the firm and Discipline Lead, Geoenvironmental and Hydrogeological services and is a Qualified Person (QP) registered with the MOECC. He has over 30 years of interdisciplinary professional experience specializing in geoenvironmental and hydrogeologic investigations and project management. His main areas of expertise include Phase One and Phase Two ESAs, site cleanup/remediation planning and supervision, waste management, UST and AST removals, site remediation, Risk Assessment, Records of site Condition and hydrogeologic investigations. He has completed hundreds of Phase One ESAs for commercial, industrial, and residential clients for a wide variety of project types (industrial complexes, commercial developments, entertainment and institutional buildings, and residential development).

11. REFERENCE

The following documents and data were referred to the Phase One ESA Report:

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
1	Aerial Photographs	1960, 1970, and 1975	City of Toronto Online Archives
2	Aerial Photographs	2004, 2007, 2015 and 2019	Google Earth
3	Ontario Base Map (OBM) Map 10 17 6100 48400, 10 17 6100 48450, 10 17 6150 48400, 10 17 6150 48450, 10 17 6150 48500 and 10 17 6200 48450	1982	OBM from PML files
4	The Physiography of Southern Ontario, 3rd Edition	1984	Chapman, L.J., and Putnam, D. F.

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
5	Bedrock Geology of Ontario, Map 2544	1991	Ministry of Northern Development and Mines
6	Quaternary Geology of Toronto and Surrounding Area, Map 2204	1980	Ministry of Natural Resources
7	Quaternary Geology of Ontario, Southern Sheet, Ontario Geological Survey, Map 2556, Scale 1:1,000,000	1991	Barnett, P.J., W.R. Cowan and A.P. Henry
8	Canadian Standards Association Standard Z768-01 Environmental Technology	2001 (Reaffirmed 2012)	Canadian Standards Association (CSA)
9	MOEE Waste Disposal Inventory	June 1991	MOEE Reference book
10	Inventory of Coal Gasification Plant Waste Sites in Ontario	April 1987	MOEE Reference book
11	Inventory of Industrial Sites Producing Coal or Using Coal Tar and Related Tars Sites in Ontario	November 1988	MOEE Reference book
12	Ontario Inventory of PCB Storage Sites	July 1993	MOEE Reference book
13	MECP Location of Small Landfill Sites	2019	http://www.ontario.ca/data/small-landfill-sites
14	MECP Location of Large Landfill Sites	2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites
15	National Pollutant Release Inventory	2019	http://www.ec.gc.ca/inrp-npri/
16	Might's and Criss Cross City Directories	Searched for the years 1935, 1939, 1945, 1950, 1955, 1960, 1970, 1975, 1980, 1985, 1990, 1999, 2008 and 2012	Might's and Criss Cross City Directories at the Toronto Reference Library
17	Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited	January 31, 2019	Peto MacCallum Ltd.
18	Make A Map: Natural Heritage Area	Current	Ontario Ministry of Natural Resources and Forestry

We trust this report is adequate for your present purposes. Should you have any questions or require further informations, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

PROFESSIONAL GEOSCIENTIST
S. A. Tarafder
SHAMSUL A. TARAFDER
PRACTISING MEMBER
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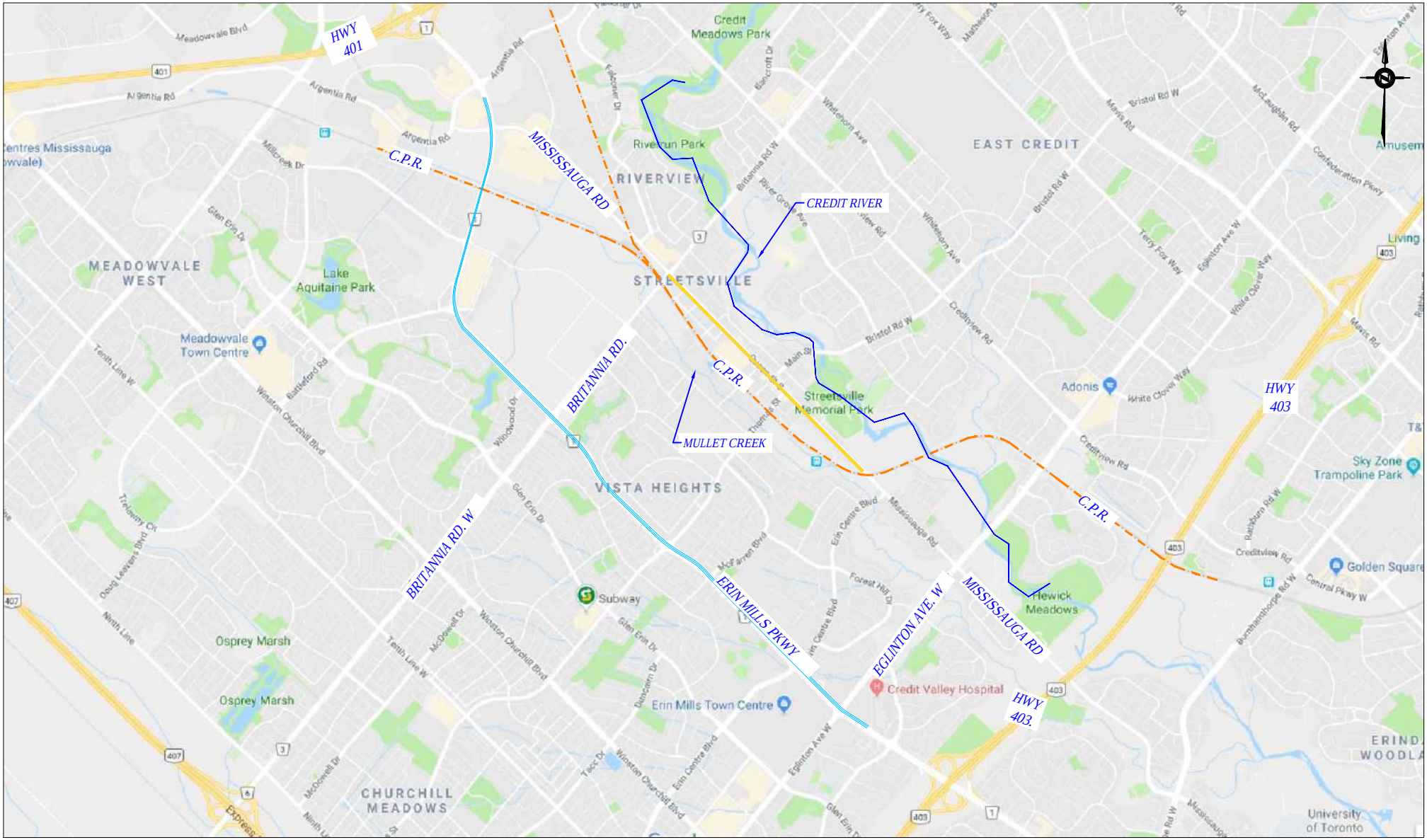
Mahaboob Alam, MSc, PhD, P.Geo.
Director
Discipline Lead, Geoenvironmental and Hydrogeological Services

ST/MA:st



REFERENCE:
THIS FIGURE WAS PREPARED FROM GOOGLE MAPS.

LEGEND:
- PROP. QUEEN ST. DIVERSION
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

KEY MAP

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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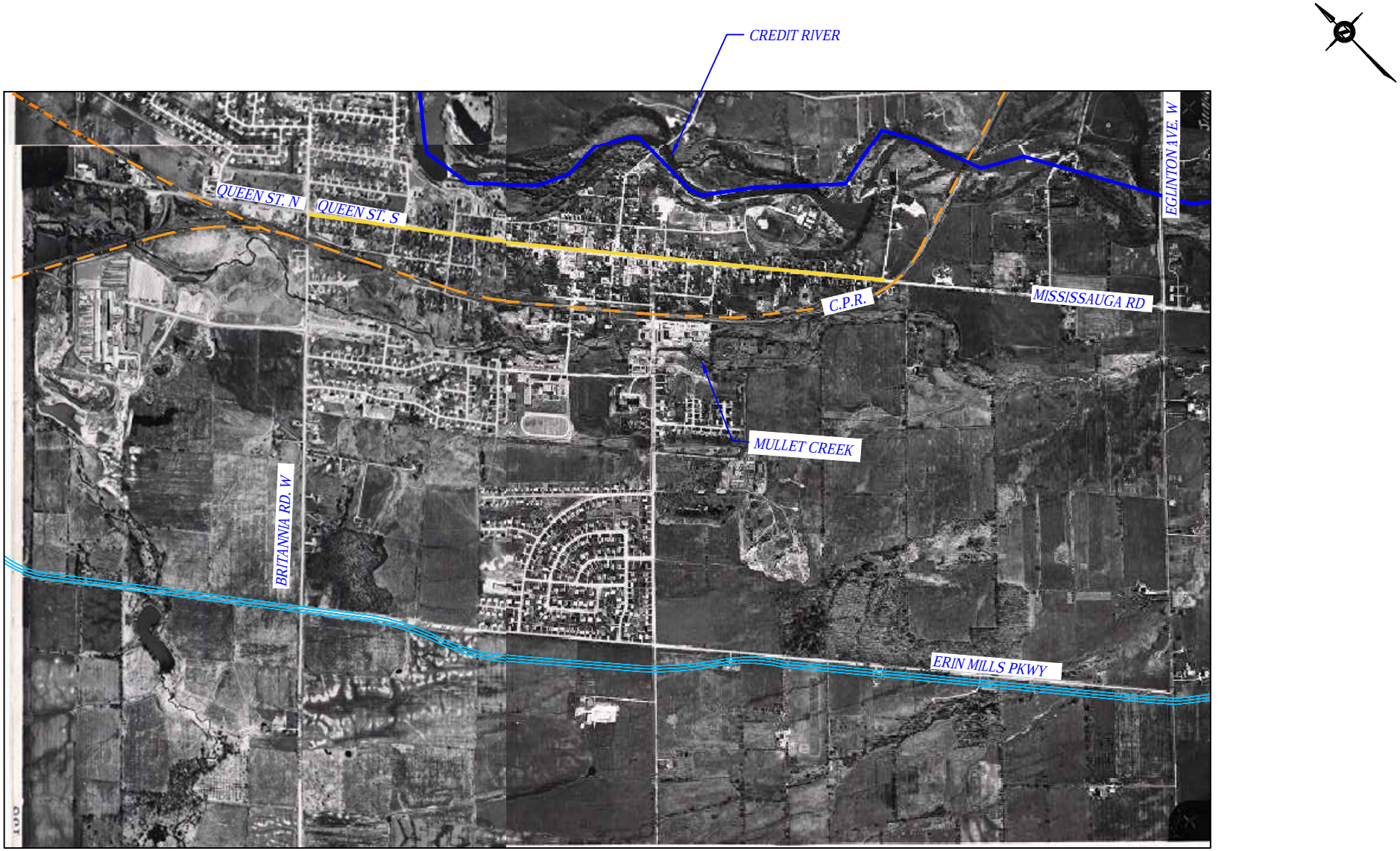
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1960, PLATE NO. 138, 139,116& 117.

LEGEND:

- PROP. QUEEN ST. DIVERSION
- C N RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1960 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

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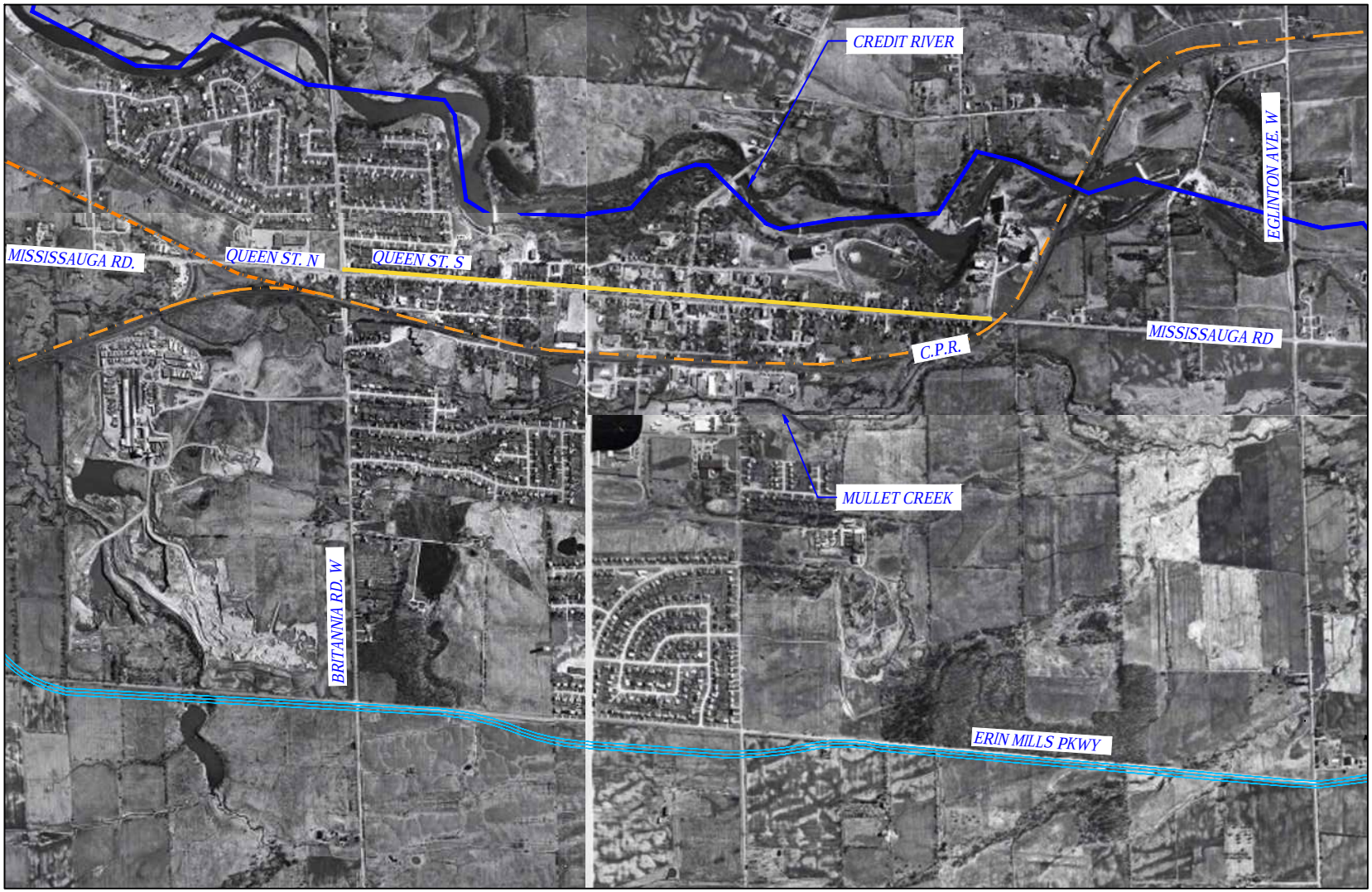
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1970, PLATE NO. 128, 127, 100& 99.

LEGEND:

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- C N RAILWAY
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REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1970 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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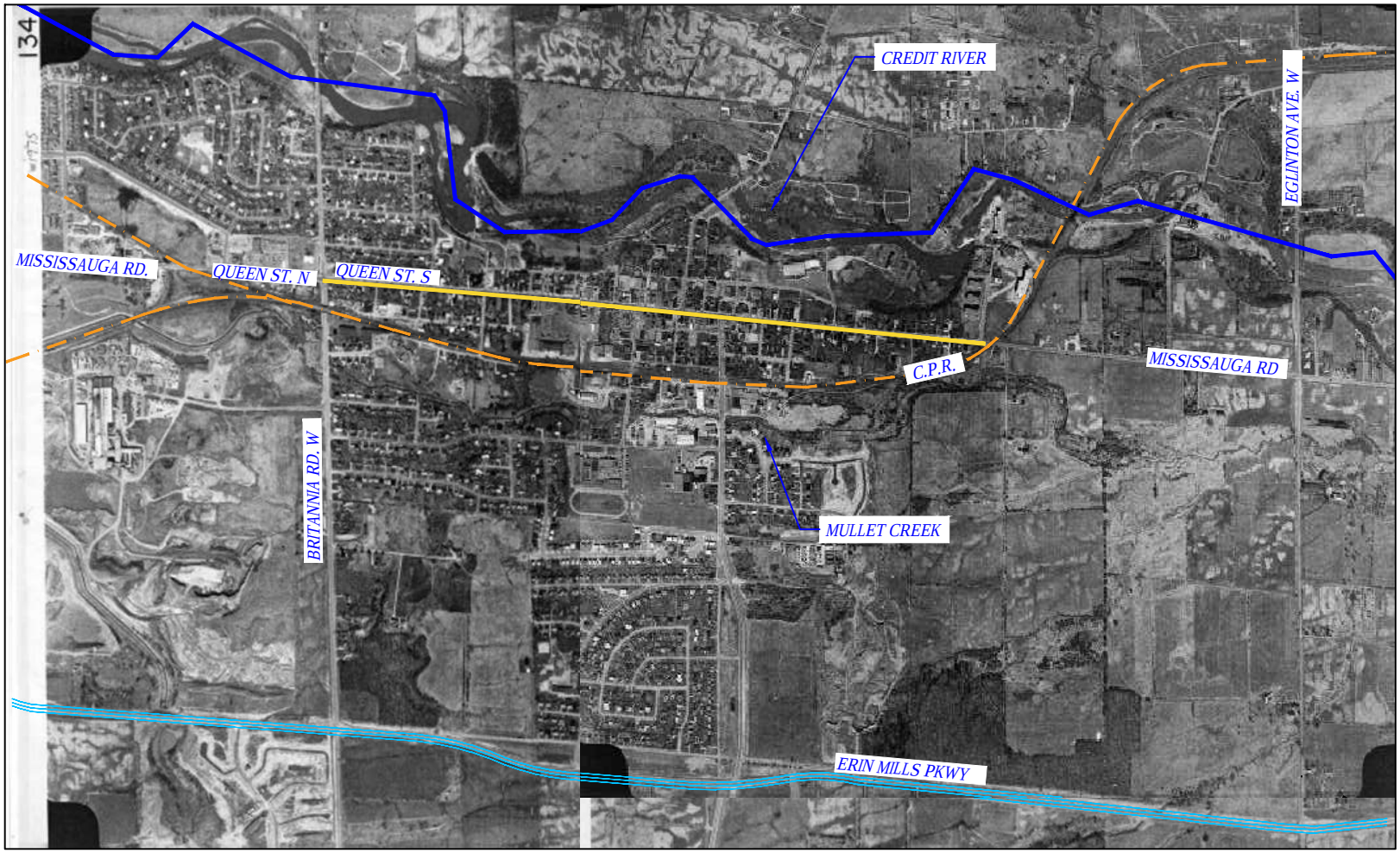
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1975, PLATE NO. 105, 106& 134.

LEGEND:
- PROP. QUEEN ST. DIVERSION
- C N RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1975 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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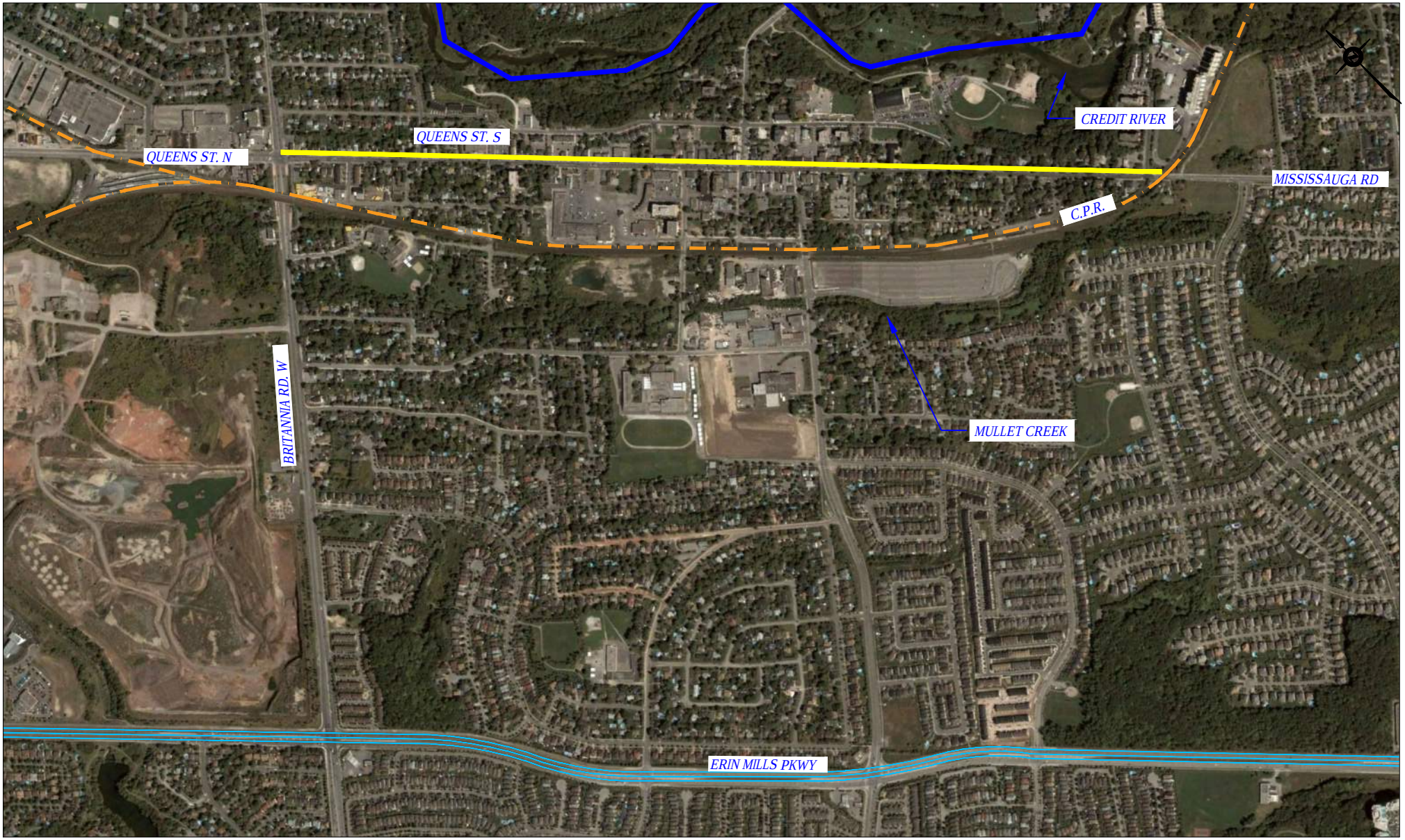

REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2004.

LEGEND:

- PROP. QUEEN ST. DIVERSION
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2004 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
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DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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APPROVED	M.A.				

REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2007.

LEGEND:

- PROP. QUEEN ST. DIVERSION
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- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2007 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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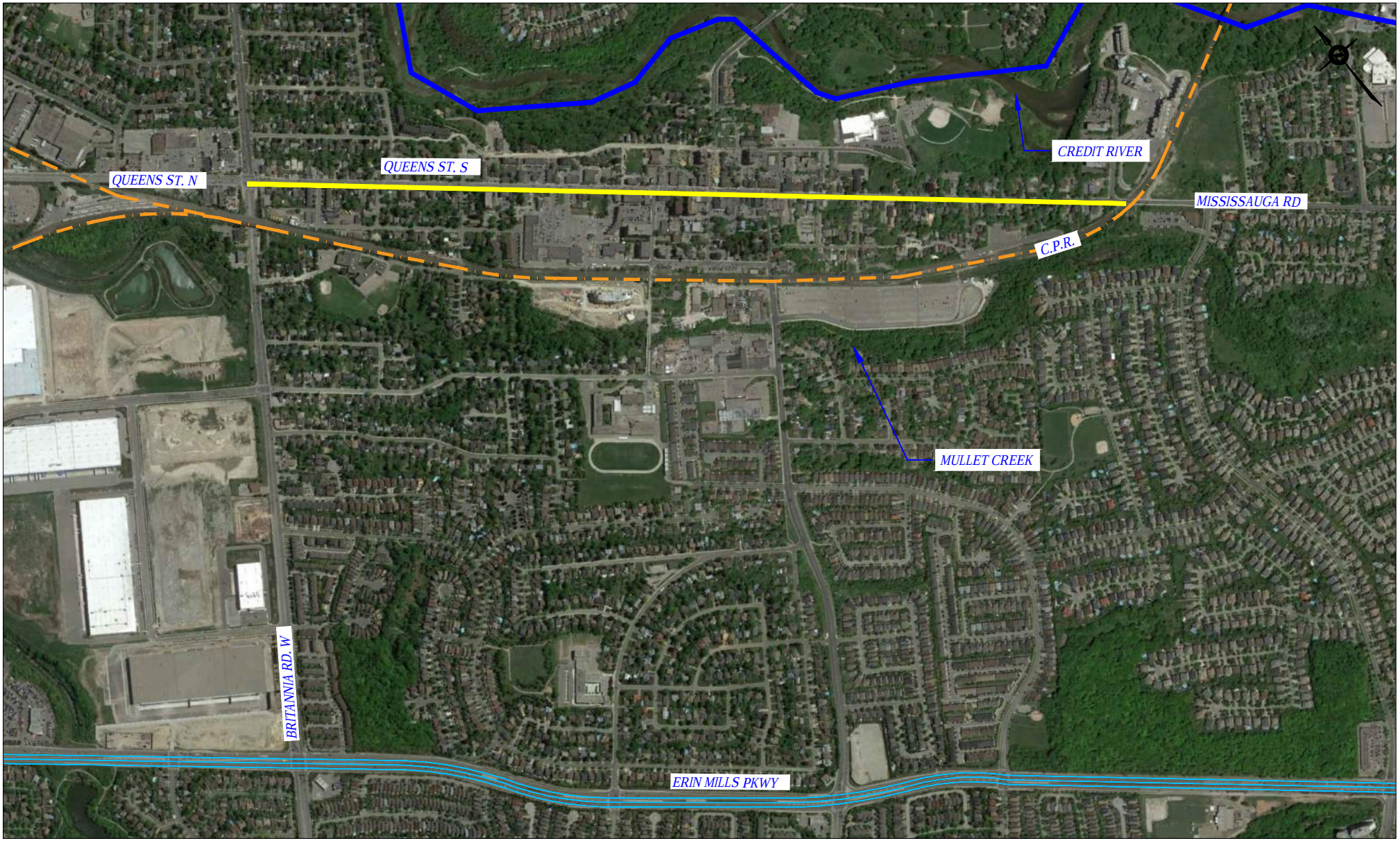
APPROVED	M.A.				



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LEGEND:

- PROP. QUEEN ST. DIVERSION
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2015 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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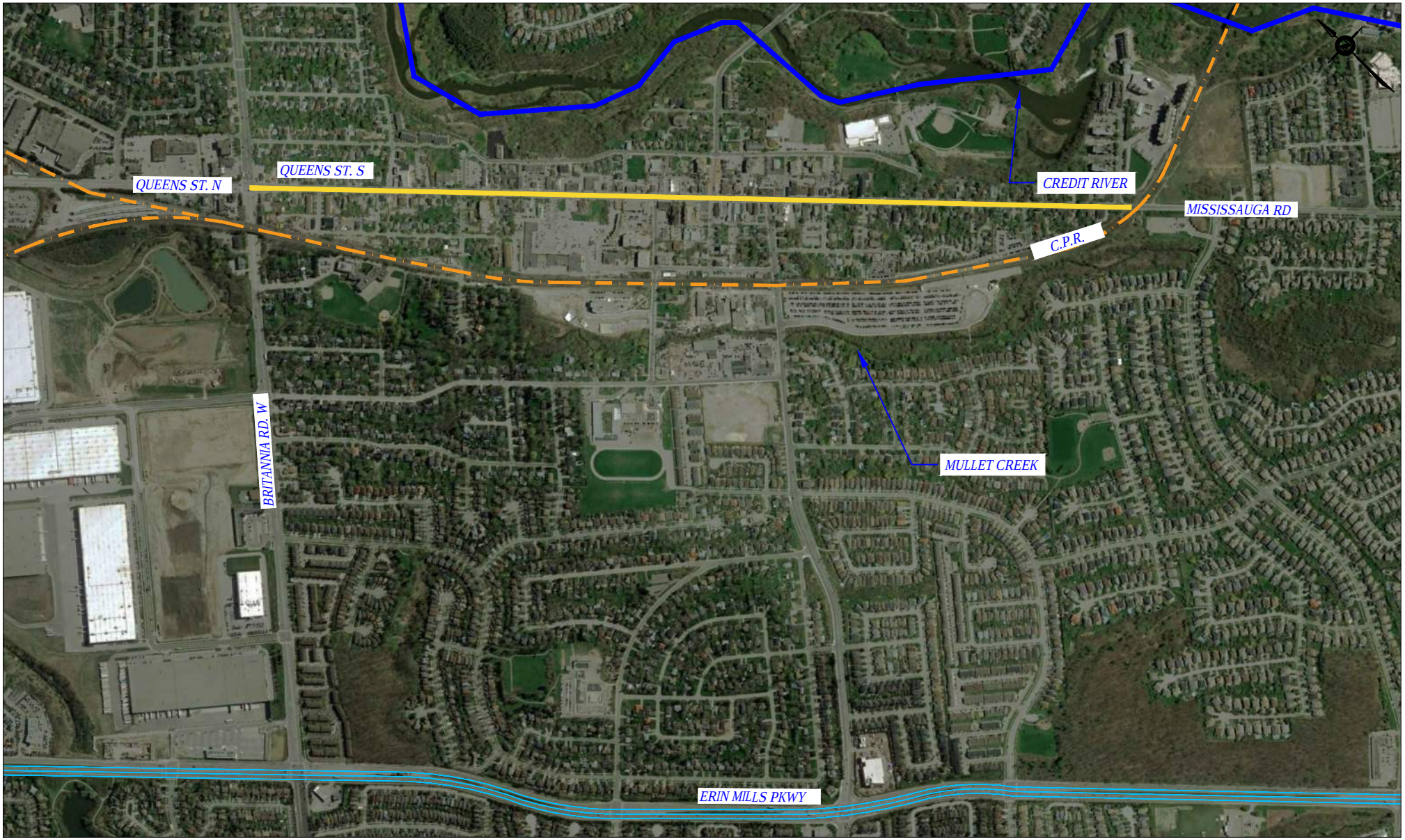

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LEGEND:

- PROP. QUEEN ST. DIVERSION
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2019 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	FIG. NO.
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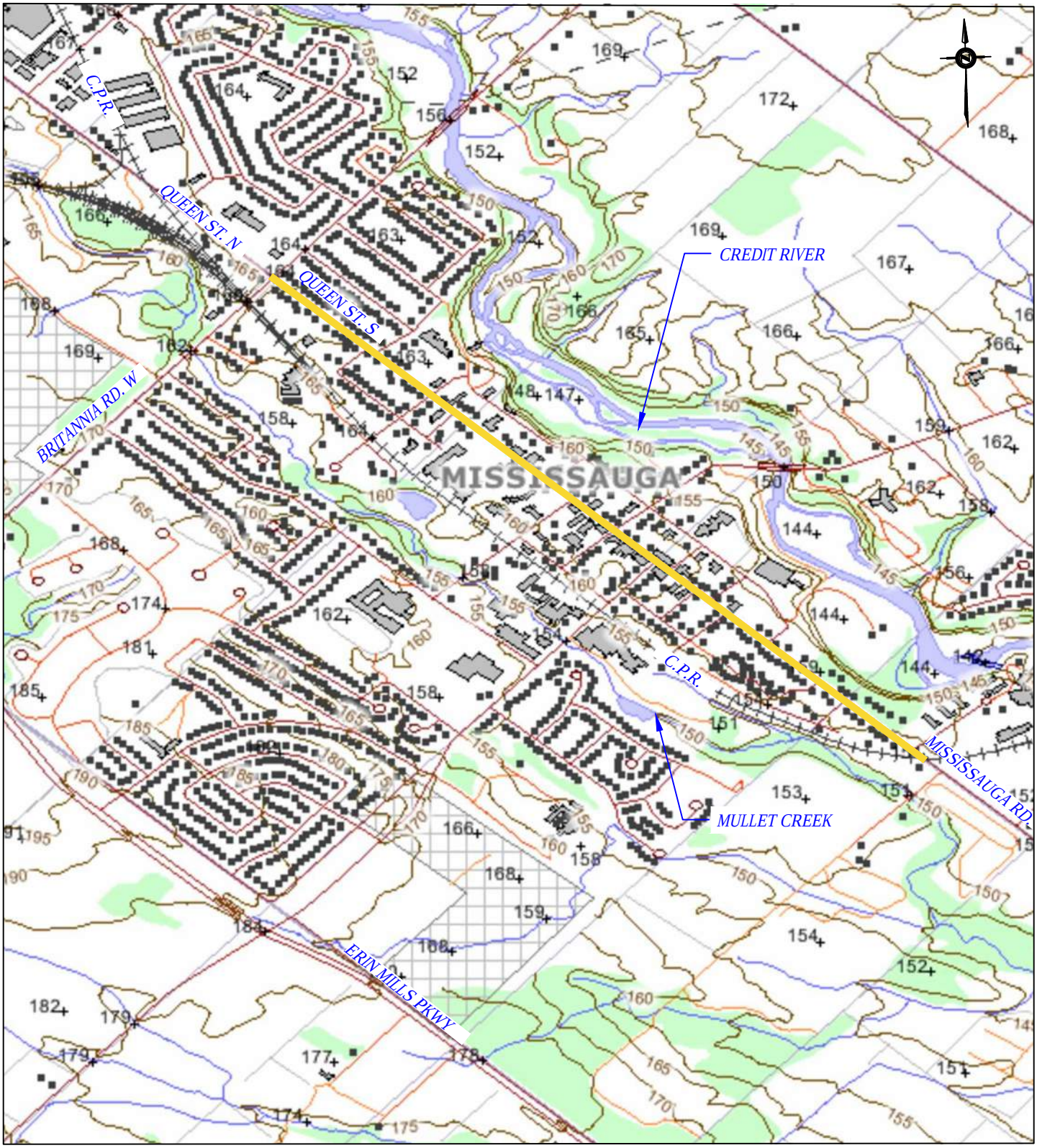
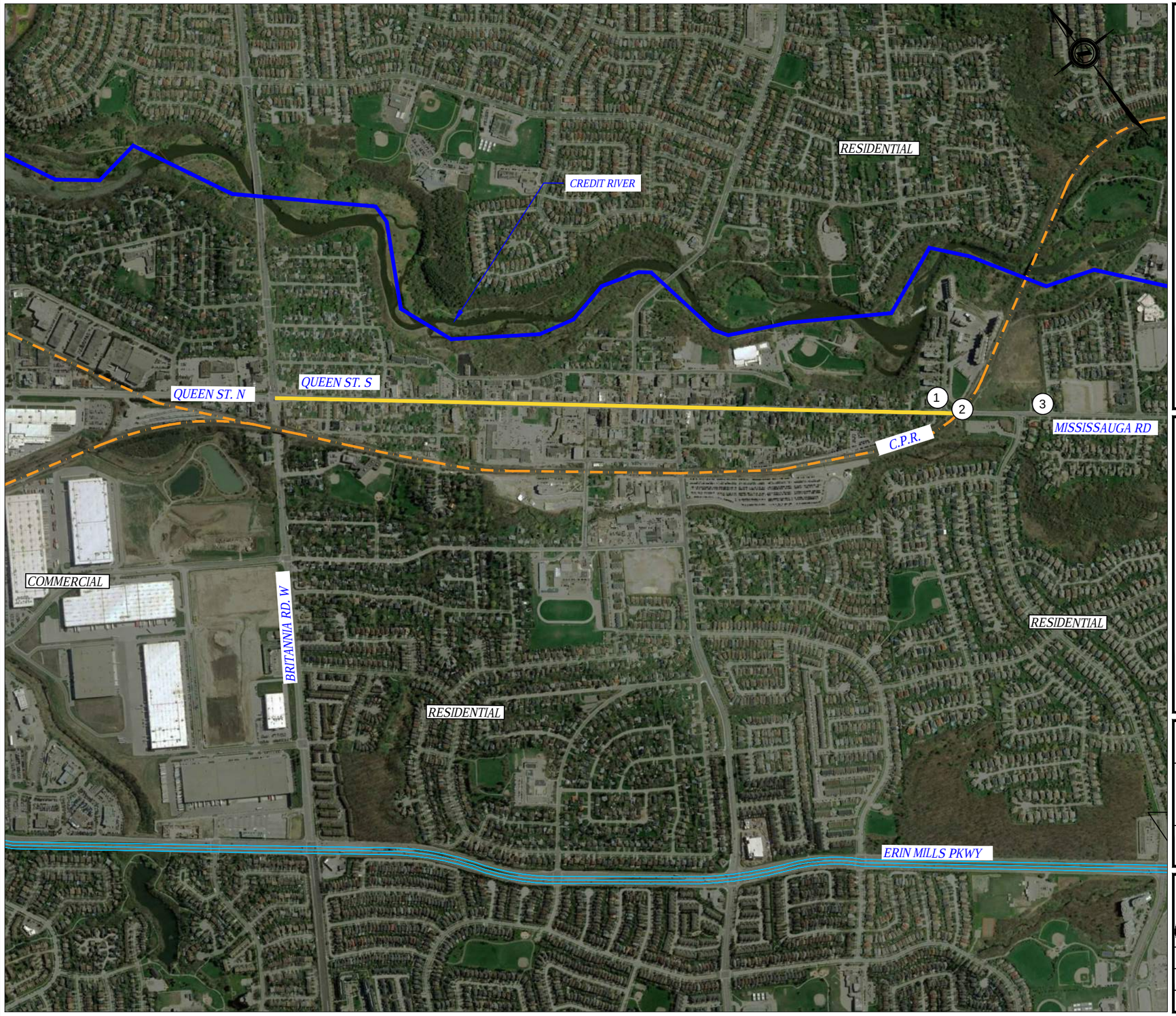


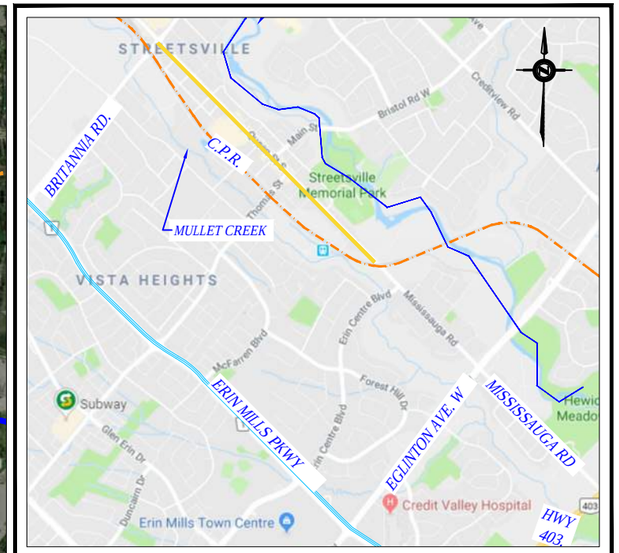
REFERENCE:
THIS FIGURE WAS PREPARED FROM OBM ONTARIO WEBSITE www.geographynetwork.ca.

LEGEND:

PROP. QUEEN ST. DIVERSION

REGIONAL MUNICIPALITY OF PEEL	Peto MacCallum Ltd. CONSULTING ENGINEERS					
PEEL WEST TRUNK DIVERSIONS, PROPOSED QUEEN ST. DIVERSION PHASE ONE ENVIRONMENTAL SITE ASSESSMENT MISSISSAUGA, ONTARIO	***DRAWN***	T.C.	***DATE***	***SCALE***	***PML REF.***	***FIG. NO.***
ONTARIO BASE MAP	***CHECKED***	S.T.	MAY 2019	1:12,500	18TX032-3	9
	APPROVED	M.A.				





KEY PLAN

TORONTO, ONTARIO

LEGEND:

- PROP. QUEEN ST. DIVERSION
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION
- (1) HUSKY GAS STATION
- (2) C. P. RAILWAY
- (3) L.A. AUTO REPAIR

REFERENCE:

THIS FIGURE WAS PRODUCED FROM GOOGLE MAPS, IMAGERY DATE MAY 7, 2018.

REGIONAL MUNICIPALITY OF PEEL

PEEL WEST TRUNK DIVERSIONS
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

SITE AND SURROUNDING AREA FEATURES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	T.C.	DATE	SCALE	PML REF.	DWG. NO.
CHECKED	S.T.	MAR. 2019	1:12,500	18TX032-3	1
APPROVED	M.A.				

Plate 1: The site at Queen Street South and Britannia Road West intersection.

Plate 2: Husky gasoline service station at 371 Queen Street South.

Plate 3: CPR tracks and Queen Street South intersection at the site east end.

Plate 4: L. A. Auto Repairs (abandoned) at 5235 Mississauga Road.

APPENDIX A

MECP Well Record Summary

MECP WELL RECORD SUMMARY

Proposed Queen Street Diversion

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	603005	4827068	W	2017/09 6946						7295290 (C33353) A203398 P	
17	603786	4825912	W	2017/07 7215						7294563 (C38915) A230107 P	
17	603754	4825994	W	2017/01 7215						7284560 (C35200) A212567 P	
17	603155	4826776	W	2016/12 7241	2			MT	0014 10	7280173 (Z250944) A203493 A	
17	603158	4826753	W	2016/12 7241	2			MT	0016 11	7280172 (Z250943) A	
17	603165	4826753	W	2016/12 7241	2			MT	0017 10	7280171 (Z250942) A	
17	603159	4826786	W	2016/12 7241	2			MT	0017 10	7280174 (Z250940) A	
17	603127	4826746	W	2016/12 7241	2			MT	0017 10	7280170 (Z250941) A	
17	603429	4826673	W	2016/06 7147	3.53	UT 0015				7267910 (Z228004) A	
17	603647	4825772	W	2016/05 6607	2			MO	0009 8	7263882 (Z223854) A196654	GREY CLAY SILT DNSE 0005 BRWN CLAY SILT DNSE 0013 GREY CLAY SILT DNSE 0016
17	603633	4825780	W	2016/05 6607	2			MO	0009 8	7263881 (Z223853) A192915	GREY CLAY SILT DNSE 0005 BRWN CLAY SILT DNSE 0013 GREY CLAY SILT DNSE 0017
17	603619	4825813	W	2016/05 6607	2			MO	0008 10	7263880 (Z223852) A201580	GREY CLAY SILT DNSE 0002 BRWN CLAY SILT DNSE 0012 GREY CLAY SILT DNSE 0018
17	603515	4825781	W	2016/05 6607	2			MO	0007 10	7263879 (Z223851) A196752	BRWN CLAY SILT DNSE 0003 GREY CLAY SILT DNSE 0017
17	603587	4825765	W	2016/05 6607	2			MO	0007 10	7263878 (Z223850) A201558	BRWN CLAY SILT DNSE 0010 GREY CLAY SILT DNSE 0017
17	604752	4825603	W	2016/01 7147	0.93 5					7257464 (Z218319) A	
17	604002	4825291	W	2015/11 7421	1.97			MO	0007 5	7254694 (Z163543) A103803	BRWN CLAY SLTY SAND 0012
17	604647	4825518	W	2015/09 7320						7249688 (Z212740) A186039 A	
17	604805	4825633	W	2015/09 7320						7249690 (Z214206) A186043 A	
17	604807	4825708	W	2015/09 7320						7249686 (Z214205) A186042 A	
17	604647	4825518	W	2015/06 7320	2	UT 0018		TH	0017 5	7244090 (Z212669) A186093	BRWN CLAY GRVL SOFT 0002 BRWN CLAY SILT DNSE 0017 GREY SHLE 0021
17	604805	4825633	W	2015/06 7320	2	UT 0015		TH	0011 5	7244091 (Z212671) A186043	BRWN CLAY GRVL SOFT 0005 BRWN CLAY SILT DNSE 0012 GREY SHLE 0016
17	604807	4825708	W	2015/06 7320	2	UT 0015		TH	0014 5	7244093 (Z212667) A186042	BRWN SAND CLAY FILL 0005 BRWN CLAY SOFT 0016 GREY SHLE 0019
17	603668	4826339	W	2015/05 7147						7243495 (C28767) A161859 P	
17	603995	4825949	W	2015/05 7147	47.2	FR 0001				7242253 (Z203296) A	
17	603744	4826389	W	2015/03 7424						7239271 (Z184865) A167881 A	
17	603612	4825804	W	2015/01 7215						7239357 (C27828) A176995 P	
17	603603	4825723	W	2015/01 7215						7239356 (C27822) A178737 P	
17	603478	4825902	W	2014/12 7147						7234423 (C26960) A153727 P	
17	603725	4826391	W	2014/10 7215						7232605 (C26232) A169143 P	
17	604064	4826341	W	2014/09 7230						7239184 (C28136) A170970 P	
17	604066	4825770	W	2014/07 7472						7224897 (Z192708) A	
17	604110	4825757	W	2014/07 7472						7224895 (Z192709) A157286 A	
17	604089	4825811	W	2014/06 7472						7224931 (Z192726) A163059 A	
17	603733	4826348	W	2014/06 7241	2			MT	0015 10	7224388 (Z191927) A166997	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	603744	4826388	W	2014/06 7241	2			MT	0013 10	7224392 (Z191926) A166894	BRWN SILT CLAY 0015 GREY SILT CLAY 0023
17	603749	4826362	W	2014/06 7241	2			MT	0015 10	7224393 (Z191928) A166895	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	603704	4826371	W	2014/06 7241	2			MT	0015 10	7224389 (Z191929) A167881	BRWN SILT CLAY 0015 GREY SILT CLAY 0025
17	604069	4825587	W	2014/04 7241	2			MT	0007 10	7221009 (Z186952) A163059	BRWN FILL 0002 BRWN SAND SILT 0011 GREY SAND SILT 0017
17	604069	4825504	W	2014/04 6607						7220655 (C23888) A157286 P	
17	603667	4826335	W	2014/03 7230						7219848 (C25589) A161859 P	
17	603624	4825680	W	2014/03 7147						7217882 (C25011) A149705 P	
17	603683	4826028	W	2014/02 7241	2			MT	0014 10	7217447 (Z185550) A160738	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY ROCK 0024
17	603673	4826035	W	2014/02 7241	2			MT	0018 10	7217446 (Z185551) A160739	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0028
17	603664	4826074	W	2014/02 7241	2			MT	0015 10	7217445 (Z185549) A160740	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0025
17	603693	4826034	W	2014/02 7241	2			MT	0015 10	7217448 (Z185552) A160737	BRWN SAND GRVL FILL 0006 BRWN SILT SAND 0015 GREY SILT CLAY 0025
17	603497	4825918	W	2013/12 7230						7218669 (C25331) A153727 P	
17	603469	4826260	W	2013/10 7215						7211531 (C23496) A142339 P	
17	603468	4826255	W	2013/06 7215						7207319 (C22812) A145101 P	
17	603928	4826153	W	2013/05 7501	1			MO	0010 5	7203857 (Z165107) A143187	BRWN SILT GRVL HARD 0004 GREY SILT CLAY GRVL 0015
17	603484	4826173	W	2013/05 7215						7207903 (C22779) A142339 P	
17	603478	4826165	W	2013/05 7215						7207318 (C21947) A144993 P	
17	603487	4826202	W	2013/02 7215						7211401 (C21150) A145015 P	
17	602992	4826444	W	2012/11 7147	35.4	FR 0010				7191717 (Z142289) A	
17	604086	4825777	W	2012/09 7241	2			MT	0008 10	7189898 (Z158465) A120887	BRWN SAND FILL 0005 BRWN SILT 0014 GREY SILT 0018
17	604605	4825626	W	2012/06 6032	1.79			MO	0005 10	7185305 (Z131689) A116361	BLCK SAND GRVL LOOS 0002 BRWN SILT SAND PCKD 0009 GREY SILT GRVL DNSE 0015
17	603646	4826120	W	2011/12 7241	1			MT	0004 2	7174624 (Z143396) A126511	GREY GRVL 0000 BRWN CLAY SILT 0006
17	603656	4826133	W	2011/12 7241	1.25			MT	0005 10	7174622 (Z143397) A123805	BRWN FILL LOAM 0005 BRWN CLAY SILT 0010 GREY CLAY SILT 0015
17	603600	4826100	W	2011/12 7241	1			MT	0004 2	7174623 (Z143395) A126488	GREY GRVL 0000 BRWN CLAY SILT 0006
17	603868	4826277	W	2011/11 7147	1.5	FR 0017			0010 10	7172234 (Z142159) A107746 A	
17	603896	4826301	W	2011/11 7147	1.5	FR 0017			0010 10	7172235 (Z124652) A107750 A	
17	603882	4826316	W	2011/11 7147	1.5	FR 0017			0010 10	7172237 (Z124650) A	

MECP WELL RECORD SUMMARY

Proposed Queen Street Diversion

Summarized well records of wells within UTM Easting +/- 250 m and UTM Northing +/- 250 m of alignment

UTM ZONE	UTM EASTING	UTM NORTHING	LOT	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL IDENTIFICATION	FORMATION
17	603800	4826324	W	2011/11 7147	3.79	FR 0005			0003 3	7172236 (Z124649) A	
17	603896	4826301	W	2011/11 7147	1.5	FR 0017			0010 10	7172238 (Z124651) A	
17	603801	4826309	W	2010/08 7241	1.5			MT	0010 10	7151892 (Z121886) A096547	BRWN SAND SILT DNSE 0015 GREY CLAY SILT DNSE 0020
17	603911	4826234	W	2010/08 7241	1.5			MT	0010 10	7151894 (Z121891) A103034	BRWN SAND SILT DNSE 0015 GREY CLAY SILT 0020
17	603905	4826263	W	2010/08 7241	1.5			MT	0010 10	7151891 (Z121887) A107750	BRWN SAND SILT DNSE 0015 GREY CLAY SILT DNSE 0020
17	603873	4826269	W	2010/08 7241	1.5			MT	0010 10	7151893 (Z121885) A107746	BRWN SAND SILT DNSE 0015 GREY CLAY SILT DNSE 0020
17	603867	4826316	W	2010/08 7241	1.5			MT	0010 10	7151890 (Z121888) A107749	BRWN SAND SILT DNSE 0015 GREY CLAY SILT DNSE 0020
17	603640	4825640	W	2010/02 7247	2			MO	0010 10	7162891 (Z109765) A095114	BRWN SILT FILL SNDY 0010 BRWN SILT CLAY DNSE 0020
17	604614	4825543	W	2009/09 7215	2			TH	0010 10	7132903 (Z104616) A090814	BRWN FILL WBRG 0004 BRWN CLAY DRY 0012 BRWN CLAY WBRG 0016 GREY SHLE DRY 0020
17	604161	4826303	W	2009/04 3349	0.47					7129342 (Z88408) A	
17	603564	4826669	W	2009/03 7215						7121844 (Z096334) A056425 A	
17	604400	4825598	W	2008/11 7247	2			MO	0010 10	7122385 (Z93981) A066719	BLCK 0000 BRWN FILL SAND GRVL 0000 BRWN CLAY TILL SLTY 0015 GREY SHLE LMSN LYRD 0020
17	603564	4826657	W	2007/10 7147	1.97			NU		7051510 (Z65769) A056425	BRWN FILL 0001 BRWN SAND 0003 BRWN CLAY 0014
17	604057	4826399	W	2006/11 7238	1.97	13		NU	0009 10	4910360 (Z50647) A045283	BLCK LOAM 0002 BRWN CLAY SILT 0007 GREY SHLE LMSN 0019
17	602902	4826805	W	2006/11 6607	0.75	0			0015 5	7040781 (Z56649) A046431	BRWN FILL 0002 GREY CLAY SILT HARD 0020
17	603560	4825949	W	2005/02 7230	1.97			NU	0009 5	4909697 (Z25171) A024778	BRWN FILL 0002 BRWN SILT CLAY SAND 0009 GREY SILT SAND GRVL 0015 GREY SHLE HARD 0016
17	603569	4825806	W	2004/07 6607						4909511 (Z15858) A	
17	604206	4826802	L	1998/06 9999				NU		4908379 (198816) A	
17	604095	4826388	W	1967/11 1612	5	SA 0059	20/52/1/3:0	DO		4902144 ()	PRDG 0022 BLUE SHLE 0064
17	603555	4826133	W	1963/09 3513	8 8	SA 0080	18/125/2/8:0	CO		4902143 ()	LOAM 0001 CLAY STNS 0035 BLUE SHLE 0125
17	604755	4825952	W	1953/03 1429	6 6	FR 0062	12/50/2/3:0	DO		4902646 ()	MSND 0007 BLUE CLAY 0018 BLUE SHLE 0063
17	602922	4826165	L	1952/05 4501	4 4	)50 FR 0055 FR (	4/16/5/0:30	DO		4902677 ()	CLAY 0005 RED SHLE 0057 LMSN 0060
17	604385	4826318	W	1948/08 2613	6	FR 0007	7/32/3/1:0	PS		4902142 ()	PRDG 0012 BLUE SHLE 0032
17	603677	4826344	W	7147						7267036 (C32446) A198588 P	
17	603994	4826121	W	7147						7287634 (C37207) A198626 P	
17	603564	4825786	W	7147						7273991 (C34042) A178737 P	

MECP WELL RECORD TABLE ABBREVIATIONS AND DESCRIPTIONS

Header Descriptions

ABBREVIATION	DESCRIPTION
UTM	UTM in Zone, Easting, Northing and Datum is NAD83
LOT	UTM estimated from Centroid of Lot
W	UTM not from Lot Centroid
DATE CNTR	Date Work Completed and Well Contractor Licence Number
CASING DIA	Casing diameter in inches
WATER	Unit of Depth in Feet. See below for Meaning of Code
PUMP TEST	Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour:Minutes
WELL USE	See below for Meaning of Code
SCREEN	Screen Depth and Length in feet
WELL	Well ID, AUDIT #, Well Tag, A for abandonment; P for Partial Data Entry Only
FORMATION	See below for Meaning of Code

Meaning of Core Material and Descriptive Terms

ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION	ABBV	DESCRIPTION
CLN	CLEAN	FILL	FILL	MARL	MARL	SILT	SILT
DRY	DRY	FLDS	FELDSPAR	MGRD	MEDIUM-GRAINED	SLTE	SLATE
QTZ	QUARTZ	FLNT	FLINT	MGVL	MEDIUM GRAVEL	SLTY	SILTY
BLDR	BOULDERS	FOSS	FOSILIFEROUS	MRBL	MARBLE	SNDS	SANDSTONE
BSLT	BASALT	FSND	FINE SAND	MSND	MEDIUM SAND	SNDY	SAN DY
CGRD	COARSE-GRAINED	GNIS	GNEISS	MUCK	MUCK	SOFT	SOFT
CGVL	COARSE GRAVEL	GRNT	GRANITE	OBDN	OVERBURDEN	SPST	SOAPSTONE
CHRT	CHERT	GRSN	GREENSTONE	PCKD	PACKED	STKY	STICKY
CLAY	CLAY	GRVL	GRAVEL	PEAT	PEAT	STNS	STONES
CLYY	CLAYEY	GRWK	GREYWACKE	PGVL	PEA GRAVEL	STNY	STONEY
CMTD	CEMENTED	GVLY	GRAVELLY	PORS	POROUS	THIK	THICK
CONG	CONGLOMERATE	GYPS	GYPSUM	PRDG	PREVIOUSLY DUG	THIN	THIN
CRYS	CRYSTALLINE	HARD	HARD	PRDR	PREV. DRILLED	TILL	TILL
CSND	COARSE SAND	HPAN	HARDPAN	QRTZ	QUARTZITE	UNKN	UNKNOWN TYPE
DKCL	DARK-COLOURED	IRFM	IRON FORMATION	QSND	QUICKSAND	VERY	VERY
DLMT	DOLOMITE	LIMY	LIMY	ROCK	ROCK	WBRG	WATER-BEARING
DNSE	DENSE	LMSN	LIMESTONE	SAND	SAND	WDFR	WOOD FRAGMENTS
DRTY	DIRTY	LOAM	TOPSOIL	SHLE	SHALE	WTHD	WEATHERED
FCRD	FRACTURED	LOOS	LOOSE	SHLY	SHALY		
FGRD	FINE-GRAINED	LTCL	LIGHT-COLOURED	SHRP	SHARP		
FGVL	FINE GRAVEL	LYRD	LAYERED	SHST	SCHIST		

Core Color

ABBV	DESCRIPTION
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLC K	BLACK
BLGY	BLUE-GREY

Well Use

ABBV	DESCRIPTION
DO	Domestic
ST	Livestock
IR	Irrigation
IN	Industrial
CO	Commercial
MN	Municipal
PS	Public
AC	Cooling And AC
NU	Not Used
OT	Other
TH	Test Hole
DE	Dewatering
MO	Monitoring
MT	Monitoring and Test Hole

Water Kind

ABBV	DESCRIPTION
FR	Fresh
SA	Salty
SU	Sulphur
MN	Minerial
UK	Not Stated
GS	Gas
IR	Iron
UT	Untested
OT	Other

Appendix B

Opta Information Intelligence Report

INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

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www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel Region, Ontario Criss Cross Directory

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 2000	
Site Listing:	-Nabisco Milling Company -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-City West Towing -Credit Mills Auto center Ltd

6553 Mississauga Road	-Ashmeade Insurance Brokers Ltd -Knapp & Associates Design Inc
371 Queen Street South	-Sunoco Inc; Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1994	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc -In Harmony Resources Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-National Propane Service
6553 Mississauga Road	-King Adjusters Ltd

	-RR Enterprises Ltd -Schering Canada Inc -Res (3 Tenants)
371 Queen Street South	-Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1989	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Tartan Color & Chemical Inc

	-Schering Canada Inc
371 Queen Street South	-Suncorp Inc

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1983	
Site Listing:	-Reid Milling Div of Christie Brown & Co Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (Street)	-Johnny's Auto Center
6553 Mississauga Road (Street)	-Eraco International Trading Inc -Erin Realty Inc -McCullough Lisa-Barr -Schering Canada Inc

371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-SMS Petroleum

PROJECT NUMBER: 60629	

Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Res (4 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1966	
Site Listing:	-Reid Milling Ltd

Adjacent Properties:	
24 Reid Drive	-Res (3 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
24 Reid Drive	-Address Not Listed

2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

*****27 Reid Drive, Mississauga, Ontario is last listed in 1965 within the City Directory Archives*****

APPENDIX C

Technical Standards and Safety Authority (TSSA) Responses

From: Public Information Services
To: Shamsul Tarafder
Subject: RE: TSSA registered Sites / PML"s Project Number 18TX032
Date: Friday, May 10, 2019 2:18:24 PM
Attachments: image004.png
image005.png
image006.png
image007.png

Records Found
Hello,
Thank you for your request for confirmation of public information.

- We confirm that there are **fuel storage tanks records** in our database at the subject address(es).

Inst Number	Segment1	Address	City	Status
64508516	FS CYLINDER EXCHANGE	371 QUEEN ST SOUTH	MISSISSAUGA	Active
9825517	FS GASOLINE STATION - SELF SERVE	371 QUEEN ST SOUTH	MISSISSAUGA	Active
30287903	FS GASOLINE STATION - SELF SERVE	371 QUEEN ST S	MISSISSAUGA	EXPIRED
10859643	FS LIQUID FUEL TANK	371 QUEEN ST S	MISSISSAUGA	EXPIRED
10859659	FS LIQUID FUEL TANK	371 QUEEN ST S	MISSISSAUGA	EXPIRED
10859676	FS LIQUID FUEL TANK	371 QUEEN ST S	MISSISSAUGA	EXPIRED
10859691	FS LIQUID FUEL TANK	371 QUEEN ST S	MISSISSAUGA	EXPIRED
10859706	FS LIQUID FUEL TANK	371 QUEEN ST SOUTH	MISSISSAUGA	Active
10859709	FS LIQUID FUEL TANK	371 QUEEN ST SOUTH	MISSISSAUGA	Active
10859715	FS LIQUID FUEL TANK	371 QUEEN ST SOUTH	MISSISSAUGA	Active

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.
Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.
Kind regards,

Connie Hill | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3383 | Fax: +1-416-231-6183 | E-Mail: publicinformationservices@tssa.org
www.tssa.org

From: Shamsul Tarafder <starafder@petomaccallum.com>
Sent: May 10, 2019 11:18 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: TSSA registered Sites / PML's Project Number 18TX032

Good Morning,

Please advise if you have any registered site at the following addresses:

371 Queen Street South, Mississauga, ON, and

5235 Mississauga Road, Mississauga, ON

Best Regards
Shamsul

Shamsul A. Tarafder, MSc, PhD, MEnvSc, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (416) 521-5567
starafder@petomaccallum.com

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APPENDIX D

Statement of Limitations

STATEMENT OF LIMITATIONS

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The report is based solely on the scope of services which are specifically referred to in this report. No physical or intrusive testing has been performed, except as specifically referenced in this report. This report is not a certification of compliance with past or present regulations, codes, guidelines and policies.

The scope of services carried out by PML is based on details of the proposed development and land use to address certain issues, purposes and objectives with respect to the specific site as identified by the client. Services not expressly set forth in writing are expressly excluded from the services provided by PML. In other words, PML has not performed any observations, investigations, study analysis, engineering evaluation or testing that is not specifically listed in the scope of services in this report. PML assumes no responsibility or duty to the client for any such services and shall not be liable for failing to discover any condition, whose discovery would require the performance of services not specifically referred to in this report.

The findings and comments made by PML in this report are based on the conditions observed at the time of PML's site reconnaissance. No assurances can be made and no assurances are given with respect to any potential changes in site conditions following the time of completion of PML's field work. Furthermore, regulations, codes and guidelines may change at any time

subsequent to the date of this report and these changes may affect the validity of the findings and recommendations given in this report.

The results and conclusions with respect to site conditions are therefore in no way intended to be taken as a guarantee or representation, expressed or implied, that the site is free from any contaminants from past or current land use activities or that the conditions in all areas of the site and beneath or within structures are the same as those areas specifically sampled.

Any investigation, examination, measurements or sampling explorations at a particular location may not be representative of conditions between sampled locations. Soil, groundwater, surface water, or building material conditions between and beyond the sampled locations may differ from those encountered at the sampling locations and conditions may become apparent during construction which could not be detected or anticipated at the time of the intrusive sampling investigation.

Budget estimates contained in this report are to be viewed as an engineering estimate of probable costs and provided solely for the purposes of assisting the client in its budgeting process. It is understood and agreed that PML will not in any way be held liable as a result of any budget figures provided by it.

The Client expressly waives its right to withhold PML's fees, either in whole or in part, or to make any claim or commence an action or bring any other proceedings, whether in contract, tort, or otherwise against PML in any way connected with advice or information given by PML relating to the cost estimate or Environmental Remediation/Cleanup and Restoration or Soil and Groundwater Management Plan Cost Estimate.

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
EA ALTERNATIVE 4
PEEL WEST TRUNK DIVERSIONS
MISSISSAUGA, ONTARIO

for

REGIONAL MUNICIPALITY OF PEEL
C/O HATCH

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December 6, 2021

EXECUTIVE SUMMARY

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Mississauga Road/Queen Street between Alpha Mills Road and Erin Centre Boulevard, along Erin Centre Boulevard between Mississauga Road and Erin Mills Parkway, and along Erin Mills Parkway between Erin Centre Boulevard and Eglinton Avenue West located in the City of Mississauga, Ontario.

The purpose of the Project is to review alternative flow diversions from the existing Credit Valley Trunk Sewer to the newly constructed West Trunk Sewer to allow for future rehabilitation of the existing sewer.

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contamination, if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

Within the project limit, the road section along Mississauga Road/Queen Street, Erin Centre Boulevard and Erin Mills Parkway are urban development, consisting mostly of residential and commercial activities.

Based on the evaluation of the historical data and site reconnaissance, thirteen (13) Potential Source of Contaminations (PSCs) were identified along the site. The PSCs were related to a gasoline service stations, auto repair stations, auto sales and service dealership, GO Transit Garage and Canadian Pacific Railway (CPR) tracks.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Recommendation

Based on the findings of the Phase One ESA, programs of soil and ground water sampling and chemical testing are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road
2	Canadian Pacific Railway (CPR) tracks at Reid Drive
3	Husky gasoline service station at 371 Queen Street South
4	Streetsville auto sales at 4 Queen Street North
5	Active Green Ross auto service station at 14 Queen Street North
6	Petro Canada gasoline service station at 26 Queen Street North
7	Ken Champ Auto repair station at 40 Queen Street North
8	Mint auto service station, Meineke auto service station and Streetsville Gas Station at 57 Queen Street North
9	CPR tracks at Matlock Avenue
10	Go Transit Garage at 6190 Mississauga Road
11	Streetsville Hyundai at 6215 Mississauga Road
12	88 Auto Sales and Flomax Auto Mechanic at 6237 Mississauga Road
13	Integra Tire and Auto Centre at 6325 Mississauga Road

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Figure 2 – 1960 Aerial Photograph

Figure 3 – 1970 Aerial Photograph

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Drawing 1: Site and Surrounding Area Features

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Appendix A – Opta Information Intelligence Report

Appendix B –Technical Standards and Safety Authority (TSSA) Responses

Appendix C – Statement of Limitations

1. INTRODUCTION

Peto MacCallum Ltd. (PML) was retained by HATCH on behalf of Region of Peel to conduct a Phase One Environmental Site Assessment (ESA) along Mississauga Road/Queen Street between Alpha Mills Road and Erin Centre Boulevard, along Erin Centre Boulevard between Mississauga Road and Erin Mills Parkway, and along Erin Mills Parkway between Erin Centre Boulevard and Eglinton Avenue West located in the City of Mississauga, Ontario (Figure 1).

The Phase One ESA was conducted as part of the due diligence process to identify and verify the potential on-site and off-site sources of contaminations (PSCs), if any, in accordance with the protocols outlined in the Canadian Standard Association (CSA) Standard Z768-01, reaffirmed 2012.

1.1 Site Description

The subject site is a roadway alignment and consists of three parts as follows:

- Along Mississauga Road/Queen Street between Alpha Mills Road to the west and Erin Centre Boulevard to the east (About 3.1 km long, Figure 1).
- Along Erin Centre Boulevard between Mississauga Road/Queen Street to the north and Erin Mills Parkway to the south (About 1.5 km long, Figure 1).
- Along Erin Mills Parkway between Erin Centre Boulevard to the west and Eglinton Avenue West to the east (About 450 m long, Figure 1).

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early1950s.

Currently, mixed residential/parkland/institutional and commercial type structures/developments are noted along Mississauga Road/Queen Street, Erin Centre Boulevard and Erin Mills Parkway.

2. SCOPE OF INVESTIGATION

The Phase One ESA involved the following tasks to assess the road alignment's physical and geoenvironmental setting and to document past and present land use activities.

i) A review of available documents including aerial photographs, topographic, geologic and hydrogeologic maps, city directories, report of previous geotechnical/ geoenvironmental investigations for the subject site prepared by PML, land registry records, Ministry of the Environment, Conservation and Parks (MECP) water well records and fire insurance plans to evaluate the site physical setting and to document past and present land use activities.

ii) Conducting a walk-through visual inspection along the road alignment and a 250 m area on both sides of the alignment to assess current site and surrounding area conditions and the visual presence of site features or olfactory evidences indicating potential contamination, if any.

iii) Interviews with the knowledgeable individuals regarding the site conditions associated with historical land use activities at the subject site.

iv) Preparation of this report, discussing the information compiled and the pertinent conclusions and recommendations together with the tables, figures, site photographs and drawings as well as other information in Appendices.

3. RECORDS REVIEW

3.1 General

3.1.1 Phase One ESA Study Area Determination and Rationale

The subject site is a roadway alignment and consists of three parts extending along Mississauga Road/Queen Street South between Alpha Mills Road to the west and Erin Centre Boulevard to the east (About 3.1 km long, Figure 1), along Erin Centre Boulevard between Mississauga Road/Queen Street to the north and Erin Mills Parkway to the south (About 1.5 km long), and along Erin Mills Parkway between Erin Centre Boulevard to the west and Eglinton Avenue West to the east (about 450 m long) (Figure 1).

The road alignments are surrounded mostly by mixed residential/parkland/institutional and commercial land uses.

The Phase One ESA Study Area was determined in accordance with the protocols outlined in the CSA Standard Z768-01, reaffirmed 2012 to identify and verify the potential on-site and off-site sources of contamination, if any.

3.1.2 First Developed Use Determination and Rationale

Based on information from aerial photographs and available maps, the first developed use of the site was presumably agriculture in the late 1940s.

3.1.3 Fire Insurance Plan

An attempt was made to review the historical Fire Insurance Plans (FIPs) for the site and surrounding areas. However, no FIPs were available to review.

3.1.4 MECP Water Well Records Review

The MECP Water Well Records database was searched for well records within a 250 m radius of the site. Two hundred and four (204) recorded wells were located within the 250 m radius of the site. Based on the MECP, seventeen (17) of the wells were recorded as water supply wells (domestic and public), installed between 1948 and 1967.

3.1.5 Previous Geotechnical Report Summary

Peto MacCallum Ltd. conducted a geotechnical investigation for the adjacent properties and submitted a report entitled Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited by Peto MacCallum Ltd., dated January 31, 2019.

The findings of the geotechnical report are summarized as follows:

A sanitary sewer replacement will be carried out on various streets in the City of Mississauga, Ontario. The sanitary sewer will be installed by both open cut and trenchless method in an established residential neighbourhood.

Based on a review of drawings dated June 2018 prepared by the Region of Peel, the available information on the proposed sanitary sewer size, alignment and invert levels is summarized below:

The project involves the following components:

i. Construction of approximately 1,100 m of new 1500 mm diameter sanitary sewer consisting of a concrete pressure pipe (CPP) with 450 mm cunette or 600 mm sanitary CPP carrier pipe. The sanitary sewer will be installed by trenchless method along the following segments:

   a. About a 100 m segment from the intersection of Britannia Road West and Joymar Drive to the intersection of Pioneer Drive and Britannia Road West.

   b. About a 960 m segment along Joymar Drive starting from Britannia Road West going eastwards to Tannery Street.

ii. Reconfiguration and replacement of approximately 2,650 m of existing local sewers and laterals on the streets listed below are anticipated to be carried out using open cut method:

   - Pioneer Drive
   - Andrea Court
   - Siberry Road
   - Joymar Drive
   - Joycelyn Drive
   - Theodore Drive
   - Donata Drive
   - Turney Drive and
   - Isherwood Court

iii. Construction of a new 250 mm diameter sanitary sewer on Thomas Street, crossing beneath Mullet Creek and the existing bridge structure by trenchless method.

It is anticipated that the preferred trenchless technology will be microtunneling.

The project area is mainly residential and falls within the Credit River Watershed and smaller surrounding watersheds, which drain directly into Lake Ontario. The sanitary sewer alignment will be along several asphalt paved residential streets located east of Britannia Road and south of Queen Street in Streetsville, Mississauga.

During the investigation for GDR, a total of 29 boreholes were drilled and 10 monitoring wells were installed for the subject project.

In general, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m (BH-7) to 5.5 m (BH-17). The fill was encountered in all 29 boreholes. Below the fill material, was encountered a thick deposit of silty clay in BH-3 (thickness about 1.8 m) and BH-19 (thickness about 1.6 m), and clayey silt in BH-28 (thickness about 4.0 m). The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock. For classification purposes, the soils encountered at this site can be divided into six (6) distinct zones:

- Pavement Structure
- Fill (mostly sand and gravel)
- Clayey Silt/Silty Clay
- Clayey Silt Till/Silty Clay Till
- Silty Sand Till/Sand and Silt Till
- Shale Bedrock

The shale bedrock of the Georgian Bay Formation was encountered in boreholes BH-1 to BH-14, BH-17, BH-19, BH-24, BH-25 and BH-29. The depth of the shale bedrock encountered varied from 3.4 m (BH-14) to 8.3 m (BH-19) below ground surface. Rock coring was conducted in boreholes BH-1 to BH-4, BH-6 to BH-14, BH-24, BH-25 and BH-29 following the procedures as

described in ASTM D2113–14 using diamond core, double tube, wireline HQ2 with the exception BH-1, BH-2, BH-3 and BH-25, where NQ2 core drilling was performed.

In general, the Georgian Bay Formation consisted of highly weathered to fresh, grey, very fine to fine grained fissile, weak to strong shale partings with occasional widely spaced jointing with sub-horizontal to horizontal bedding planes, interbedded with fresh, dark grey, moderately hard, calcareous, crystalline carbonate.

3.1.6 Previous Geo-Environmental Testing

The geoenvironmental sampling and chemical testing program was conducted in conjunction with a geotechnical investigation referred in Section 3.1.5. For excess soil management and/or off-site disposal options, soil samples were selected for chemical analyses.

Chemical Analyses

Based on the visual examination of soils in the boreholes and the site background information, the retrieved soil samples were submitted to SGS Laboratories Inc. (SGS), located in Lakefield, Ontario for chemical testing. SGS is accredited by the Canadian Association for Laboratory Accreditation (CALA). The soil samples were analyzed for the following parameters.

- Selected discrete soil samples were analyzed for metals, inorganic, benzene, toluene, ethylbenzene and xylenes (BTEX) and F1 through F4 fraction petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) parameters as listed in the Ontario Regulation 153/04 as amended by Ontario Regulation 511/09.

- Selected composite soil samples were analyzed for Toxicity Characteristic Leachate Procedure (TCLP) for metals and inorganic parameters listed in Schedule 4 of Ontario Regulation 347 as amended by Ontario Regulation 558/00.

Findings of Chemical Analyses

For off-site disposal, the results of the soil chemical analyses were compared with the Ontario Regulation 511/09 Standards (Tables 1, 2 and 3) for residential/parkland and industrial/ commercial property uses in background, potable and non-potable ground water situations.

Comparison with Table 1 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Table 1 background standards for residential/parkland/ institutional property use.

Comparison with Tables 2 and 3 Residential/Parkland/Institutional Property Use Standards

Based on the chemical test results the analyzed soil samples from all boreholes with the exception of BH-29, exceeded the Tables 2 and 3 standards for residential/parkland/institutional property use.

Comparison with Tables 2 and 3 Industrial/Commercial/Community Property Use Standards

Based on the chemical test results, the analyzed soil samples from sixteen (16) boreholes (BH1, BH3, BH6, BH7, BH9, BH10, BH11, BH12, BH13, BH15, BH20, BH24, BH25, BH26 and BH28) exceeded the Tables 2 and 3 standards for industrial/commercial/community property use.

Leachate Quality (TCLP) Results

The results of the TCLP analyses were compared with Schedule 4, Ontario Regulation 347 as amended by Ontario Reg. 558/00, and found that the analyzed soils are not of leachate toxic nature.

3.2 Environmental Source Information

Environmental source information was obtained from the following sources: MECP, Toronto Reference Library, Opta Information Intelligence, Technical Standards and Safety Authority (TSSA) and the National Pollutant Release Inventory website. The environmental source information from Opta Information Intelligence and TSSA are attached in Appendices A and B, respectively.

A summary of the environmental source information is presented in Table 1 below.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
1	Opta Information Intelligence	City Directory Information Source	▪ Sunoco gasoline service station was located at 371 Queen Street South and Johnny's Auto Center was located at 5235 Mississauga Road ▪ Active Green & Ross Tire & Auto Centre, Harvey's Tire Centre Ltd. and Sungas were located at 14 Queen Street North. ▪ Bernie's Auto Service, Bernie's Used car Sales and Petro Canada were located at 26 Queen Street North. ▪ Queen Street Auto Sales Ltd. was located at 40 Queen Street North. ▪ AAA Speedy Auto & Window Glass, Excel Service Station and Meineke Discount Mufflers were located at 57 Queen St North. ▪ Wilcox Bodies Limited, and Wilcox Truck Bodies Limited were located at 6215 Mississauga Road. ▪ Credit Valley Auto Sales &	Yes. Potential impact to soil and ground water.

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
			Service and Starfield Maintenance were located at 6237 Mississauga Road. ▪ Mississauga Radiator was located at 6325 Mississauga Road.	
2	Technical Standards and Safety Authority (TSSA)	Release of Public Information - TSSA	▪ Records of five (5) active and five (5) expired fuel storage tanks noted at 371 Queen Street South. ▪ Records of three (3) active fuel storage tanks notes at 5235 Mississauga Road. ▪ Records of ten (10) expired fuel storage tanks noted at 14 Queen St North. ▪ Records of six (6) active and two (2) expired fuel storage tanks noted at 26 Queen St North. ▪ Records of four (4) expired fuel storage tanks noted at 40 Queen St North. ▪ Records of five (5) active fuel storage tanks noted at 57 Queen St North.	Yes. Potential impact to soil and ground water.
3	Ontario Ministry of Environment and Energy (MOEE) July 1993	Ontario Inventory of PCB Storage Sites	No listing was noted within the road alignment and adjacent properties.	None

TABLE 1

ENVIRONMENTAL SOURCE INFORMATION

ITEM	SOURCE	TITLE	PERTINENT INFORMATION	ANY POTENTIAL SOURCE OF CONTAMINATION (PSCs)?
4	Ontario Ministry of Environment and Energy (MOEE) April 1987 and November 1988	Inventory of Coal Tar Wastes and Coal Gasification Plants	No listing was noted within the road alignment and adjacent properties.	None
5	Ontario Ministry of Environment and Energy (MOEE) June 1991	Waste Disposal Site Inventory of Landfill Sites	No listing was noted within the road alignment and adjacent properties.	None
6	MECP Location of Small Landfill Sites, 2019	http://www.ontario.ca/data/small-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
7	MECP Location of Large Landfill Sites, 2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites	No listing was noted within the road alignment and adjacent properties.	None
8	http://www.ec.gc.ca/inrp-npri/	National Pollutant Release Inventory	No listing found for the road alignment and adjacent properties.	None

3.3 Physical Setting Sources

3.3.1 Aerial Photographs

Historical and recent aerial photographs for the road alignment and vicinity areas were reviewed in order to assess the development sequence of the road alignment and adjacent properties. Based on the availability, the aerial photographs for the years 1960, 1970, 2004, 2007, 2015 and

2019 were selected for the current investigation and are shown on Figures 2 to 7. The review findings are outlined below.

Based on the aerial photographs of 1960,1970, 2004 and 2007 mixed residential and commercial type structures/developments were noted along both sides of Mississauga Road/Queen Street South and Erin Centre Boulevard (Figures 2 to 5).

Based on the Google Maps of 2015 and 2019, mixed residential and commercial type structures/developments extended to areas further north and south of Queen Street South (Figures 6 and 7).

3.3.2 Topography, Hydrology and Geology

A review of the Topographic Map was conducted for the site and surrounding areas.

Residential properties appear consistently within the area from Britannia Road West to the west to Canadian Pacific Railway (CPR) tracks to the east, with various commercial properties scattered through the area. Credit River locating in the north runs parallel and Mullet Creek locating in the south runs parallel to the road alignment. CPR tracks crossed the road alignment twice along Mississauga Road/Queen Street South (Figure 8).

Residential properties appear consistently within the area of Erin Centre Boulevard from Misssissauga Road to Erin Mills Parkway. Mullet Creek runs across Erin Centre Boulevard, about 120 m west of the intersection of Erin Centre Boulevard and Mississauga Road. Wabukayne Creek, a tributary of Mullet Creek, crosses Erin Mills Parkway and Erin Centre Boulevard from a north-westerly to south-easterly direction towards Mullet Creek (Figure 8).

The local topography is considered as a rolling terrain with existing ground surface elevation varying approximately between 185 m (amsl) and 150 m (amsl), with topographic relief of approximately 35 m (Figure 8).

According to Chapman and Putnam (Physiography of Southern Ontario, Ministry of Natural Resources, 1984), the project area is in the physiographic region known as the South Slope bordered by Peel Plain to the north and Iroquois Plain to the south. The physiographic landform in the area is defined as Till Moraines.

The OGS Earth Map of Surficial Geology of Southern Ontario (Ontario Geological Survey, 2010), indicates that the project area lies on a region of clay to silt-textured till deposits, derived from glaciolacustrine deposits or shale.

The OGS Earth Map of Paleozoic Geology of Southern Ontario (Armstrong and Dodge, 2007), indicates that the bedrock geology at the project area comprises shale, limestone, dolostone and siltstone of Georgian Bay Formation of the Upper Ordovician Period.

According to Credit Valley Conservation Authority (CVC), the project area is located within the Credit River Watershed. Credit River is located at the north end of the the project area. Mullet Creek, a tributary of the Credit River, crossed the site at the central portions of the project area. Both watercourses flow south-easterly. Wabukayne Creek, a tributary of Mullet Creek, crosses Erin Mills Parkway and Erin Centre Boulevard intersection from a north-westerly to south-easterly direction towards Mullet Creek.

The hydrogeology of the study area is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow towards Credit River and finally southerly towards Lake Ontario.

Based on the geotechnical investigation report by PML dated January 31, 2019, the subsurface soil conditions encountered at the borehole locations consisted of pavement structure, granular fill followed by fill of thickness ranging from 0.6 m to 5.5 m. The fill material was underlain by 0.6 m to 5.5 m thick very stiff to hard clayey silt till/silty clay till, and 3.2 to 4.3 m thick compact to very dense silty sand till/sandy silt or silt and sand till, which overlies the shale bedrock.

3.3.3 Fill Materials

No fill piles were noticed along the alignment. However, engineered fill materials are expected to be present along the road alignment and adjacent developed sites/properties.

3.3.4 Water Bodies and Areas of Natural Significance

Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about 150-300 m south/southwest of Mississauga Road and cuts across Erin Centre Boulevard (about 90 m southwest from the intersection of Erin Centre Boulevard and Mississauga Road/Queen Street). Wabukayne Creek, a tributary of Mullet Creek, cuts across Erin Mills Parkway and Erin Centre Boulevard intersection and flows from a north-westerly to south-easterly direction.

Based on the Ontario Ministry of Natural Resources and Forestry (MNRF), no area of natural significance (ANSI) existed on the road alignment and adjacent properties.

4. INTERVIEW

During the course of this assessment, PML interviewed the following person on June 15, 2021, as outlined in Table 2 below:

TABLE 2

INTERVIEWS SUMMARIZED INFORMATION

PLACE/ METHOD	PERSON INTERVIEWED	RATIONALE	INFORMATION PROVIDED
Husky gas station/ Meeting	Mr. Raza Shehzab and Tahir Raja, 371 Queen Street South	Retailer for last 9 years	• The subject site has been used as a gasoline service station for about 40 years. • Previously, Sunoco gasoline service station was located at the site. • Currently, the site is an operational Husky gasoline service station having USTs.

Previously, PML interviewed the following persons on April 26, 2019, as outlined in Table 2A below:

TABLE 2A

INTERVIEWS SUMMARIZED INFORMATION

PLACE/ METHOD	PERSON INTERVIEWED	RATIONALE	INFORMATION PROVIDED
Esso gas station and Mr. Lube auto service station/ Meeting	Mr. Khalid Yokhanna, 2520 Britannia Road West	Manager for last 10 years	1) The subject site was historically used for gas station. 2) Mr. Yokhanna is not willing to release any further information. 3) However, it is understood that the site is an operational Esso Gas Station with underground storage tanks (USTs) and Mr. Lube auto service station with aboveground storage tanks (ASTs).
Ross Bloom Dry Cleaners/ Meeting	Mr. Ashraf Suliman, 17 Queen Street North, Mississauga	Owner for last 12 years	1) Historical use of the subject property is not known. 2) Ross Bloom Dry Cleaners was in business for the past 12 years. 3) This is a drop-off and pick-up station only, no chemical is used on the property. 4) There is no on-site or off-site environmental concerns.
Meineke Car Care Centre/ Meeting	Mr Ivo Boutros, 57 Queen Street North, Mississauga	Owner of Meineke Car Care Centre	1) The subject site was historically and currently used for auto repair and service station. 2) Waste oils are stored on tanks and are transported off-site by a private company. 3) Mint auto repair station is located adjacent east and Streetsville Gas Station is located adjacent west of the property. 4) The site is connected to the City's water supply and sewer system.
Streetsville Gas Station/ Meeting	Mr. Rasheed Syed, 57 Queen Street North, Mississauga	Owner for Streetsville Gas Station for about 1 year	1) The subject site was historically used for gasoline service station. 2) There are USTs present on the site. There is no AST on the site.

5. SITE RECONNAISSANCE

5.1 General

A site reconnaissance along Mississauga Road/Queen Street, Erin Centre Boulevard and Erin Mills Parkway was carried out by a Geoscientist in Training (Mr Jason Noronha) of PML on June 15, 2021.

Selected site photographs were taken at the time of site reconnaissance which are shown on Plates 1 to 11. Drawing 1 shows the site and surrounding features and PSCs along the road alignment as observed during the site reconnaissance.

5.2 The Site Observations

During the site reconnaissance, it was confirmed that the site consists of Mississauga Road/Queen Street between Alpha Mills Road and Erin Centre Boulevard, along Erin Centre Boulevard between Mississauga Road and Erin Mills Parkway, and along Erin Mills Parkway between Erin Centre Boulevard and Eglinton Avenue West located in the City of Mississauga, Ontario. The subject site and vicinity are surrounded by mixed residential/parkland/institutional and commercial properties (Drawing 1).

At present, Mississauga Road/Queen Street is single and double laned (at various sections) local roadway having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. The road section along Erin Centre Boulevard from Queen Street/Mississauga Road to Erin Mills Parkway is a single lane local roadway having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. The road section along Erin Mills Parkway from Erin Centre Boulevard to Eglinton Avenue West is a double lane local roadway having underground utilities, traffic lights and road lights and the site's surface is mostly covered with asphalt pavement. During the site visit, normal operation of road like movement of vehicles was noticed. Construction works along both sides of Erin Mills Parkway from Erin Centre Boulevard to Eglinton Avenue West were noted.

Fill pile was not noticed along the alignment of Queen Street South, Erin Centre Boulevard and Erin Mills Parkway. There were no unusual noise,odour and vibration noted. No unidentified substance was noted at the site. Fifteen monitoring wells were seen on a vacant lot at 146 and 148 Queen Street South.

5.3 The Study Area Observations

A visual inspection of the Study Area (250 m on both sides of Mississauga Road/Queen Street North, Erin Centre Boulevard, Erin Mills Parkway) were conducted from the limits of the road alignment and publicly accessible areas to check for PSCs, water bodies and areas of natural significance.

The road alignment along Mississuaga Road/Queen Street South, Erin Centre Boulevard and Erin Mills Parkway are surrounded by mixed residential/parkland/institutional and commercial properties.

Rose Bloom dry cleaners (drop-off and pick-up center only), Mint auto service station, Meineke Auto Care Centre, Streetsville Gas Station, Streetsville Hyundai, 88 Auto Sales, Flomax Auto Mechanic, and Integra Tire and Auto Centre are located along north shoulder of Mississauga Road/Queen Street North. Streetville auto sales, Active Green Ross auto service station, Petro Canada gasoline service station, Ken Champ Auto repair station and Go Transit Garage are located along south shoulder of Mississauga Road/Queen Street North. CPR tracks are located about 400 m northwest of Queen Street and Britannia Road intersection. Husky gasoline service station and L. A. Auto Repairs station are located along north shoulder of Queen Street South. CPR tracks crossed the subject alignment about 35 m east of Queen Street South and Reid Drive intersection. The road alignment along Erin Centre Boulevard from Mississauga Road/Queen Street South to Erin Mills Parkway is surrounded by mixed residential/parkland and commercial properties. The road alignment along Erin Mills Parkway from Erin Centre Boulevard to Eglinton Avenue West is surrounded by commercial properties. (Drawing 1).

No Area of Natural and Scientific Interest (ANSI) existed on the Site. Credit River is located about 100-250 m north/northeast of the site. Mullet Creek, a tributary of Credit River, is located about

150-300m south/southwest of Mississauga Road and cuts across Erin Centre Boulevard (about 90 m southwest from the intersection of Erin Centre Boulevard and Mississauga Road/Queen Street). Wabukayne Creek, a tributary of Mullet Creek, cuts across Erin Mills Parkway and Erin Centre Boulevard intersection.

6. REVIEW AND EVALUATION OF INFORMATION

6.1 Potential Source of Contamination (PSCs)

Based on the evaluation of the historical data and site reconnaissance, thirteen (13) PSCs were identified on the adjacent properties to the road alignment.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealership, GO Transit Garage and CPR tracks.

The identified PSCs are listed in Table 3 below and shown on attached Drawing 1.

TABLE 3
POTENTIAL SOURCES OF CONTAMINATION (PSCs) ON / IN / UNDER THE ROAD ALIGNMENT AND ADJACENT PROPERTIES

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road
2	CPR tracks at Reid Drive
3	Husky gasoline service station at 371 Queen Street South
4	Streetsville auto sales at 4 Queen Street North
5	Active Green Ross auto service station at 14 Queen Street North
6	Petro Canada gasoline service station at 26 Queen Street North
7	Ken Champ Auto repair station at 40 Queen Street North

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
8	Mint auto service station, Meineke auto service station and Streetsville Gas Station at 57 Queen Street North
9	CPR tracks at Matlock Avenue
10	Go Transit Garage at 6190 Mississauga Road
11	Streetsville Hyundai at 6215 Mississauga Road
12	88 Auto Sales and Flomax Auto Mechanic at 6237 Mississauga Road
13	Integra Tire and Auto Centre at 6325 Mississauga Road

6.2 Contaminants of Potential Concern (COPC)

Metals, PAHs, VOCs and PHCs are considered as contaminants of potential concern (COPC) for the site. Since Metals, PAHs, VOCs and PHCs are found as frequent contaminants in gasoline service stations, auto repair stations and railway tracks, those are considered as COPC as well as background level check for the road alignment.

6.3 Conceptual Site Model (CSM)

A Conceptual Site Model (CSM) is presented to demonstrate the current site geoenvironmental conditions. The subject CSM has been prepared based on the site background information compiled to date and a site reconnaissance.

This CSM consists of Figures 1 to 8 and a plan showing PSCs along the both sides of Queen Street South, Erin Centre Boulevard and Erin Mills Parkway Road alignments (Drawing 1), which depict the site conditions including surficial features, and present and past land uses in and around the alignment.

Historically, agricultural land use occupied the site and the vicinity in the late 1940s or early 1950s.

The road alignment along Mississauga Road/Queen Street North is surrounded by mostly commercial properties. Rose Bloom dry cleaners (drop-off and pick-up center only), Mint auto service station, Meineke Auto Care Centre, Streetsville Gas Station, Streetsville Hyundai, 88 Auto Sales, Flomax Auto Mechanic, and Integra Tire and Auto Centre are located along north shoulder of Mississauga Road/Queen Street North. Streetsville auto sales, Active Green Ross auto service station, Petro Canada gasoline service station, Ken Champ Auto repair station and Go Transit Garage are located along south shoulder of Mississauga Road/Queen Street North. CPR tracks are located about 400 m northwest of Queen Street and Britannia Road intersection. Husky gasoline service station and L. A. Auto Repairs station are located along north shoulder of Queen Street South. CPR tracks crossed the subject alignment about 35 m east of Queen Street South and Reid Drive intersection. The road alignment along Erin Centre Boulevard from Mississauga Road/Queen Street South to Erin Mills Parkway is surrounded by mixed residential/parkland and commercial properties. The road alignment along Erin Mills Parkway from Erin Centre Boulevard to Eglinton Avenue West is surrounded by commercial properties. (Drawing 1).

Based on the evaluation of the historical data and site reconnaissance, thirteen (13) PSCs were identified on the adjacent properties to the site. The identified PSCs are listed in Section 6.1, Table 3, and shown on attached Drawing 1.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, CPR tracks and GO Transit Garage.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

Based on the Ontario Ministry of Natural Resources and Forestry, no ANSI existed on the road alignment and adjacent properties.

According to CVC, the project area is located within the Credit River Watershed. Credit River is located at the north end of the the project area. Mullet Creek, a tributary of the Credit River, crossed the site at the central portions of the project area. Both watercourses flow south-easterly.

Wabukayne Creek, a tributary of Mullet Creek, crosses Erin Mills Parkway and Erin Centre Boulevard intersection from a north-westerly to south-easterly direction towards Mullet Creek.

The hydrogeology is primarily controlled by the Mullet Creek, Credit River, topographic elevation, glacial geology and bedrock topography of the region. Locally, shallow ground water flows towards topographic depressions. The deep/regional ground water is expected to flow southerly towards Mullet Creek and finally towards Credit River.

7. CONCLUSIONS

A Phase One ESA was conducted to assess the potential for contamination of the soil and ground water along Mississauga Road/Queen Street between Alpha Mills Road and Erin Centre Boulevard, along Erin Centre Boulevard between Mississauga Road and Erin Mills Parkway, and along Erin Mills Parkway between Erin Centre Boulevard and Eglinton Avenue West located in the City of Mississauga, Ontario.

Within the project limit of Queen Street South Diversion (EA Alternative 4), PSCs were identified along Mississauga Road/Queen Street South as shown on Drawing 1.

Based on the evaluation of the historical data and site reconnaissance, thirteen (13) PSCs were identified along the road alignment.

The PSCs were related to gasoline service stations, auto repair stations, auto sales and service dealerships, CPR tracks and GO Transit Garage.

Based on the evaluation of information, it is understood that there are possibilities of contamination from historical and current land use activities along the alignment.

8. RECOMMENDATIONS

Based on the findings of Phase One ESA, programs of soil and ground water sampling and chemical testing are recommended for areas abutting the following properties.

ITEM NO.	POTENTIAL SOURCE OF CONTAMINATION
1	L. A. Auto Repairs (Abandoned) at 5235 Mississauga Road
2	CPR tracks at Reid Drive
3	Husky gasoline service station at 371 Queen Street South
4	Streetsville auto sales at 4 Queen Street North
5	Active Green Ross auto service station at 14 Queen Street North
6	Petro Canada gasoline service station at 26 Queen Street North
7	Ken Champ Auto repair station at 40 Queen Street North
8	Mint auto service station, Meineke auto service station and Streetsville Gas Station at 57 Queen Street North
9	CPR tracks at Matlock Avenue
10	Go Transit Garage at 6190 Mississauga Road
11	Streetsville Hyundai at 6215 Mississauga Road
12	88 Auto Sales and Flomax Auto Mechanic at 6237 Mississauga Road
13	Integra Tire and Auto Centre at 6325 Mississauga Road

9. STATEMENT OF LIMITATIONS

The assignment is subject to the Statement of Limitations that is included in Appendix C and must be read in conjunction with this report.

10. QUALIFICATIONS OF ENVIRONMENTAL CONSULTANT

PML was established in 1973 as a result of the merger of Peto Associates Ltd., founded in 1956, and the Ontario division of Racey MacCallum and Associates Limited, chartered in 1952. PML is a consulting engineering firm that specializes in the fields of geoenvironmental, hydrogeological and geotechnical engineering, building sciences, construction supervision/inspection and materials engineering/testing. Personnel in our four-branch offices form a network of full time dedicated environmental professionals.

The Site reconnaissance and partial preparation of this report were conducted by Mr. Jason Noronha, BSc in Environmental Science. Mr. Noronha is a Project Supervisor with over seven years of experience in the field of Environmental Site Assessment, supervising field investigations, data gathering, conducting sampling programs, data analyses and report preparation. His main areas of expertise include Phase One and Phase Two ESAs and hydrogeologic investigations.

The investigation and report preparation was conducted by Mr. Shamsul Tarafder, MSc. PhD., P.Geo. Mr. Tarafder is a Senior Geoscientist with over fifteen years of experience in geology, geophysics, physical and contaminant hydrology and hydrogeology, hydrogeochemistry and soil contamination chemistry. His experience includes soil and ground water investigations including Phase One and Two ESAs, aquifer characterization, groundwater exploration, soil and groundwater quality assessment, hydrogeological assessment, in-situ remediation of organic contaminants involving LNAPLs and DNAPLs such as petroleum products, VOCs and semi-VOCs, PAHs, BTEX and ether compounds using advanced treatment technologies, and solute transport hybrid numerical and analytical modelling. He has completed hundreds of Phase One and Two ESAs and Hydrogeological Site Assessment (HSA) reports for commercial, industrial, and residential properties. Mr. Tarafder is also author and co-author of a number of peer reviewed scientific articles and is a Qualified Person (QP) as mandated in Ontario Regulation 153/04 (amended).

This report was reviewed by Mahaboob Alam, MSc., PhD., P.Geo., a Professional Geoscientist registered with the Association of Professional Geoscientists of Ontario. Mr. Alam is a Director of the firm and Discipline Lead, Geoenvironmental and Hydrogeological services and is a Qualified Person (QP) registered with the MECP. He has over 30 years of interdisciplinary professional experience specializing in geoenvironmental and hydrogeologic investigations and project management. His main areas of expertise include Phase One and Phase Two ESAs, site cleanup/remediation planning and supervision, waste management, UST and AST removals, site remediation, Risk Assessment, Records of site Condition and hydrogeologic investigations. He has completed hundreds of Phase One ESAs for commercial, industrial, and residential clients for a wide variety of project types (industrial complexes, commercial developments, entertainment and institutional buildings, and residential development).

11. REFERENCES

The following documents and data were referred to the Phase One ESA Report:

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
1	Aerial Photographs	1960 and 1970	City of Toronto Online Archives
2	Aerial Photographs	2004, 2007, 2015 and 2019	Google Earth
3	Topographic Map	2018	Natural Resources Canada-The Atlas of Canada
4	The Physiography of Southern Ontario, 3rd Edition	1984	Chapman, L.J., and Putnam, D. F.
5	Bedrock Geology of Ontario, Map 2544	1991	Ministry of Northern Development and Mines
6	Quaternary Geology of Toronto and Surrounding Area, Map 2204	1980	Ministry of Natural Resources
7	Quaternary Geology of Ontario, Southern Sheet, Ontario Geological Survey, Map 2556, Scale 1:1,000,000	1991	Barnett, P.J., W.R. Cowan and A.P. Henry

ITEM	DOCUMENT / DATA	DATE	AUTHOR / SOURCE
8	Canadian Standards Association Standard Z768-01 Environmental Technology	2001 (Reaffirmed 2012)	Canadian Standards Association (CSA)
9	MOEE Waste Disposal Inventory	June 1991	MOEE Reference book
10	Inventory of Coal Gasification Plant Waste Sites in Ontario	April 1987	MOEE Reference book
11	Inventory of Industrial Sites Producing Coal or Using Coal Tar and Related Tars Sites in Ontario	November 1988	MOEE Reference book
12	Ontario Inventory of PCB Storage Sites	July 1993	MOEE Reference book
13	MECP Location of Small Landfill Sites	2019	http://www.ontario.ca/data/small-landfill-sites
14	MECP Location of Large Landfill Sites	2019	http://www.ontario.ca/environment-and-energy/map-large-landfill-sites
15	National Pollutant Release Inventory	2019	http://www.ec.gc.ca/inrp-npri/
16	Might's and Criss Cross City Directories	Searched for the years 1935, 1939, 1945, 1950, 1955, 1960, 1970, 1975, 1980, 1985, 1990, 1999, 2008 and 2012	Might's and Criss Cross City Directories at the Toronto Reference Library
17	Draft Geotechnical Data Report (GDR) including Geotechnical Profile for Sanitary Sewer Replacement on Various Streets in the City of Mississauga, Ontario, Project 16-2300A, Phase 3 prepared for The Regional Municipality of Peel c/o R.J. Burnside & Associated Limited	January 31, 2019	Peto MacCallum Ltd.
18	Make A Map: Natural Heritage Area	Current	Ontario Ministry of Natural Resources and Forestry

We trust this report is adequate for your present purposes. Should you have any questions or require further informations, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Jason Noronha, BSc
Project Supervisor
Geoenvironmental and Hydrogeological Services

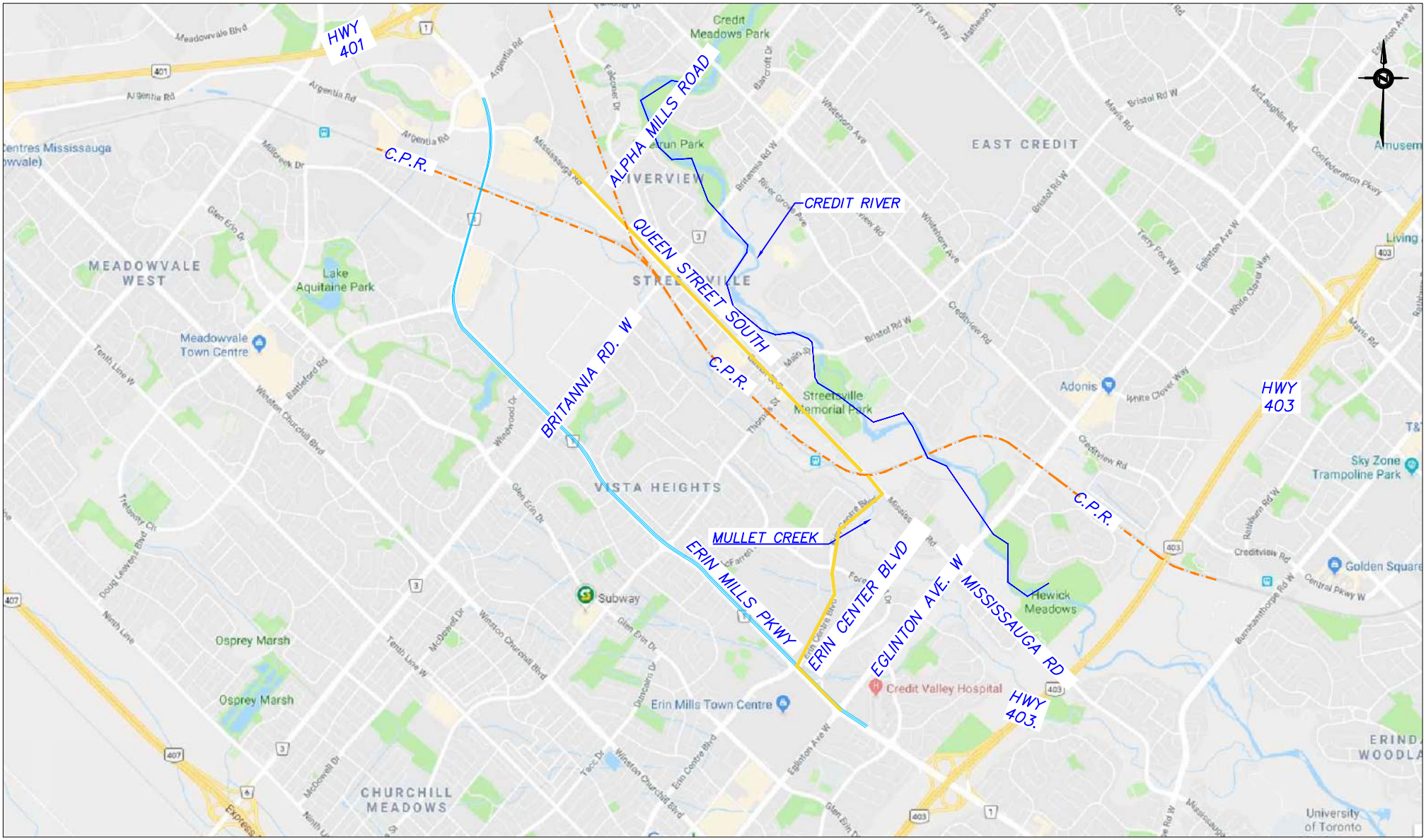
PROFESSIONAL GEOSCIENTIST
SHAMSUL A. TARAFDER
PRACTISING MEMBER
2594
DEC 06, 2021
ONTARIO

Shamsul A. Tarafder, MSc, PhD, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

PROFESSIONAL GEOSCIENTIST
MAHABOOB ALAM
PRACTISING MEMBER
0682
DEC. 06, 2021
ONTARIO

Mahaboob Alam, MSc, PhD, P.Geo.
Director
Discipline Lead, Geoenvironmental and Hydrogeological Services

ST/MA:st



REFERENCE:
THIS FIGURE WAS PREPARED FROM GOOGLE MAPS.

LEGEND:
- EA ALTERNATIVE 4
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

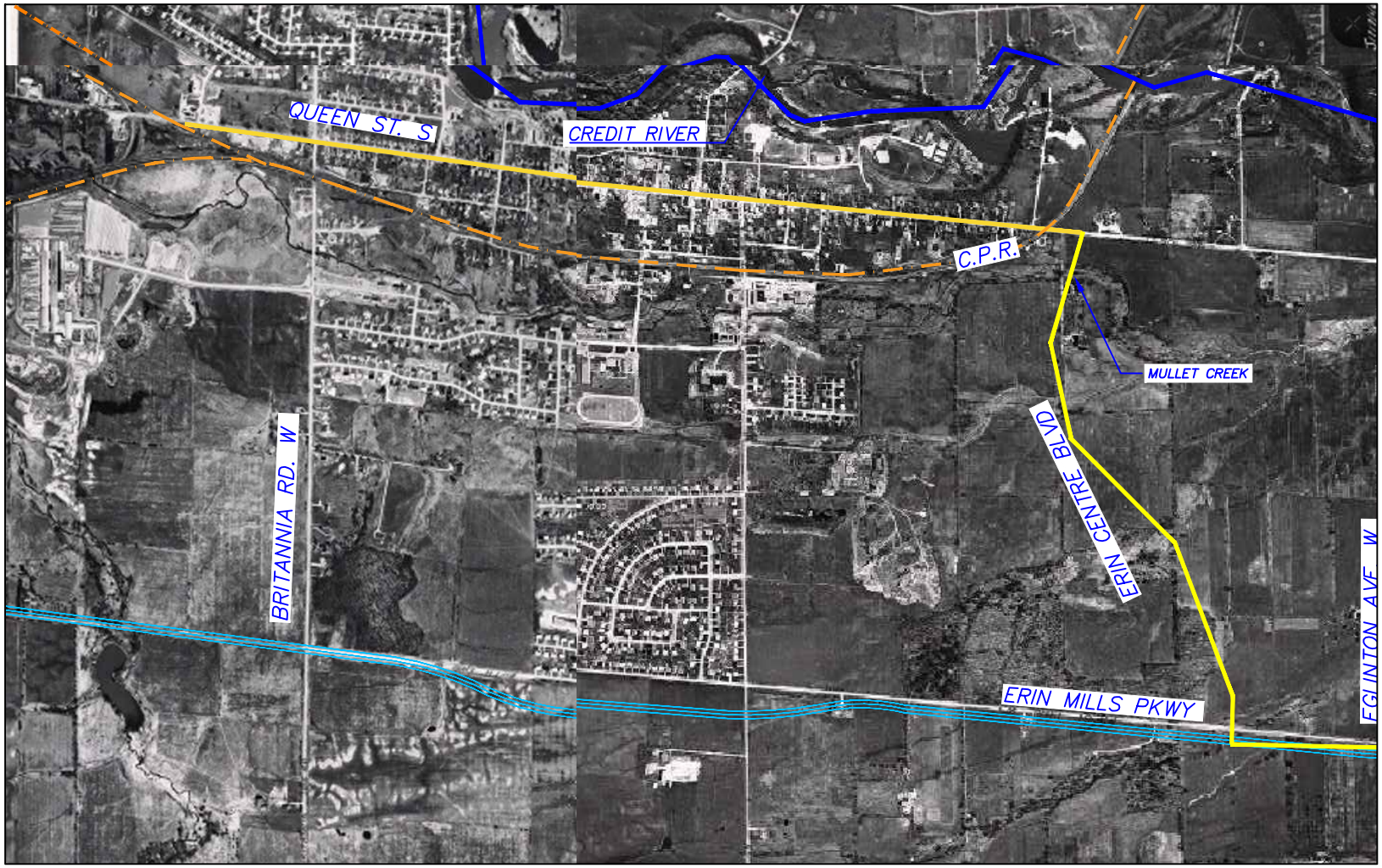
REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

KEY MAP

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
CHECKED	S.T.	JULY 2021	1:50,000	20TX015	1
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1960, PLATE NO. 138, 139,116& 117.

LEGEND:

- EA ALTERNATIVE 4
- C N RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1960 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

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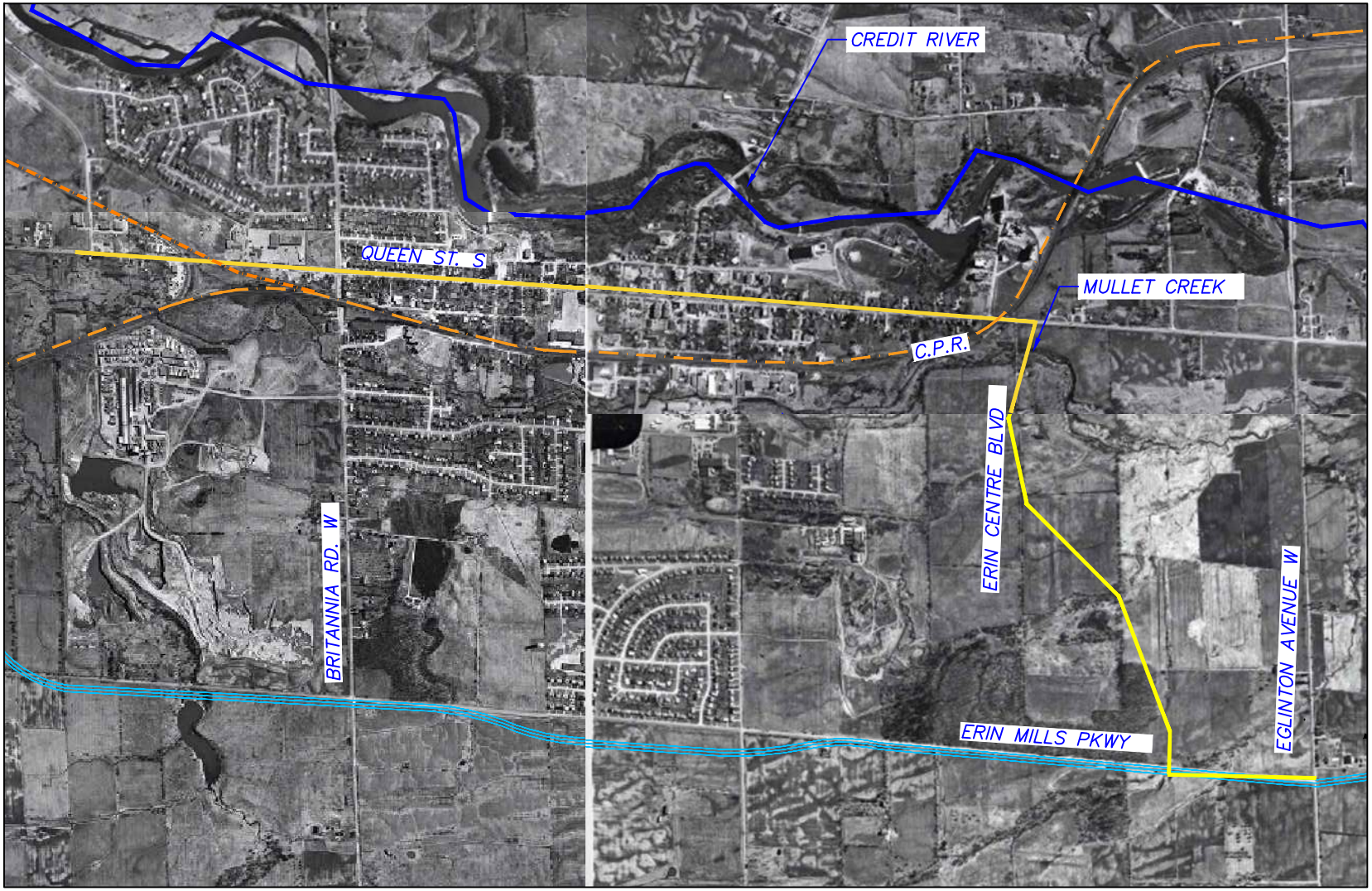
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM ONTARIO SERVICES WEBSITE www.TORONTO.CA/MAPS/AERIAL PHOTOGRAPHS-1970, PLATE NO. 128, 127, 100& 99.

LEGEND:
- PROP. QUEEN ST. DIVERSION
- C N RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

1970 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
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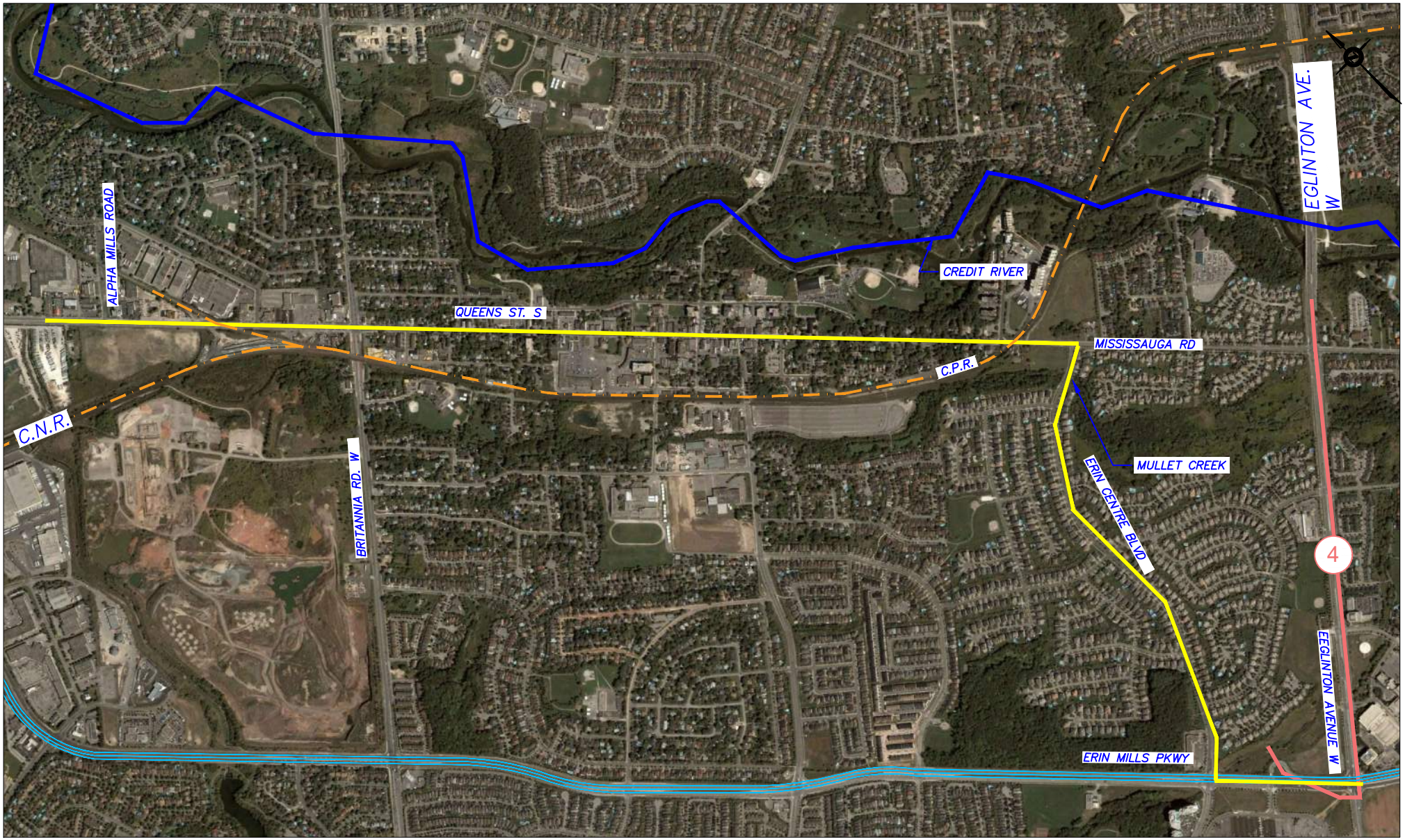
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2004.

LEGEND:

- PROP. QUEEN ST. DIVERSION
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2004 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
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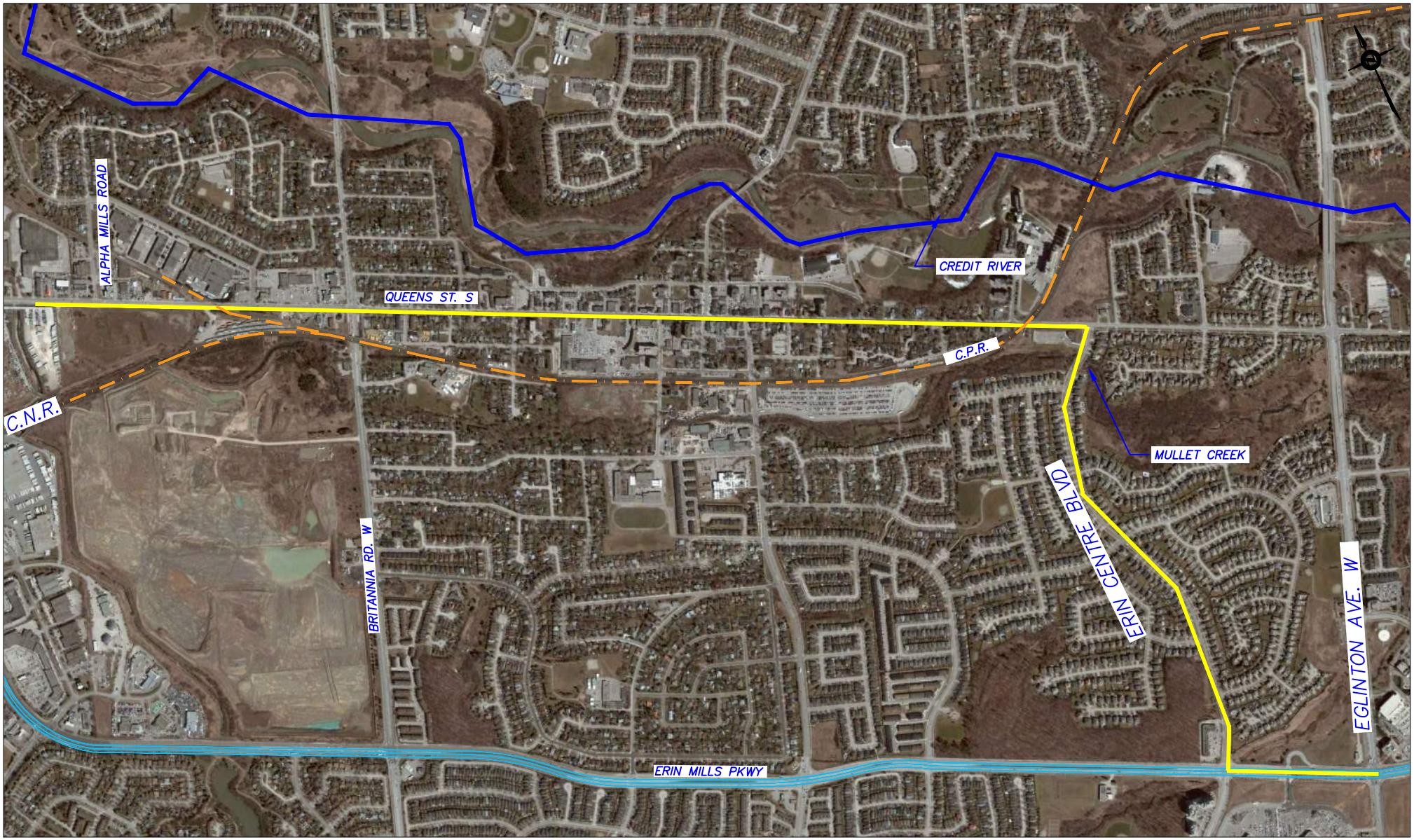
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2007.

LEGEND:

- EA ALTERNATIVE 4
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2007 AERIAL PHOTOGRAPH

Peto MacCallum Ltd.
CONSULTING ENGINEERS

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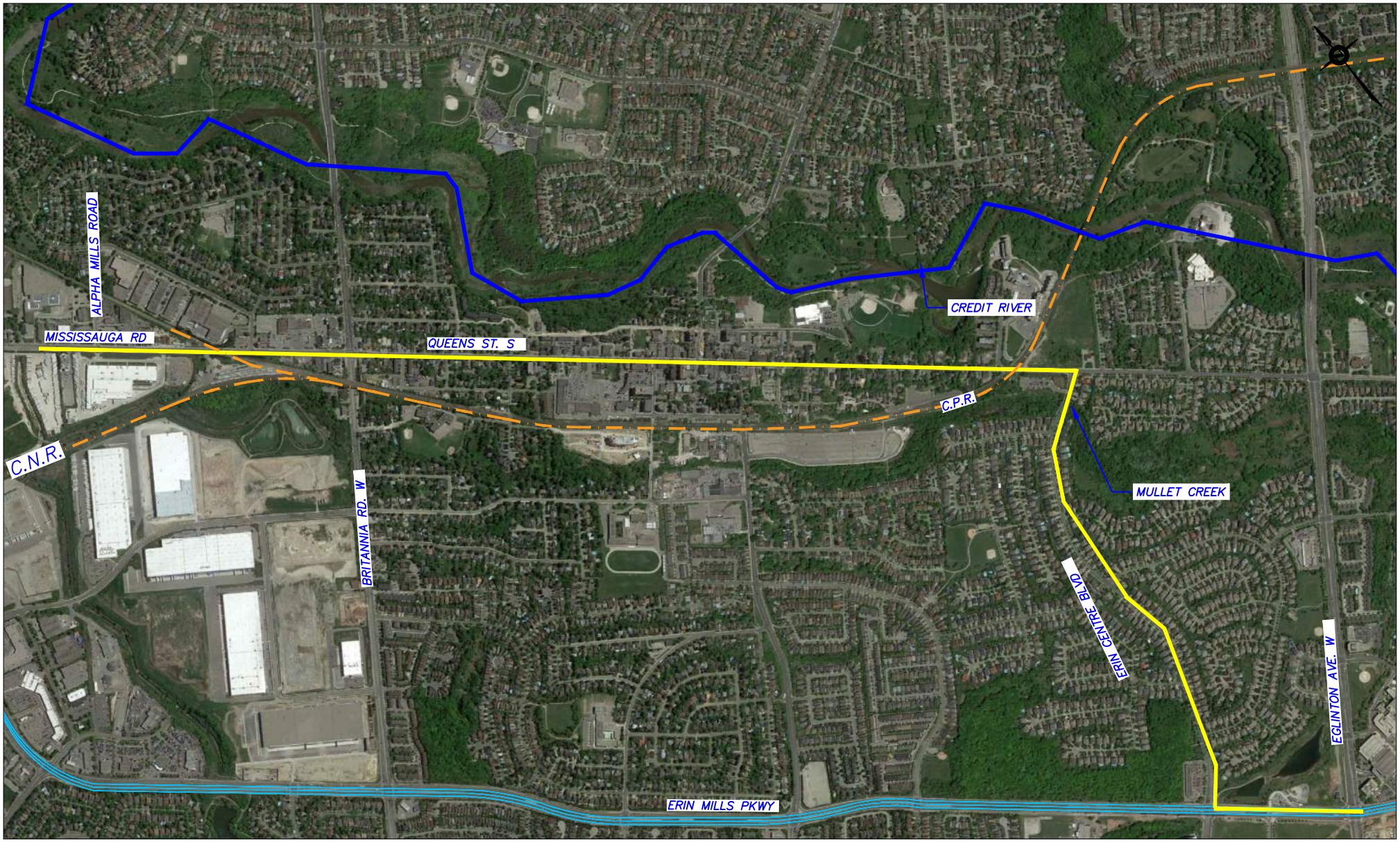
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY DATE 2015.

LEGEND:

- EA ALTERNATIVE 4
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2015 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
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DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
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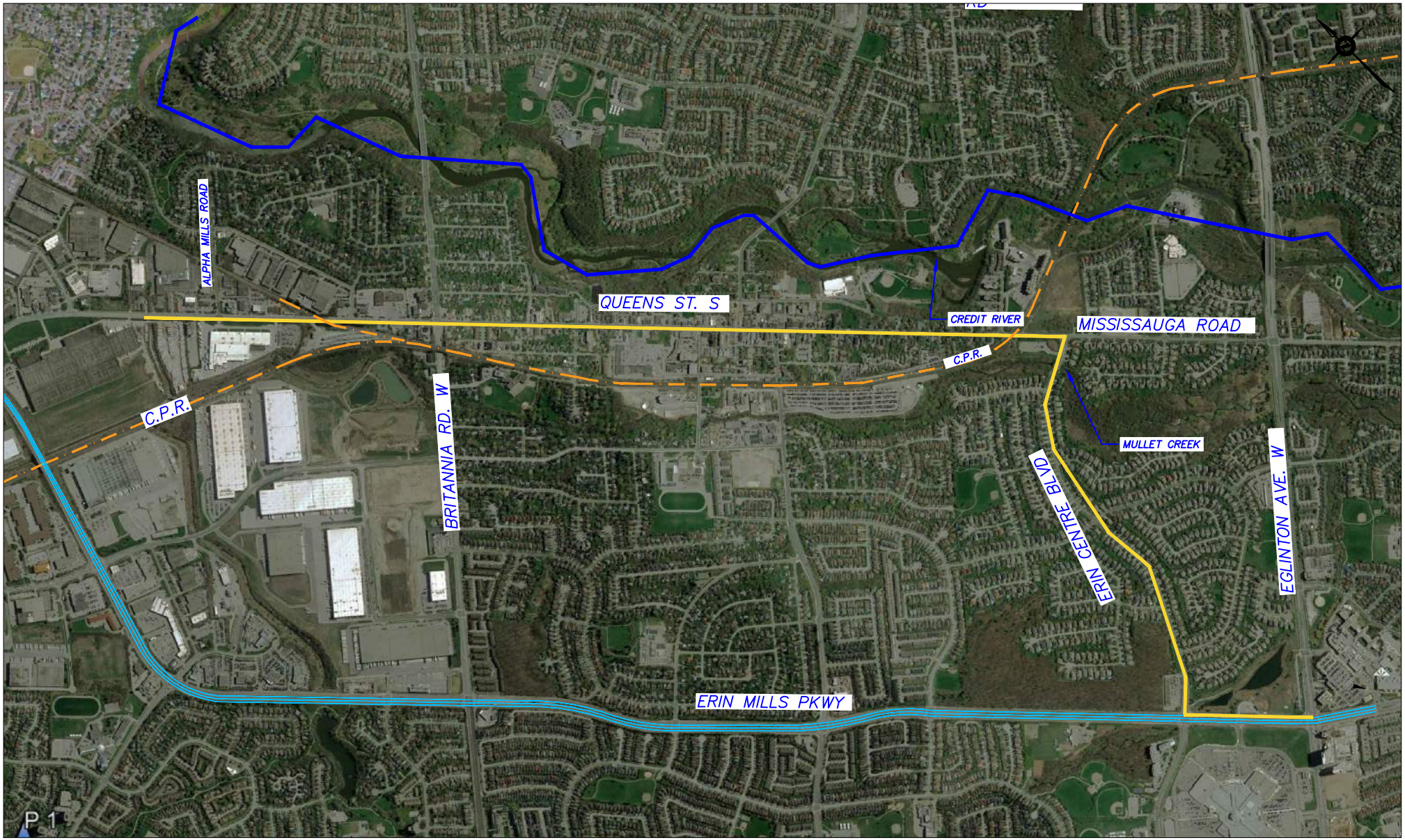
APPROVED	M.A.				



REFERENCE: THIS FIGURE WAS PREPARED FROM GOOGLE MAPS, IMAGERY 2019.

LEGEND:

- EA ALTERNATIVE 4
- C P RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

2019 AERIAL PHOTOGRAPH

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
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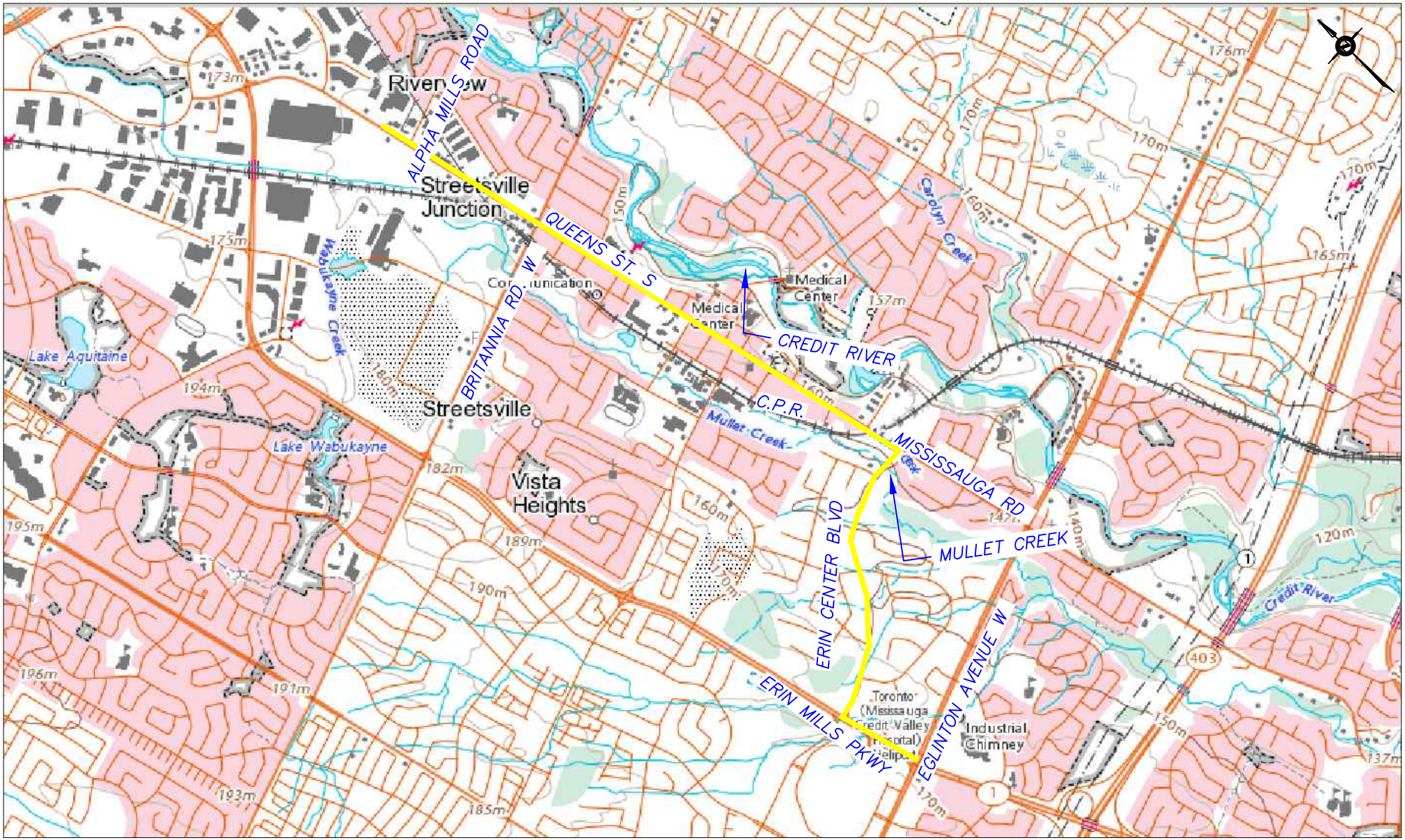
APPROVED	M.A.				



REFERENCE:
THIS FIGURE WAS PREPARED FROM NATURAL RESOURCES CANADA-THE ATLAS OF CANADA, 2018

LEGEND:

EA ALTERNATIVE 4

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

TOPORAMA

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	FIG. NO.
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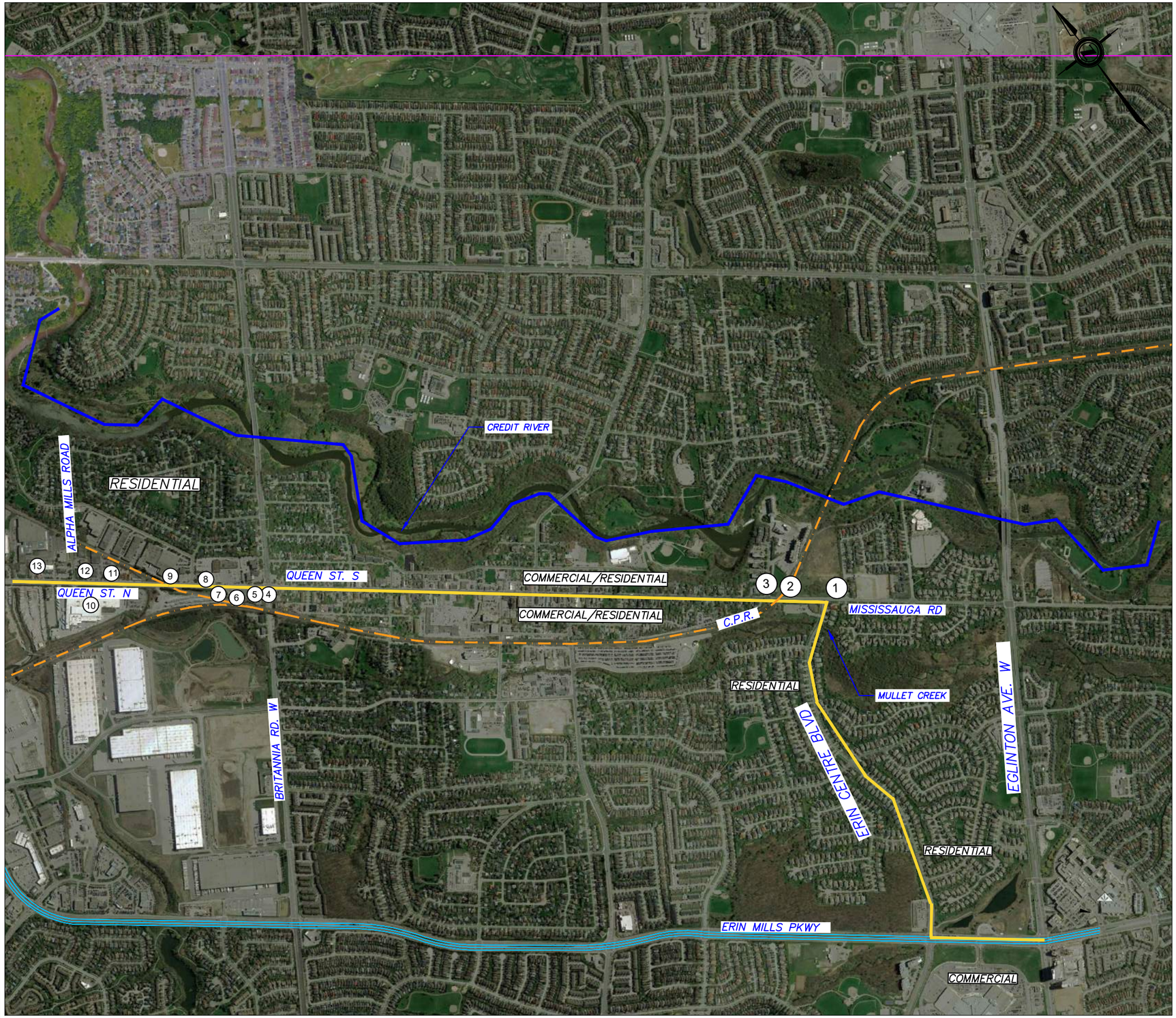
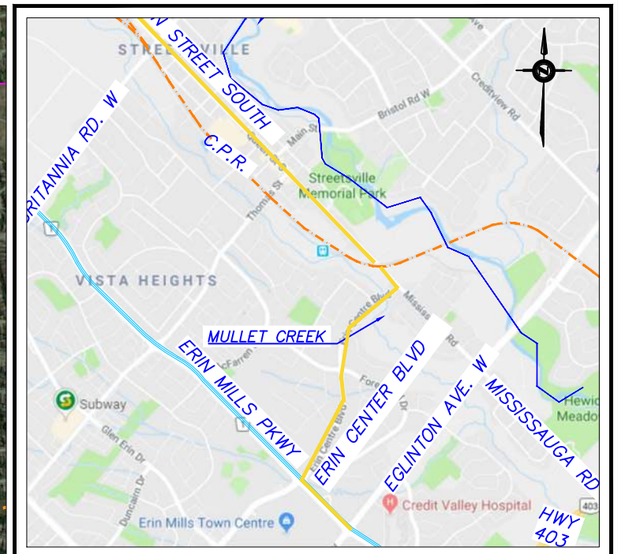
APPROVED	M.A.				





KEY PLAN

TORONTO, ONTARIO

LEGEND:

- EA ALTERNATIVE 4 DIVERSION
- CP RAILWAY
- EXIST. WEST TRUNK SEWER
- WEST TRUNK SEWER UNDER CONSTRUCTION

1. L.A. AUTO REPAIR
2. C. P. RAILWAY
3. HUSKY GAS STATION
4. STREET VILLE AUTO SALE
5. GREEN ROSS AUTO SERVICE STATION
6. PETRO CANADA GAS STATION
7. KEN CHAMP AUTO REPAIR STATION
8. MINT AUTO SERVICE STATION, MEINEKE AUTO SERVICE STATION AND STREETSVILLE GAS STATION
9. C.P RAILWAY
10. GO TRANSIT GARAGE
11. STREETSVILLE HYUNDAI
12. 88 AUTO SALES AND FLOMAX AUTO MECHANIC
13. INTEGRA TIRE AUTO CENTRE

REFERENCE:

THIS FIGURE WAS PRODUCED FROM GOOGLE MAPS, IMAGERY DATE 2019.

REGIONAL MUNICIPALITY OF PEEL

REGION OF PEEL WEST TRUNK DIVERSION-EA ALTERNATIVE 4
PHASE ONE ENVIRONMENTAL SITE ASSESSMENT
MISSISSAUGA, ONTARIO

SITE AND SURROUNDING AREA FEATURES

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN	J.N.	DATE	SCALE	PML REF.	DWG. NO.
CHECKED	S.T.	JULY 2021	1:20,000	21TX015	1
APPROVED	M.A.				

Plate 1: The site at Queen Street South and Britannia Road West Intersection**.**

Plate 2: Residential properties along Queen Street South.

Plate 3: Monitoring wells installed by others at 148 Queen Street South.

Plate 4: Husky gasoline service station at 371 Queen Street South.

Plate 5: L.A. Auto Repairs (abandoned) at 5235 Mississauga Road.

Plate 6: Residential neighborhood along Erin Centre Boulevard.

Plate 7: CPR tracks and Queen Street South intersection at the site east end.

Plate 8: The site at Queen Street South and Erin Centre Boulevard intersection.

Plate 9: Mullet Creek crossing the site at Erin Centre Boulevard just south of Queen Street South and Erin Centre Boulevard intersection.

Plate 10: Erin Centre Plaza at 2555 Erin Centre Boulevard, Mississauga.

Plate 11: Erin Woods Park at 5303 Erin Mills Parkway, Mississauga.

APPENDIX A

Opta Information Intelligence Report

INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

An SCM Company
www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel Region, Ontario Criss Cross Directory

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 2000	
Site Listing:	-Nabisco Milling Company -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-City West Towing -Credit Mills Auto center Ltd

6553 Mississauga Road	-Ashmeade Insurance Brokers Ltd -Knapp & Associates Design Inc
371 Queen Street South	-Sunoco Inc; Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1994	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc -In Harmony Resources Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road	-National Propane Service
6553 Mississauga Road	-King Adjusters Ltd

	-RR Enterprises Ltd -Schering Canada Inc -Res (3 Tenants)
371 Queen Street South	-Streetsville Sunoco

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1989	
Site Listing:	-Reid Milling Div of Nabisco Brands Ltd -Sandston Transport Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Tartan Color & Chemical Inc

	-Schering Canada Inc
371 Queen Street South	-Suncorp Inc

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1983	
Site Listing:	-Reid Milling Div of Christie Brown & Co Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential -DP Wordsmith Inc
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (Street)	-Johnny's Auto Center
6553 Mississauga Road (Street)	-Eraco International Trading Inc -Erin Realty Inc -McCullough Lisa-Barr -Schering Canada Inc

371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Multi Tenant Residential
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Johnny's Auto Center
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-SMS Petroleum

PROJECT NUMBER: 60629	

Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Reid Milling Ltd
Adjacent Properties:	
24 Reid Drive	-Res (4 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1966	
Site Listing:	-Reid Milling Ltd

Adjacent Properties:	
24 Reid Drive	-Res (3 Tenants)
2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

PROJECT NUMBER: 60629	
Site Address:	27 Reid Drive, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
24 Reid Drive	-Address Not Listed

2125 Erin Centre Blvd	-Address Not Listed
5235 Mississauga Road (North)	-Address Not Listed
6553 Mississauga Road (North)	-Address Not Listed
371 Queen Street South	-Address Not Listed

*****27 Reid Drive, Mississauga, Ontario is last listed in 1965 within the City Directory Archives*****

opta
INFORMATION INTELLIGENCE

600, 175 Commerce Valley Dr. W
Markham, Ontario
L3T 7P6

T: 905.882.6300
Toll Free: 1.800.268.8080
F: 905.695.6543

An SCM Company
www.optaintel.ca

City Directory Information Source
Polk's Halton/Peel, Ontario Criss-Cross Directory

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 2000	
Site Listing:	-AAA Speedy Auto & Window Glass -Excel Service Station -Meineke Discount Mufflers
Adjacent Properties:	
4 Queen St North	-Streetsville Business Services
14 Queen St North	-Active Green & Ross Tire & Auto Centre -Harvey's Tire Centre Ltd. -Sungas
17 Queen St North	-Carpet & Rug Outlet Inc. -Goulash Hut

	-Interiors By Sophie & Leslie Inc. -L'Express Deli & Rotisserie -Rose Bloom Cleaners -Wing's Rest
20 Queen St North	-Bobby's Hideaway
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales -Petro-Canada (Full-Service Stations)
40 Queen St North	-Queen Street Auto Sales Ltd.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Wilcox Bodies Limited -Wilcox Truck Bodies Limited
6237 Mississauga Road	-Credit Valley Auto Sales & Service -Starfield Maintenance
6325 Mississauga Road	-Mississauga Radiator

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario

Year: 1994	
Site Listing:	-Speedy Auto Glass -Olco Gas Bar -Meineke Discount Mufflers
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Active Tire & Auto Centre -Comet Gas Bar
17 Queen St North	-Cornerock Café -Gold Star Donuts -J & M Chopsticks Inc. -Thrifty Dry Cleaners
20 Queen St North	-Queen's Villa Family Rest
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales -Petro-Canada
40 Queen St North	-Daley's Auto Service -Daley's BC Shell Self Serv. -Shell Canada Products

6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Arctic Snow Plows -Wilcox Truck Bodies Limited
6237 Mississauga Road	-Anthony Fraschetti Ltd. -Dollar Rent A Car -Starfield Maintenance -Randy's Auto Service Centre
6325 Mississauga Road	-Mississauga Radiator

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1989	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Res (1 Tenant)
14 Queen St North	-Active Tire & Auto Centre

17 Queen St North	-Address Not Listed
20 Queen St North	-Quackers Rest
26 Queen St North	-Bernie's Auto Service -Bernie's Used Car Sales
40 Queen St North	-Daley's Auto Service -Daley's BC Shell Self Serv. -Northtown Shell
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Anthony Fraschetti Ltd. -Bill's Auto Repair Centre -Starfield Maintenance -Randy's Auto Service Centre
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1983	

Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-B P Canada Service Stations
17 Queen St North	-Address Not Listed
20 Queen St North	-Muddy Duck Rest & Tavern
26 Queen St North	-Bernie's Auto Service
40 Queen St North	-Shell Canada Ltd.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	

Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1977-78	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Russell's B P
17 Queen St North	-Address Not Listed
20 Queen St North	-Pit Stop Drive-In
26 Queen St North	-Address Not Listed
40 Queen St North	-Daley's BC Shell Self Serv.
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1972-73	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed
6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed

6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1965	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed
6190 Mississauga Road	-Address Not Listed

6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

PROJECT NUMBER: 61225	
Site Address:	57 Queen Street North, Mississauga, Ontario
Year: 1958	
Site Listing:	-Address Not Listed
Adjacent Properties:	
4 Queen St North	-Address Not Listed
14 Queen St North	-Address Not Listed
17 Queen St North	-Address Not Listed
20 Queen St North	-Address Not Listed
26 Queen St North	-Address Not Listed
40 Queen St North	-Address Not Listed

6190 Mississauga Road	-Address Not Listed
6215 Mississauga Road	-Address Not Listed
6237 Mississauga Road	-Address Not Listed
6325 Mississauga Road	-Address Not Listed

*****57 Queen Street North, Mississauga, Ontario is last listed for 1992 within the city directory archives*****

Appendix B

Technical Standards and Safety Authority (TSSA) Responses

From: Public Information Services
To: Jason Noronha
Subject: RE: fuel tanks
Date: Friday, June 04, 2021 3:40:02 PM
Attachments: image001.png
image003.png
image004.png
image005.png
image006.png

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Please refrain from sending documents to head office and only submit your requests electronically via email along with credit card payment. We are all working remotely and mailing in applications with cheques will lengthen the overall processing time.

RECORD FOUND

Hello Jason,
Thank you for your request for confirmation of public information.

- We confirm that there are records in our database of fuel storage tanks at the subject addresses:

Inst Numb	Context	Address	City	Provin	Postal Co	Inststatusnan	Segment1
64508516	-	371 QUEEN ST SOUTH	MISSISSAUGA	ON	L5M 1M3	Active	FS CYLINDER EXCHANGE
9825517	FS Facility	371 QUEEN ST SOUTH	MISSISSAUGA	ON	L5M 1M3	Active	FS GASOLINE STATION - SELF SERVE
30287903	FS Facility	371 QUEEN ST S	MISSISSAUGA	ON	L5M 1M3	EXPIRED	FS GASOLINE STATION - SELF SERVE
10859643	FS Liquid Fuel Tank	371 QUEEN ST S	MISSISSAUGA	ON	L5M 1M3	EXPIRED	FS LIQUID FUEL TANK
10859659	FS Liquid Fuel Tank	371 QUEEN ST S	MISSISSAUGA	ON	L5M 1M3	EXPIRED	FS LIQUID FUEL TANK
10859676	FS Liquid Fuel Tank	371 QUEEN ST S	MISSISSAUGA	ON	L5M 1M3	EXPIRED	FS LIQUID FUEL TANK
10859691	FS Liquid Fuel Tank	371 QUEEN ST S	MISSISSAUGA	ON	L5M 1M3	EXPIRED	FS LIQUID FUEL TANK
10859706	FS Liquid Fuel Tank	371 QUEEN ST SOUTH	MISSISSAUGA	ON	L5M 1M3	Active	FS LIQUID FUEL TANK
10859709	FS Liquid Fuel Tank	371 QUEEN ST SOUTH	MISSISSAUGA	ON	L5M 1M3	Active	FS LIQUID FUEL TANK
10859715	FS Liquid Fuel Tank	371 QUEEN ST SOUTH	MISSISSAUGA	ON	L5M 1M3	Active	FS LIQUID FUEL TANK

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard). Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.
Kind regards,
Sherees

Public Information Agent
Facilities and Business Services
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-6222 | Fax: +1-416-734-3568 | E-Mail: publicinformationservices@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: June 4, 2021 1:43 PM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: fuel tanks

[CAUTION]: This email originated outside the organisation.
Please do not click links or open attachments unless you recognise the source of this email and know the content is safe.

Good afternoon,

I would like to request a list of fuel tanks for the following locations in Mississauga,

1. 6325 Mississauga Road
2. 8 Falconer Rd
3. 371 Queen St South
4. 5325 Mississauga Rd

Thank you

Jason

Sent from Mail for Windows 10

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From: Public Information Services
To: Jason Noronha
Subject: RE: fuel tanks
Date: Thursday, June 03, 2021 3:53:56 PM
Attachments: image005.png
image006.png
image007.png
image010.png
image012.png

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Please refrain from sending documents to head office and only submit your requests electronically via email along with credit card payment. We are all working remotely and mailing in applications with cheques will lengthen the overall processing time.

RECORD FOUND
Hello Jason,
Thank you for your request for confirmation of public information.

- We confirm that there are records in our database of fuel storage tanks at the subject addresses:

Inst Numb	Address	City	Provin	Postal Co	Inststatusnan	Segment1
64988331	5235 MISSISSAUGA RD	MISSISSAUGA	ON	L5M 2L9	Registered	FS GASOLINE STATION - SELF SERVE
64988332	5235 MISSISSAUGA RD	MISSISSAUGA	ON	L5M 2L9	Registered	FS LIQUID FUEL TANK
64988333	5235 MISSISSAUGA RD	MISSISSAUGA	ON	L5M 2L9	Registered	FS LIQUID FUEL TANK

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard).
Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.
Kind regards,
Saara

Public Information Agent
Facilities and Business Services
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-6222 | Fax: +1-416-734-3568 | E-Mail: publicinformationservices@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: June 3, 2021 3:01 PM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: fuel tanks

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Please do not click links or open attachments unless you recognise the source of this email and know the content is safe.

Good afternoon,

I would like to request a list of fuel tanks for the following locations in Mississauga,

1. 5235 Mississauga Road
2. 2125 Erin Centre Blvd
3. 2555 Erin Centre Blvd
4. 5100 Erin Mills Pky

Thanks

Jason

Sent from Mail for Windows 10

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From: Jason Noronha
To: Shamsul Tarafder
Subject: Fw: Fuel tank request - Record Fuels
Date: Tuesday, May 14, 2019 8:12:36 AM
Attachments: image001.png
image002.png
image004.png
image005.png
image006.png
image007.png

From: Public Information Services <publicinformationservices@tssa.org>
Sent: May 13, 2019 4:17 PM
To: Jason Noronha
Subject: RE: Fuel tank request - Record Fuels

Hello,

I have searched the below noted address (addresses) and I have located the following record:

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
10064114	FS Facility	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
10107223	FS Facility	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
11311074	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235550	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235578	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235606	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11235632	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11311052	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11311090	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11423035	FS Liquid Fuel Tank	14 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
64758794	-	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS CYLINDER EXCHANGE
9569374	FS Facility	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS GASOLINE STATION - FULL SERVE
27528077	FS Facility	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS CYLINDER EXCHANGE
11496119	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
10986235	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986251	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986266	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK
10986281	FS Liquid Fuel Tank	26 QUEEN ST N	MISSISSAUGA	ON	L5N 1A1	Active	FS LIQUID FUEL TANK

Effective November 1, 2017 TSSA requires that any requests for the release of public information, must complete the release for public information form. The release for public information form can be found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392. Please complete the form (1 address per form) and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: May 10, 2019 2:49 PM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: Fuel tank request

Good afternoon,

I would like to request a list of fuel tanks for the following locations in Mississauga

1) 4 Queen Street North, Mississauga
2) 14 Queen Street North, Mississauga
3) 26 Queen Street North, Mississauga

Thank you

Regards,

Jason Noronha, BSc
Geoscientist-in-training
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (647) 401-4604
jnoronha@petomaccallum.com

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From: Jason Noronha
To: Shamsul Tarafder
Subject: Fw: List of fuel tanks-Mississauga - Record Fuels
Date: Tuesday, May 14, 2019 11:01:29 AM
Attachments: image002.png
image003.png
image004.png
image005.png

From: Public Information Services <publicinformationservices@tssa.org>
Sent: May 14, 2019 11:00 AM
To: Jason Noronha
Subject: RE: List of fuel tanks-Mississauga - Record Fuels

Hello,

I have searched the below noted address (addresses) and I have located the following record:

Inst Number	Context	Address	City	Province	Postal Code	Inststatusname	Segment1
9588537	FS Facility	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS GASOLINE STATION - FULL SERVE
10986296	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11449559	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK
11449573	FS Liquid Fuel Tank	40 QUEEN ST N STREETSVILLE	MISSISSAUGA	ON	L5N 1A1	EXPIRED	FS LIQUID FUEL TANK

Inst Number	Context	Address	City	Province	Postal Code	Inventory Item Id SUM	Inststatusname	Segment1
9885940	FS Facility	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6880	Active	FS GASOLINE STATION - FULL SERVE
11096696	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096647	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096664	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK
11096684	FS Liquid Fuel Tank	57 QUEEN ST N UNIT 1	MISSISSAUGA	ON	L5N 1A2	6932	Active	FS LIQUID FUEL TANK

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Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Jason Noronha <jnoronha@petomaccallum.com>
Sent: May 14, 2019 10:09 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: List of fuel tanks-Mississauga

Good morning,

I would like to request a list of fuel tanks for the following locations in Mississauga

1) 17 Queen St N, Mississauga
2) 40 Queen St N, Mississauga
3) 57 Queen St N, Mississauga

Thank you

Regards,

Jason Noronha, BSc
Geoscientist-in-training
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (647) 401-4604
jnoronha@petomaccallum.com

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From:	Public Information Services
To:	Shamsul Tarafder
Subject:	Re: TSSA Registered Sites/Fuel Tank Request (No Record)
Date:	Tuesday, May 14, 2019 11:06:15 AM
Attachments:	image004.png image005.png image006.png image007.png

---

Hello,

Thank you for your inquiry.

We have no record in our database of any fuel storage tanks at the subject address (addresses).

For a further search in our archives please complete our release of public information form found at https://www.tssa.org/en/about-tssa/release-of-public-information.aspx?_mid_=392 and email the completed form to publicinformationservices@tssa.org or through mail along with a fee of $56.50 (including HST) per location. The fee is payable with credit card (Visa or MasterCard) or with a Cheque made payable to TSSA.

Although TSSA believes the information provided pursuant to your request is accurate, please note that TSSA does not warrant this information in any way whatsoever.

Thank you and have a great day,

Roxana

Roxana Mashtaler | Public Information Agent
Facilities
345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel: +1-416-734-3472 | Fax: +1-416-231-6183 | E-Mail: rmashtaler@tssa.org
www.tssa.org

From: Shamsul Tarafder <starafder@petomaccallum.com>
Sent: May 14, 2019 10:11 AM
To: Public Information Services <publicinformationservices@tssa.org>
Subject: TSSA Registered Sites/Fuel Tank Request

Good Morning,

Please advise if you have any registered site/fuel tank at the following addresses:

6190 Mississauga Road, Mississauga, ON, and

6215 Mississauga Road, Mississauga, ON

6237 Mississauga Road, Mississauga, ON

6325 Mississauga Road, Mississauga, ON

Best Regards
Shamsul

Shamsul A. Tarafder, MSc, PhD, MEnvSc, P.Geo.
Associate and Senior Geoscientist
Geoenvironmental and Hydrogeological Services

Peto MacCallum Ltd.
165 Cartwright Avenue
Toronto, Ontario M6A 1V5
Tel: (416) 785-5110
Fax: (416) 785-5120
Cell: (416) 521-5567
starafder@petomaccallum.com

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APPENDIX C

Statement of Limitations

STATEMENT OF LIMITATIONS

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APPENDIX B

Geotechnical and Hydrogeological Background Review

West Trunk Diversion (WTD)

Geotechnical and Hydrogeological Background Review Study (TM-02)

December 3rd, 2021

Report Prepared For:

Regional Municipality of Peel

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Issue and Revision Record					
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APPENDICES

Appendix A Geotechnical Data Plan

ACRONYMS

CADD	Computer Aided Design and Drafting
EA	Environmental Assessment
CVTS	Credit Valley Trunk Sewer
GGHA	Greater Golden Horseshoe Area
Peel Region	Regional Municipality of Peel
Hatch	Hatch Corporation
IFC	Issued for Construction
L/s	Litres Per Second
MLD	Mega-Litres Per Day
MTO	Ministry of Transportation Ontario
OPSD	Ontario Provincial Standard Drawings
OPSS	Ontario Provincial Standard Specifications
OTM	Ontario Traffic Manual
PDR	Preliminary Design Report
RFI	Request for Information
WTS	West Trunk Sewer
RFP	Request for Proposal
SCADA	Supervisory Controls and Data Acquisition
TM	Technical Memorandum
WTD	West Trunk Diversion
WTT	West Trunk Twinning

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Peel West Trunk Diversion Project (WTD) serves as the groundwork to facilitate the future rehabilitation of the existing Credit Valley Trunk Sewer (CVTS) which was originally built in the late 1960s and has been servicing the west portion of the Regional Municipality of Peel (Peel Region) since then. Peel Region has identified additional benefits of linking the recently constructed West Trunk Sewer (WTS) with the CVTS using newly installed permanent trunk sanitary sewers first as a redundancy measure, and second as operational dynamicity via the inclusion of automated Supervisory Controls and Data Acquisition (SCADA) controlled gates

1.2 STUDY AREA

The WTD is located in the Streetsville neighbourhood of the City of Mississauga between the Credit River and Erin Mills Parkway from west of Britannia Road West to Eglinton Avenue. Four preliminary alignment alternatives are being considered to divert flows from the CVTS to the WTS in order to facilitate future rehabilitation works and manage peak wet weather flows.

The four proposed EA alignment alternatives are illustrated in Figure 1.

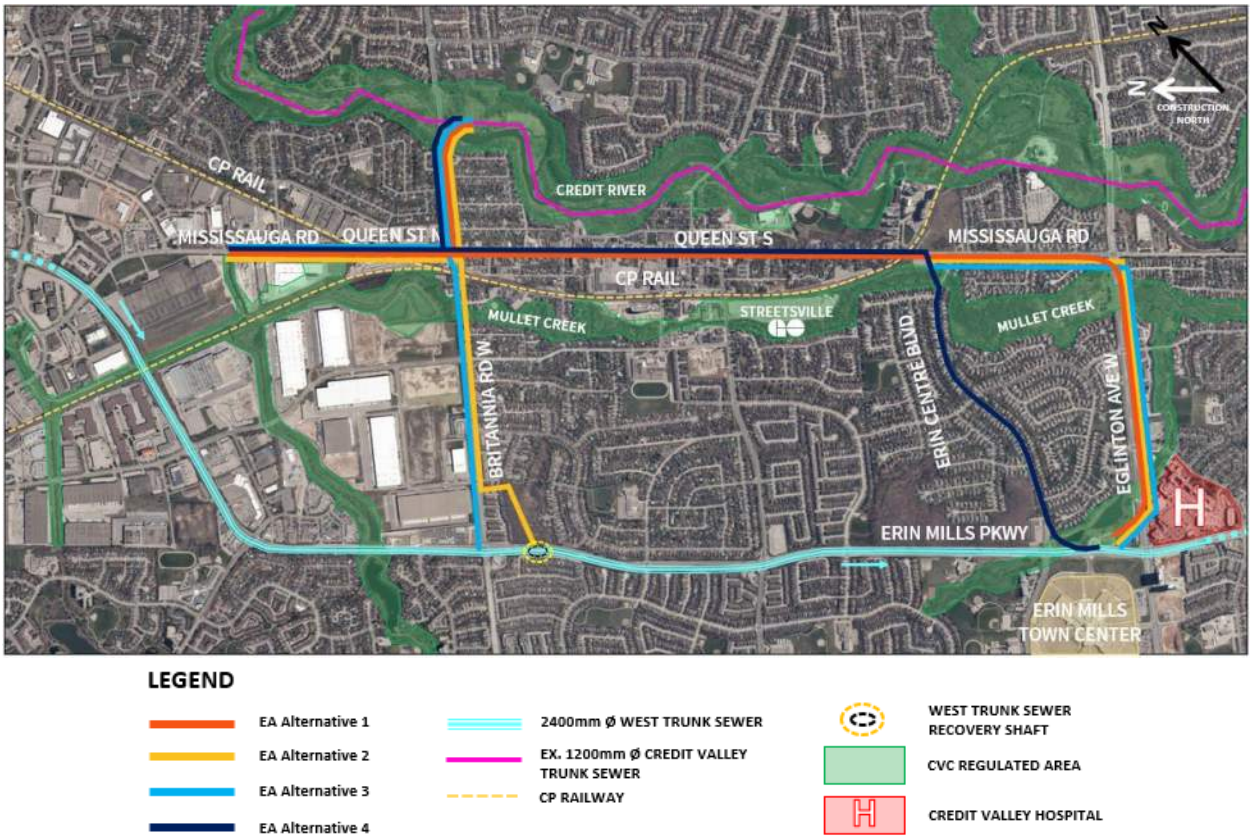

Figure 1 – EA Alignment Alternatives

1.3 PURPOSE OF DOCUMENT

Hatch has prepared this Technical Memorandum (TM) to summarize the available geotechnical and hydrogeological reports describing the local and regional geotechnical features and the hydrogeology of the project area. This TM provides a general overview of all available geotechnical and hydrogeological background information, reports, and data for the WTD project, which have been summarized in tabular format in Section 1.5, all of which will be used by Hatch to provide input to the EA process and design phase of the proposed wastewater infrastructure.

1.4 SCOPE OF WORK AND RFP REQUIREMENTS

As detailed in RFP 2018-482P Section 13 (Scope of Professional Engineering Services), relevant scope of work items involved with the geotechnical and hydrogeological background information review are summarized as follows:

- Obtain and review available geologic and physiographic information, including water and well records,
- Obtain and review available geotechnical and foundation investigation reports within alternative routes, including borehole logs,
- Provide an overview of the geological and hydrogeological setting in the project areas,
- Provide an assessment of the potential dewatering/depressurization requirements,
- Assess potential impacts on existing groundwater resources, water wells, and surface water features,
- Provide preliminary geotechnical assessment of the soil and groundwater conditions anticipated along the trunk sewer alignments,
- Provide an assessment of the likely impact to the design and construction methodology for the tunnelling and open cut infrastructure, and,
- Provide input to the EA process.

1.5 INFORMATION PROVIDED BY PEEL REGION

All available background information currently available to Hatch has been grouped into the following general categories, and is summarized in Table 1-1. A brief description of each category is provided below:

- Request for Proposal and Addenda
  - Request for proposal documents and four (4) associated addenda issued during the request for proposal period.
- Geotechnical Reports and Investigations
  - Geotechnical design reports and investigations (including geotechnical data reports (GDR) and geotechnical baseline reports (GBR)) for infrastructure within the project area including, but not limited to, the West Trunk Sewer, Streetsville Watermain and Sanitary Sewer Replacements, West Trunk Sewer Interconnect, and private watermain replacements, providing an overview of geotechnical field conditions, factual data, and design recommendations specific to contiguous

projects. All boreholes included in the geotechnical reports and investigations in the project area have been plotted and are summarized in Figure 1 in Appendix A.

- Hydrogeolgical Reports and Investigations
  - Hydrogeological assessment for Streetsville watermains, providing an overview of site geology and hydrogeologic conditions.
- Water Well Records
  - Various well records from the 1950's to present, detailing well testing results as well as the overburden and bedrock materials in the project area.
- Aerial Maps
  - Maps provided by the Oak Ridges Moraine Groundwater Program provide aerial views of existing boreholes, shallow water table wells, and include stratigraphic profiles of major roadways.
- Other Relevant Information
  - Includes various information from related project on water taking records, electrical resistivity tomography (ERI) investigations, record (as-built) drawings, field photographs and videos, flood mitigation plans, tunnel boring machine (TBM) shop drawings, and a jet grouting proposal.

Table 1-1:Available Background Information

REQUEST FOR PROPOSAL AND ADDENDA		
Document Title	**Date Published**	**Primary Author**
Engineering Services for the West Trunk Diversions	June 22, 2018	Region of Peel
Engineering Services for the West Trunk Diversions - Addendum 1	July 6, 2018	Region of Peel
Engineering Services for the West Trunk Diversions - Addendum 2	July 23, 2018	Region of Peel
Engineering Services for the West Trunk Diversions - Addendum 3	August 9, 2018	Region of Peel
Engineering Services for the West Trunk Diversions - Addendum 4	August 16, 2018	Region of Peel
GEOTECHINCAL REPORTS AND INVESTIGATIONS		
Document Title	**Date Published**	**Primary Author**
Geotechnical Investigation and Design Report West Trunk Sewer CPR Crossing Argentia Road	March 1, 2012	Golder Associates
Geotechnical Investigation and Design Report Proposed West Trunk Sewer Watermain Highway 401 Crossing	September 1, 2012	Golder Associates
Geotechnical Data Report - Detail Design and Contract Administration for the West Trunk Sewer	July 1, 2012	Golder Associates
Geotechnical Data Report - Detail Design and Contract Administration for the West Trunk Interconnect Sewer	July 1, 2012	Golder Associates

Geotechnical Investigation and Design Report - West Trunk Sewer CPR Crossing Erin Mills Parkway	May 1, 2012	Golder Associates
Geotechnical Investigation and Design Report - West Trunk Sewer Highway 403 Crossing West of Erin Mills Parkway	May 1, 2012	Golder Associates
Geotechnical Investigation, Streetsville Watermain and Sanitary Sewer Replacements	December 10, 2014	SPL Consultants Ltd.
Chemical Characterization of Soil and Groundwater on Queen Street North from Thomas Street to Reid Drive, Mississauga, Ontario	April 19, 2011	SPL Beatty
Geotechnical Investigation Proposed Watermain Replacement on Queen Street and Thomas Street, Mississauga, Ontario	April 29, 2009	Coffey Geotechnics
Chemical Characterization of Soil Queen St. S and Thomas St., Mississauga	April 29, 2009	Coffey Geotechnics
Farmstead Lane, Switzer Gate, Plum Tree Court, and Creditview Rd, Mississauga	May 27, 2010	Terraprobe
Main St. and Bristoll Rd. W, Streetsville	April 7, 2010	Alton Associates Inc.
Augusta Ct., Baymill Ct., Cider Mill Pl., Coachford Way, Evenstar Ct., featherston Ct., Harlow Rd., Miraya Ct, and The Loft, Mississauga	July 18, 2008	Coffey Geotechnics
Alpha Mills Rd., Nipiwin Dr., Glace Bay Rd., Tours rd., Crickadom Ct., and Neuchatel Rd., Mississauga	April 11, 2013	SPL Consultants Ltd.
Ellen St., Church St., Water St., and Wyndham St. , Mississauga	December 10, 2014	SPL Consultants Ltd.
Pimlico Court and Minstrel Mews, Mississauga	July 27, 2010	SPL Beatty
Theodore Dr., The Chase, Pickwick Dr., & Moongate Cres, Streestville	May 19, 2009	Coffey Geotechnics
Queen St. S and Thomas St., Mississauga	April 29, 2009	Coffey Geotechnics
Pimlico Court and Minstrel Mews, Mississauga	July 23, 2010	SPL Consultants Ltd.
Ellen St., Church St., Water St., and Wyndham St. , Mississauga	March 5, 2013	SPL Consultants Ltd.
Kitimat Rd., Minnesota Ct., Campobello Rd., Kinsmen Gate, and Rimini Mews, Mississauga	May 14, 2004	Trow Associates Inc.
West Trunk GBR - Contract 1 GBR	November 1, 2012	Golder Associates
West Trunk GDR - Contract 1 GDR	May 1, 2012	Golder Associates
CPR Underpass Investigation - Brittania Side Rd., Streetsville	February 19, 1960	Racey, MacCallum and Associates Ltd.
Borehole Logs (DRAFT) - Erin Mills Pkwy and North of Brittania Rd. W	September 3, 2015	Peto MacCallum Ltd.
Borehole Logs (DRAFT) - Erin Mills Pkwy and North of Brittania Rd. W	August 14, 2015	Peto MacCallum Ltd.

Detail Design and Contract Administration for the West Trunk Sewer Supplementary Geotechnical Investigation Report (Version 4)	April 5, 2017	Golder Associates
Detail Design and Contract Administration for the West Trunk Sewer Supplementary Geotechnical Investigation Report (Version 4b)	May 23, 2017	Golder Associates
HYDROGEOLOGICAL REPORTS AND INVESTGATIONS		
Document Title	**Date Published**	**Primary Author**
Hydrogeologic Assessment Watermain Crossing Bristol Road and Credit Revier, Mississauga, Region of Peel	April 1, 2010	SPL Beatty
WATER WELL RECORDS		
Document Title	**Date Published**	**Well Owner/Contractor**
Erin Mills Pkwy and Brittania Rd W, Mississauga Well Record	February 10, 2019	McNally Construction
Erin Mills Pkwy and Brittania Rd W, Mississauga Well Record	February 10, 2019	McNally Construction
Erin Mills Pkwy and Brittania Rd W, Mississauga Well Record	February 12, 2019	McNally Construction
Erin Mills Pkwy and Brittania Rd, Mississauga Well Record	August 12, 2016	Region of Peel
6405 Erin Mills Parkway, Mississauga Well Record	November 24, 2014	Metrus Properties
Brittania Side Rd., Streetsville Well Record	September 18, 1963	Derby Dog Food Ltd.
73 Main St., Streetsville Well Record	November 15, 1967	Private Homeowner (not reported)
Streetsville Rd, and Base Line, Streetsville Well Record	July 25, 1956	Private Homeowner (not reported)
Thorny Brae Rd. Well Record	August 20, 1956	Private Homeowner (not reported)
Streetsville Well Record	September 14, 1954	Private Business (not reported)
Base Line and CPR, Streetsville Well Record	January 20, 1958	Private Homeowner (not reported)
Base Line and Credit River, Streetsville Well Record	September 19, 1956	Private Homeowner (not reported)
Streetsville Rd, and Base Line, Streetsville Well Record	July 6, 1962	Private Homeowner (not reported)
Base Line, Streetsville Well Record	June 2, 1964	Private Homeowner (not reported)
Main St. and Drury Rd., Streetsville Well Record	December 11, 1953	Private Homeowner (not reported)

Main St. and Drury Rd., Streetsville Well Record	February 20, 1953	Private Homeowner (not reported)
Main St. and Drury Rd., Streetsville Well Record	March 30, 1953	Private Homeowner (not reported)
Credit River, Streetsville Well Record	September 11, 1957	F.M. Dennis (well contractor)
Carolyn Rd, Streetsville Well Record	July 15, 1960	WM. E Core & Son (well contractor)
Carolyn Rd, Streetsville Well Record	September 8, 1960	Private Homeowner (not reported)
Carolyn Rd, Streetsville Well Record	June 24, 1967	WM. E Core & Son (well contractor)
Streetsville Well Record	September 12, 1951	not reported
Streetsville Well Record	August 28, 1951	not reported
Alpha Rd, Streetsville Well Record	July 8, 1969	Oxford Const
Subway Rd, Streetsville Well Record	May 29, 1952	R. Burns Renwick (well contractor)
Brittania Rd. W, Streetsville Well Record	October 29, 1966	WM. E Core & Son (well contractor)
Britannia Side Rd., Streetsville Well Record	December 3, 1960	WM. E Core & Son (well contractor)
Streetsville Well Record	July 11, 1960	S. McCauley (well contractor)
Streetsville Well Record	July 14, 1960	S. McCauley (well contractor)
Britannia Side Rd., Streetsville Well Record	December 30, 1971	not reported
Mississauga Rd, Mississauga Well Record	December 21, 1999	Core's Well Drilling (well contractor)
AERIAL MAPS		
Document Title	**Date Published**	**Source**
Aerial View: Queen St. S,Brittania Rd. W, Eglinton Ave. W, and Erin Mills Pkwy	July 8, 2019	Oak Ridges Moraine Groundwater Program
Cross Section View: Queen St. S from Brittania Rd. W to Eglinton Ave. W	July 8, 2019	Oak Ridges Moraine Groundwater Program
Aerial View: Brittania Rd. W, Queen St. S, Eglinton Ave. W, and Erin Mills Pkwy	July 8, 2019	Oak Ridges Moraine Groundwater Program
Cross Section View: Brittania Rd. W, Queen St. S, Eglinton Ave. W, and Erin Mills Pkwy	July 8, 2019	Oak Ridges Moraine Groundwater Program

Aerial View of Borehole Records: Eglinton Ave W from Erin Mills Pkway to Queen St. S	July 8, 2019	Oak Ridges Moraine Groundwater Program
Aerial View of Document Records (Study Area and CAMC Boundary): Brittania Rd. W, Queen St. S, Eglinton Ave. W, and Erin Mills Pkwy	July 8, 2019	Oak Ridges Moraine Groundwater Program
Aerial View of Shallow Water Table Wells: Queen St. S,Brittania Rd. W, Eglinton Ave. W, and Erin Mills Pkwy	July 8, 2019	Oak Ridges Moraine Groundwater Program
OTHER RELEVANT INFORMATION		
Document Title	**Date Published**	**Primary Author/Source**
Convergence Pin Monitoring Reports	2013-2014	Frontop
Concrete Test Reports (Compressive Strength)	2016-2018	Golder Associates
Water Taking Records and Discharge Values	2013-2017	Region of Peel
Rock Support Shop Drawing and Geo-Engineering Evaluation of Temporary Ground Support for Shafts	July 21, 2013	McNally Construction Inc.
TBM Shop Drawing Submission	June 24, 2014	WSP
Erin Mills Pkway and Brittania Rd. Feedermain Plan and Profile As-Builts	May 1, 1984	Marshall Macklin Monaghan Limited
ERI Interpreted Survey Results - Brittania Rd. and Erin Mills Pkwy	August 20, 2015	Golder Associates Ltd.
ERI Interpreted Survey Results - Brittania Rd. and Erin Mills Pkwy	September 11, 2015	Golder Associates Ltd.
Twinning of the West Trunk Sanitary Sewer Plan and Profile Drawings	November 1, 2012	Genivar
Material through screw March 29 2017.mov	Site video	
Pic in screw at inspection door at erector.JPG	Site photo	
Pic in screw inspection door at drive.JPG	Site photo	
Polymer mixed in Chamber.JPG	Site photo	
Valve at Screw Drive after screw retracted.mp4	Site video	
WTC1 Peer Review Workshop Presentation.pptx	Peer Review Workshop Presentation	
After Well 7 Install (2).mov	Site video	
After Well 7 Install.mov	Site video	
CH Chamber After Polymer.JPG	Site photo	
Chamber inspection after polymer mixing.MOV	Site video	
Credit River - Wetlands and Flood Mitigation Natural adaptation to extreme rainfall	July 1, 2017	Oak Ridges Groundwater Program
Jet Grout Cost Estimate	N/A	N/A
Jet Grout Compound Sketch - Erin Mills Pkwy	N/A	N/A

Evaluation Of Stress Control of Jet Grout Block in West Trunk	September 15, 2015	McNally Construction Inc.
Twinning of the West Trunk Sewer - Jet Grouting Proposal	September 11, 2015	Geo-Foundations

2. REVIEW OF GEOTECHNICAL AND HYDROGEOLOGICAL BACKGROUND INFORMATION

2.1 EXISTING GEOTECHNICAL DATA

All available geotechnical data in the project area has been plotted using the boreholes coordinates provided in geotechnical data reports and investigations noted in Section 1.5. The geotechnical data pertaining to the WTD project is presented in Figure 1 in Appendix A.

There is limited available geotechnical data along the proposed alignment of the WTD, as shown in Figure 1. The subsurface conditions and geotechnical parameters in the following sections have been projected from their geographical location to the anticipated project alignment for discussion purposes only and cannot be considered an accurate representation of field conditions for design implementation/consideration.

2.1.1 GEOLOGIC HISTORY OF THE AREA

Southern Ontario, including the study area for the West Trunk Diversion Sewer, has been subjected to extensive glaciations during the last 20,000 years. At least four periods of glaciations are known to have occurred within this period of time which were interrupted by warmer climate inter-glacial periods. The last glacier (Wisconsin Glacier) withdrew from the area approximately 8,000 to 10,000 years ago.

Remnants from the soil deposits laid down during the first three glaciations and the inter-glacial periods have been largely or completed obliterated by the last Wisconsin Glacier. As the last glacier retreated eastward into the Lake Ontario basin, a shallow water body, Lake Peel, was dammed between the ice front and the Niagara escarpment. Traces of glacial lake sediments can be found in shallow depressions along the creek and river valleys. Sands and gravels left behind as near shore, or delta deposits, can also be found in the area. As the glacier withdrew further, and when drainage via the Hudson River into the Atlantic Ocean became possible, lake levels stabilized into the Lake Ontario basin. This stable stage formed the prominent shoreline of glacial Lake Iroquois, the remnant of which can be found a short distance south of Dundas Street.

The study area for the proposed West Trunk Diversion Sewer (north of Highway 403) lies within the physiographic region known as the South Slope. The South Slope is comprised of calcareous clay till with lacustrine clay and silt reworked by the aforementioned glaciers, with numerous scattered drumlins and deep valley cuts caused by flowing streams towards Lake Ontario. The surface topography slopes gradually and uniformly towards Lake Ontario. The main geologic units found across the West Trunk Diversion Sewer project are the Queenston and Georgian Bay

Formations. The Georgian Bay Formation consists of blue-grey shale interbedded with minor siltstone and limestone. The overlying Queenston Formation consists of brownish red to maroon, slight calcareous to non-calcareous, sparsely fossilferous and locally gypsiferous shale interbedded with grey green shale, bioclastic limestone and calcareous siltstone. Mississauga Road, Queens Street North, and Queens Street South are near the contact zone between the two formations, therefore both rock types are present in the local stratigraphy.

2.1.2 GENERAL SUBSURFACE CONDITIONS

Existing boreholes in the study area were advanced to depths ranging between approximately 3 m to 70 m below the existing ground surface in the project area. Generally, the subsurface conditions in the project area consist of relatively shallow overburden deposits with local deep deposits along sections where it is believed that former river valleys and buried erosion channels may exist. The overburden is underlain by shale bedrock of the Queenston and/or Georgian Bay Formations. The soil stratigraphy in the existing borehole logs can be summarized in the following strata units: topsoil/asphalt and fill materials; clayey silt to silty clay deposits; cohesive till deposits; granular till deposits; deformation till deposit; and, sand and gravel to sand to silty sand/sandy silt to sand and silt/silt deposits. The overburden is underlain by local bedrock, which can be described as shale interbedded with thin limestone and siltstone layers from the Queenston Formation overlying shale interbedded with thin limestone layers from the Georgian Bay Formation.

A summary of the general subsurface conditions, detailing relevant soil and rock parameters, is presented in subsequent sections.

2.1.2.1 OVERBURDEN

Asphalt (about 0.1m thick) was encountered at the ground surface in the majority of boreholes and is typically underlain by fill materials ranging from 0.1m to 2.0m below ground surface consisting of clayey silt to silty clay, trace gravel, sand and gravel, and sandy silt. The fill occasionally contains trace organic matter, rootlets, occasional cobble and boulder, trace gravel and shale fragment. SPT ‘N’ values for fill material vary from 2 blows to greater than 50 blows per 0.3m of penetration, indicating a very loose to very dense consistency.

The fill material is underlain by clayey silt to silty clay deposits, encountered at an approximate depth ranging from 2.0m to 6.0m below ground surface. SPT ‘N’ values recorded within the clayey silt to silty clay deposits generally range from 6 blows to greater than 50 blows per 0.3m of penetration, indicating a loose to very dense consistency. Non-cohesive sand and some fill deposits within the clayey silt to silty clay layer are associated with the lower bound SPT ‘N’ values in this strata. The water content measured on samples of this deposit generally vary between 9 percent and 28 percent.

Underlying the clayey silt to silty clay deposits, cohesive till deposits and granular till deposits were noted in the majority of boreholes. Cohesive and granular till deposits were encountered at

an approximate depth ranging from 1.0m to 14.0m below ground surface. SPT 'N' values for cohesive till deposits vary from 5 blows to greater than 50 blows per 0.3m of penetration, indicating a loose to very dense consistency, with natural moisture content ranging from 8 percent to 18 percent. SPT 'N' values for granular till deposits vary from 11 blows to greater than 50 blows per 0.3m of penetration, indicating a compact to very dense consistency, with natural moisture content ranging from 7 percent to 12 percent. The presence of cobles and boulders was occasionally noted in the till deposits due to the nature of glacial deposition of these till layers.

The cohesive till deposits and granular till deposits are underlain by cohesionless deposits varying in composition from sand and gravel to sand to silty sand/sandy silt to sand and silt/silt deposits, encountered at an approximate depth ranging from 2.3 to 8.0 below ground surface. The location of these cohesionless deposits vary, but are notable features in the majority of boreholes. SPT 'N' values for this layer vary from 9 blows to greater than 50 blows per 0.3m of penetration, indicating a loose to very dense relative density. The water content measured on samples within the cohesionless deposits range from 9 percent to 23 percent.

Given the wide range of data assessed as part of this background review study, the aforementioned limits for SPT 'N' values, water content, and anticipated depth of strata are approximations used to generalize the local subsurface conditions and should not be used as a design basis. It is suggested that design recommendations are drawn from targeted data specific to the WTD project, to be undertaken during the design/EA phase.

2.1.2.2 BEDROCK

The bedrock can be described as shale interbedded with thin limestone and siltstone layers from the Queenston Formation overlying shale interbedded with thin limestone layers from the Georgian Bay Formation.

The interpreted bedrock surface was encountered in boreholes at depths ranging from 0.5 m to 46 m below existing ground surface. Despite this wide range, bedrock was typically encountered at an average depth of 7m below ground surface.

The rock quality designation (RQD) based on the borehole data ranges from 0% to 100%, with an overall average value of 56%, indicating a rock mass of very poor to excellent quality and on average fair quality as per Table 3.10 of the Canadian Foundation Engineering Manual (CFEM, 2006). All major diversion sewers, apart from the minor open cut works undertaken as part of the Falconer Diversion Area, will be constructed via trenchless technology with an anticipated tunnel zone ranging from approximately 20m to 40m below ground surface. At the expected tunnel zone, the RQD generally ranged from 80% to 100%, indicating a rock mass of good to excellent quality. Some zones of slightly weathered, thinly laminated weak shale of the Georgian Bay Formation interbedded with limestone, with RQD ranging between 0% and 60% (very poor to fair rock quality) are present at the anticipated tunnel horizon.

2.1.3 GEOHAZARDS

A major system of buried valleys extending from Lake Huron to Lake Ontario intersects with the West Trunk Diversion Sewer project area. Recent project experience and existing geotechnical investigation data have identified several of these buried valley features, including a buried valley at the intersection of Highway 403 and Erin Mills Parkway and a second buried valley at the intersection of Burnhamthorpe Road West and Erin Mills Parkway. A third buried valley feature at the intersection of Erin Mills Parkway and Britannia Road, was encountered during the construction phase of the West Trunk Sewer, and this deep, water bearing buried valley significantly impeded tunnel mining operations as the selected TBM did not have the capability to control high groundwater inflows and the change in ground conditions. A fourth buried valley feature at the intersection of Kingsmen Gate and Erin Mills Parkway was detected during the supplemental geotechnical investigation for the west trunk sewer.

With tunnels at depths typically below the groundwater table in bedrock ground conditions, the presence of a buried valley is a primary concern for tunnel construction. The ground conditions during tunnelling when encountering a buried valley change from typically, stable bedrock with minor inflows of groundwater via joints and discontinuities, to unstable glacial depositions of soil, cobbles, boulders, and local bedrock fragments with significant groundwater inflows. “Open face” tunnel boring machines are not equipped or capable of mining through buried valleys due to the unstable nature of these ground conditions, as they do not prevent ground inflows, or apply a supporting, or face pressure, to the ground being mined. The combination of uncontrolled high groundwater inflows and open face tunnel boring machines (TBM) can produce flowing ground conditions, which will significantly impact tunnel production, and lead to overmining and potential ground surface settlement. A TBM with a "closed face" mode of operation seals the tunnel from groundwater inflows and actively applies supporting pressure to the ground being mined at the tunnel face to maintain an equilibrium between the TBM and the mined ground.

The buried valleys identified during the background review are briefly discussed in the following sections. For additional information on the buried valley features, please refer to the reports and boreholes logs presented in Table 2-1 for further detail.

Table 2-1: Buried Valley Documentation

Document Title	Date Published	Primary Author/Source
Geotechnical Investigation and Design Report - West Trunk Sewer Highway 403 Crossing West of Erin Mills Parkway	May 2012	Golder Associates
Geotechnical Data Report - Detail Design and Contract Administration for the West Trunk Sewer	July 2012	Golder Associates
Detail Design and Contract Administration for the West Trunk Sewer Supplementary Geotechnical Investigation Report (Version 4)	April 5, 2017	Golder Associates

Detail Design and Contract Administration for the West Trunk Sewer Supplementary Geotechnical Investigation Report (Version 4b)	May 23, 2017	Golder Associates
Borehole Logs (DRAFT) - Erin Mills Pkwy and North of Brittania Rd. W	September 3, 2015	Peto MacCallum Ltd.
Borehole Logs (DRAFT) - Erin Mills Pkwy and North of Brittania Rd. W	August 14, 2015	Peto MacCallum Ltd.

2.1.3.1 HIGHWAY 403 AND ERIN MILLS PARKWAY BURIED VALLEY

During the geotechnical investigation phase of the West Trunk Sewer Highway 403 Crossing, it was determined that the bedrock surface at the intersection of Highway 403 and Erin Mills Parkway, near the westbound on-ramp (N-W ramp), dips down into an approximately 22m deep buried valley. Boreholes drilled directly adjacent to the buried valley indicate that the bedrock depth ranged from 3.0m and 13.8m, with bedrock levels within the buried valley reported at 22.7m below ground surface. Borehole BH15, drilled in the buried valley, noted the presence of sand with loose to very dense consistency, and very dense gravelly sand, trace to some silt, and cobbles and hard clayey silt with sand and trace gravel overlying the shale bedrock, characteristic of a buried valley feature.

2.1.3.2 BURNHAMTHORPE ROAD WEST AND ERIN MILLS PARKWAY BURIED VALLEY

Results from the geotechnical field investigation for the West Trunk Sewer alignment indicated that an extensive buried valley was present at the intersection of Burnhamthorpe Road West and Erin Mills Parkway. The bedrock surface encountered adjacent to the buried valley ranged between 3.0m and 6.2m below ground surface, with bedrock contact in the buried valley lowering to approximately 31.0m. The subsurface conditions above bedrock contact consisted of very dense, wet, grey sand, some gravel to sand and gravel, containing rock fragments underlain by rounded to subrounded shale, limestone and granitic gravel to cobble sizes with interbeds of shale and limestone slabs; coarse sand retrieved in wash water (deformation till), indicative of a buried valley.

2.1.3.3 ERIN MILLS PARKWAY AND BRITANNIA ROAD BURIED VALLEY

During construction of the West Trunk Sewer Contract 1, a buried valley approximately 50m deep was encountered at the intersection of Britannia Road and Erin Mills Parkway. Additional geotechnical/geophysical investigations were added to the project scope during tunnel construction to delineate the bedrock surface between the initial borehole investigation. The geophysical survey, including both electrical resistivity imaging (ERI) and seismic refraction, was carried out to determine bedrock contact as the investigation phase boreholes did not capture the buried valley. Investigation phase boreholes in the area indicated a shallow bedrock contact between 2.5m and 6.0m below ground surface. The ERI was not successful in delineating the bedrock surface at this buried valley, however the seismic refraction survey was able to identify the bedrock contact, which was measured at approximately 50m and 40m deep. Boreholes were drilled straight to bedrock, with no overburden sampling.

The seismic refraction survey also uncovered a fourth buried valley at Kingsmen Gate and Erin Mills Parkway, with bedrock contact ranging from 18m to 29m below ground surface. Adjacent boreholes in the vicinity of this buried valley confirm the presence of a shallow bedrock surface between 4.0m and 10.0m below ground surface. The major soil type within the bedrock valley at Kingsmen Gate and Erin Mills Parkway is characterized as a very dense silty sandy gravel to silty sand and gravel till which overlays the bedrock.

2.2 EXISTING HYDROGEOLOGICAL DATA

The Credit River runs parallel to the proposed project alignment along Queen Street and Mississauga Road, and the impact of the proposed construction on the groundwater is presented in the following section.

The groundwater levels in existing boreholes ranged from 1.0 m to 14.5 m (average depth of 4m below existing ground surface), with hydraulic conductivity values ranging from 7.7×10^{-7} to 1.5×10^{-4}. The east section of the project alignment along Britannia Road crosses underneath the Credit River, with a potential shaft adjacent to this body of water. Due to a locally high groundwater table adjacent to the river, at approximately 4.5m below ground surface, water tight shaft construction methods are recommended to mitigate any effects on the groundwater.

As indicated in historical reports, the bedrock in the project area is considered to be a poor aquifer, with both low yields and poor quality, with typical yields less than 0.15L/s. The shale groundwater usually has a high mineral content, with high concentrations of chloride.

3. RECOMMENDATIONS/CONCLUSIONS

The primary concern regarding the ground conditions is the noted presence of buried valley features within the project area bedrock. To mitigate the risk associated with buried valleys, it is recommended to specify a tunnel boring machine capable of operating in closed face mode, with the ability to apply pressure to the excavation face, either by fluid or mechanical means. Due to the anticipated deep trenchless methods of installation generally in bedrock and the use of a closed face tunnel boring method to mitigate the impact of buried valleys, groundwater issues associated with installation of the WTD would be significantly reduced.

Based on the review of the available geotechnical and hydrogeological data detailed above, Hatch has identified a number of data gaps, specifically along the proposed project alignment, as well as several geohazards noted in Section 2.1.3, which should be addressed for completion of the WTD design phase. Some of the identified data gaps will be filled in whole, or in part, via project-specific investigations, however, it is recommended to pursue a full suite of geotechnical and hydrogeological testing along Queen Street North, Queen Street South, Britannia Road West, and Eglinton Avenue West during the design phase to address all data gaps and to collect pertinent information for the WTD project. The identification of buried valleys during this project-specific geotechnical and hydrogeological testing phase will be critical to the success of the project. Peel Region has also opted to undertake a geophysical investigation of the entire project

alignment during the EA phase to further assist with the identification of notable geologic features. Results from the geophysical investigation will assist with strategic placement of boreholes as part of the investigations undertaken during the detailed design phase investigations.

APPENDIX A GEOTECHNICAL DATA PLAN

Shallow Borings 1
Shallow borings present along the WTD alignment on Mississauga Road & Queens Street South do not contact bedrock and do not reach the anticipated tunnel zone. There is additional geotechnical data in the project area that is not presented in this figure, as it is not relevant to the WTD alignment.
Geohazards 4
Three (3) buried valley features were identified during review of background information and these geologic hazards significantly impeded tunnel mining operations. Identification of these features during the design phase will be critical to the success of the project.
Deep Borings 2
Available deep borings are present along Erin Mills Parkway and reached the anticipated tunnel zone for the WTD. The geotechnical information in this area has been summarized in the Technical Memorandum. There is additional geotechnical data in the project area that is not presented in this figure, as it is not relevant to the WTD alignment.
Project Alignment 3
In order to connect the Credit Valley Trunk Sewer (CVTS) to the newly constructed West Trunk Sewer (WTS), three (3) alternative project alignments have been considered, including the single diversion (alternative 1 [red]), and dual diversion (alternatives 2 [blue] and 3 [yellow]) concepts.
MISSISSAUGA RD
QUEEN ST N
QUEEN ST S
MISSISSAUGA RD
BRITANNIA RD W
HWY 401
ERIN MILLS PKWY
ERIN MILLS PKWY
ERIN MILLS PKWY
WINSTON CHURCHILL BLVD
WINSTON CHURCHILL BLVD
BRITANNIA RD W
EGLINTON AVE W
HWY 403
HWY 403
BURNHAMTHORPE RD W
BURNHAMTHORPE RD W
DUNDAS ST W
DUNDAS ST W
N

APPENDIX C

Natural Environment Report

NATURAL HERITAGE ASSESSMENT REPORT
WEST TRUNK SANITARY SEWER DIVERSION PROJECT
REGIONAL MUNICIPALITY OF PEEL

Prepared for:
HATCH CORPORATION

Prepared by:
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Version 1.0
November 2021
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NATURAL HERITAGE ASSESSMENT REPORT

WEST TRUNK SANITARY SEWER DIVERSION PROJECT

REGIONAL MUNICIPALITY OF PEEL

Prepared for Hatch Corporation, November 2021

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DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

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VERSION CONTROL

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1 INTRODUCTION

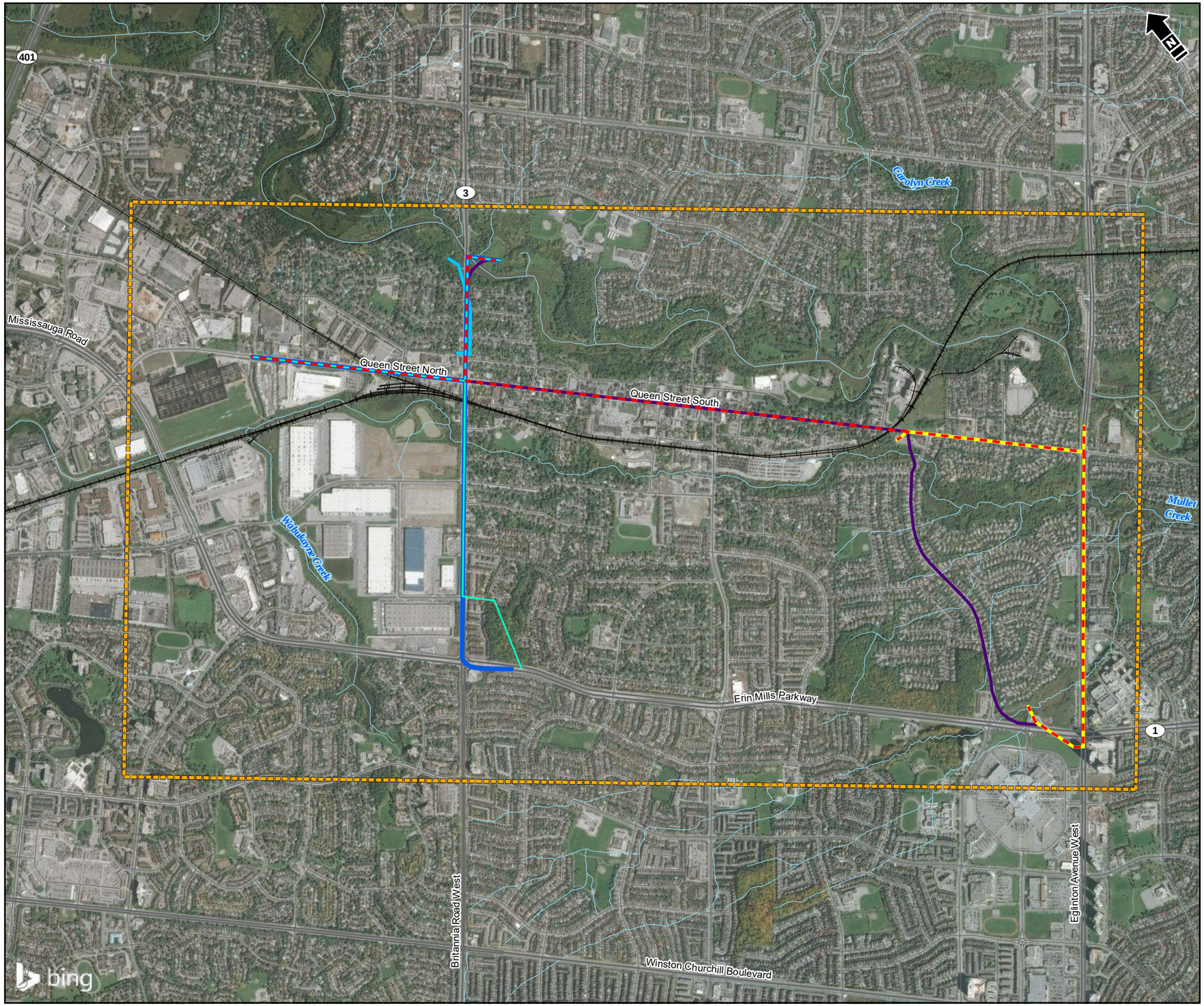
The Regional Municipality of Peel (Region of Peel) retained Hatch Corporation to complete a Schedule B Municipal Class Environmental Assessment (EA), detailed design, and construction administration associated with the West Trunk Sanitary Sewer Diversion Project within the City of Mississauga (the City). In addition, Hatch was retained to complete a Schedule A/A+ EA associated with the Falconer Drive Easement West Diversion, also within the City. The requirements for this project include the construction of a new trunk sanitary sewer line to divert sub-trunk sanitary flow from the existing Credit Valley Trunk Sewer to the new West Trunk Sewer on Erin Mills Parkway.

The construction phase of the West Trunk Diversion alignment is currently proposed to be completed by tunnel, using a tunnel boring machine. The tunnelling will be facilitated through surface works associated with the construction of tunnelling shafts, laydown areas, and work compounds (staging areas). The majority of the work will be undertaken within the municipal right-of-way (RoW), with construction shafts located outside the travelled portion of the roads within adjacent vacant lands and existing open spaces where the predominant land use constraints are the existing trees and vegetation. In some cases, the lands that have the potential to be affected by this work are in close proximity to riverine valley corridors that serve as wildlife habitat.

1.1 Project Background

Hatch retained Matrix Solutions Inc. to complete an environmental inventory and natural heritage assessment to support the Schedule B Municipal Class EA and detailed design of the West Trunk Sanitary Sewer Diversion Project for the City. The West Trunk Diversion is a key component of the Region of Peel's long-term wastewater services and management strategy. The following four proposed alignments will undergo an environmental inventory and natural heritage assessment (Figure 1):

- Britannia Road West Diversion (part of Alignments 1, 2a, and 2b of the Schedule B EA)
- Eglinton Avenue West Diversion (part of Alignments 2a and 2b of the Schedule B EA)
- Falconer Drive Easement- West Diversion (part of the Schedule A/A+ EA)
- Erin Centre Boulevard Diversion (Alignment 4 of the Schedule B EA; this alignment was added in May 2021)



Study Area
Watercourse
Railway
Highway
Road

West Diversion Alignment Options

Proposed Britannia Rd. West Diversion (Alignment 1)
Proposed Britannia Rd. West Diversion (Alignment 2a)
Proposed Britannia Rd. West Diversion (Alignment 2b)
Proposed Eglinton Ave. West Diversion (Alignment 2a and 2b)
Proposed Erin Centre Blvd. Diversion (Alignment 4)
Proposed Falconer Dr. Easement Diversion (All Alignments)

1:20,000 metres
210 0 210 420
NAD 1983 UTM Zone 17N

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Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Hatch
West Diversion Sanitary Sewer

Study Area

Date:	Project:	Submitter:	Reviewer:
June 2021	27404	E. Wilkinson	A. Fausto

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Figure 1

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1.2 Study Objectives

The natural heritage screening assessment provides a summary of the study area, an outline of the EA methodology, and information regarding the existing environmental conditions present within the study area for each proposed West Trunk Sanitary Sewer Diversion alignment alternative and the proposed Falconer Drive Easement West Diversion. During the spring of 2019 (Alignments 1, 2a, 2b, and Falconer) and summer 2021 (Alignment 4), the following natural environment inventories were completed:

- identification of significant habitat features
- terrestrial habitat screening surveys
- species at risk (SAR) habitat assessment
- incidental wildlife observations
- aquatic habitat screening surveys

The results of the environmental inventories were used to evaluate potential impacts for all design alternatives to aid in determining the preferred alignment based on the existing natural environment conditions and potential constraints. A preliminary assessment of potential significant natural heritage features and issues involved with alignment alternatives was conducted to provide recommendations for mitigation of potential environmental impacts and to determine specific regulatory permit requirements prior to construction.

Screening-level natural heritage evaluations were completed for the entire study area during the EA phase of the project. Detailed natural heritage evaluations will be completed for the preferred alternative alignment and shaft locations. Aquatic habitat mapping will be completed for watercourse crossings along the proposed alignment and those watercourses within 30 m of proposed work locations when the preferred alignment is chosen.

1.3 Environmental Setting

The West Trunk Sanitary Sewer Diversion alignment alternatives are located primarily within a highly urbanized portion of Mississauga, with defined natural environment corridors extending along the Credit River (Britannia Road crossing east of Queen Street), Mullet Creek (Britannia Road crossing west of Queen Street; Eglinton Avenue crossing west of Mississauga Road; and Erin Centre Boulevard crossing west of Mississauga Road), and an Unnamed Tributary of Mullet Creek (Eglinton Avenue crossing East of Erin Mills Parkway). Mullet Creek originates in the Peel Plain Physiographic region, with its headwaters north of Highway 407, and flows south through the South Slope Physiographic region within the study area to its confluence with the Credit River south of Burnhamthorpe Road. The headwaters for the Credit River originate in the Kame and Till Moraines and Drumlinized Till Plains above the Niagara Escarpment near the Town of Orangeville and flow south to Lake Ontario in Mississauga (Chapman and Putnam 1984).

Within the study area, remnant natural areas (woodlands, wetlands, valley, and watercourse corridors) are mainly associated with the valleylands and riparian habitat adjacent to the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek. The remaining upland areas along the West Trunk Sanitary Sewer Diversion alignments are urban areas with environmental constraints limited to manicured lawns, fallow agricultural lands, small woodlots, and the vegetated road RoW.

2 REGULATORY FRAMEWORK

Regulatory framework provides guidance on the protection of natural heritage features and evaluation of significance. Features identified within the subject lands were evaluated against the relevant federal, provincial, and municipal planning policies applicable to the study area.

2.1 Federal Legislation

2.1.1 Fisheries Act

The *Fisheries Act* sets out provisions to protect fish and fish habitat. In summer 2019, amendments were made to the *Fisheries Act* with the aim to restore protections for fish and fish habitat, enhance habitat restoration, improve management of projects, and strengthen Indigenous roles in projects. Section 35(1) states:

> *35(1) No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.*

An additional provision in Section 36(3), which prohibits the deposit of deleterious substances, states:

> *36(3) … no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.*

The *Fisheries Act* prohibits the death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat unless authorized by Fisheries and Oceans Canada (DFO) or a designated representative. As per amendments made to the *Fisheries Act* in 2019, it is now the proponent's responsibility to review the "measures to protect fish and fish habitat" as it relates to their project. If a project cannot implement the appropriate measures to prevent the death of fish and HADD, the project may require a project review by the DFO. Different criteria for a request for review are used and include:

- regulatory partnerships
- aquatic SAR
- marine protected areas

- aquatic invasive species
- measures to protect fish and fish habitat
- waterbodies where DFO review is not required
- compliance with standards and codes of practice

Review of these criteria will identify whether the project is exempt from the DFO review.

2.1.2 Species at Risk Act

The federal *Species at Risk Act* (SARA) was developed to help prevent wildlife from being extirpated or extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened. The SARA Section 32 states:

> *32 (1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.*
>
> *(2) No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual.*

Section 33 prohibits the damage or destruction of habitat and states:

> *33 No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.*

Additionally, for species listed as endangered or threatened that have had critical habitat identified through the implementation of a recovery strategy or action plan, Section 58 prohibits the destruction of critical habitat and states:

> *58(1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species - or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada - if*
>
> *(a) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;*
>
> *(b) the listed species is an aquatic species; or*
>
> *(c) the listed species is a species of migratory birds protected by the Migratory Birds Convention Act, 1994.*

Currently, no habitat protection is provided to species listed as "of special concern;" however, their populations are being closely monitored, and declines might result in reclassification to a protected category and then protection under SARA.

2.1.3 Migratory Bird Convention Act

The *Migratory Birds Convention Act* (MBCA) and associated regulations have the goal of ensuring the conservation of migratory bird populations by regulating potentially harmful human activities. Sections 5 and 6 of the MBCA prohibit the destruction/disturbance of migratory bird habitat and killing/removing migratory bird fledglings, eggs, nests, or other harmful activity to migratory birds. Under certain conditions, authorization to undertake prohibited activities (including scaring, capturing, or killing migratory birds or taking or destroying their nests or eggs) may be authorized through a permit issued by Environment and Climate Change Canada (ECCC 2016).

This law protects all birds with the exception of European Starling, House Sparrow, and Rock Pigeon. Bird nests that are destroyed during construction activities are referred to as "incidental take" and is illegal except under the authority of a permit obtained through the Canadian Wildlife Service. If the work can be completed without interfering with or harming migratory birds, a permit is not needed. Typically, a nest sweep would be conducted during the migratory bird nesting timing window of April 1 to August 30, in case trees would need to be removed. If a nest is found during a sweep, the appropriate setback from the nest would be determined, and no work would be completed in the setback area until it can be determined by a qualified biologist that the nest is no longer actively being used.

2.2 Provincial Legislation

2.2.1 Endangered Species Act

The *Endangered Species Act* (ESA) provides for the conservation and protection of fauna and flora species within the Province of Ontario that are threatened with extinction. Species designated as threatened or endangered in Ontario automatically receive legal protection under the ESA and their habitats are protected generally under the ESA (i.e., areas essential for breeding, rearing, feeding, hibernation, and migration). 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 Species at Risk in Ontario 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) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or

(b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause.

Currently, no specific protection is afforded to species listed as special concern under the ESA; however, as noted above, special concern species are considered species of conservation concern (SCC), and thus, their habitat is considered significant wildlife habitat (SWH) and receives protection under the Provincial Policy Statement (PPS; MMAH 2020). In order to balance protection and recovery goals with social and economic considerations, the ESA also gives the Ministry of the Environment, Conservation and Parks (MECP) the authority to issue permits or enter into agreements with proponents in order to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the ESA. In instances where a SAR or their critical habitat is observed, under Section 17(2) of the ESA, an overall benefit permit may be required to move the SAR or alter their habitat. The overall benefit permit provides authorization to perform the activity that would otherwise be prohibited by subsection 9(1) or 10(1) of the ESA, as long as an overall benefit to the species in Ontario is provided. Ontario Regulation 242/08 also outlines various exemptions or agreements that may be employed under the ESA, which are project or species specific.

2.2.2 Conservation Authorities Act

Section 28(1) of the *Conservation Authorities Act* (CAA) empowers conservation authorities with the ability to make regulations governing development that can have an impact to watercourses and water bodies. Under the CAA, a permit is required from the applicable conservation authorities before any site alteration to a watercourse, water body, or wetland. Conservation authorities also have the authority to grant permission to straighten, change, divert, or interfere with the existing channel of a river, creek, stream, or watercourse or to change or interfere with a wetland under conditions outlined in the CAA and associated regulation. The study area is located partially within a Credit Valley Conservation (CVC)-regulated watershed area. In 2013, CVC implemented Ontario Regulation 160/06: *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. The regulation identifies that:

no person shall undertake development, or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,…

b) river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse…

d) wetlands; or

e) other areas where development could interfere with the hydrologic function of a wetland, including areas within 120 metres of all provincially significant wetlands and areas within 30 metres of all other wetlands

Consultation with CVC will be required to discuss mitigation measures along the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek within the study area.

2.2.3 Provincial Policy Statement

The PPS (MMAH 2020) is issued under the authority of Section 3 of the *Planning Act* and came into effect on May 1, 2020, replacing the 2014 PPS. Section 2.1 of the PPS, Natural Heritage, establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as "significant." The Natural Heritage Reference Manual (MNR 2010) and the *Significant Wildlife Habitat Technical Guide* (MNR 2000) were prepared by the Ministry of Natural Resources (MNR; currently the Ministry of Natural Resources and Forestry [MNRF]) to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.

- Section 2.1.4 of the PPS states that development and site alteration shall not be permitted in significant wetlands in Ecoregions 5E, 6E, and 7E, or significant coastal wetlands.

- Section 2.1.5. of the PPS states that development or site alteration shall not be permitted in SWH or other types of significant habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions.

- Section 2.1.6. of the PPS states that development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

- Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in habitat of Endangered or Threatened species except in accordance with provincial or federal requirements.

In all cases, development and/or site alteration is not permitted under the PPS on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions (MMAH 2020).

2.2.4 Greenbelt Plan

The Greenbelt Plan (MAH 2017) was prepared under the Government of Ontario's *Planning Act*. The Greenbelt Plan is an overarching strategy which identifies areas which should be protected from urbanization in order to provide permanent protection to the agricultural land base and the ecological and hydrological features, areas, and functions occurring in the landscape. The Greenbelt area identifies Protected Countryside Area, which is made of the Agricultural System, the Natural System, Parkland, Open Space and Trails and Settlement Areas, to which all Protected Countryside Policies apply and Urban River Valley Areas which are not subject to Protected Countryside Policies except as set out in Section 6 of the Greenbelt Plan. The Urban River Valley designation applies to lands within the main corridors of river valleys connecting the rest of the Greenbelt to the Great Lakes and inland lakes. Lands in this designation are generally characterized by being:

a) *Lands containing natural and hydrologic features, including coastal wetlands; and/or*

b) *Lands designated in official plans for uses such as parks, open space, recreation, conservation and environmental protection.*

The Credit River valley corridor is identified under the Greenbelt Plan as an Urban River Valley Area as shown on Schedule 1 and Schedule 4 of the Greenbelt Plan.

2.3 Municipal Legislation and Regulations

2.3.1 Region of Peel Official Plan

The *Region of Peel Official Plan* (Region of Peel 2014) was prepared under the Government of Ontario's *Planning Act*. The *Region of Peel Official Plan*'s purpose is to recognize the need for effective environmental protection and management measures to ensure environmental sustainability. The Region of Peel has created a Greenland System, which is made up of Core Areas, Natural Areas and Corridors, and Potential Natural Areas and Corridors. If any of these designated areas are impacted through development or alteration, the *Region of Peel Official Plan* requires rehabilitation of the ecological features lost through replacement (Region of Peel 2014). The natural corridor associated with the Credit River valley system is designated as a Core Area under the *Region of Peel Official Plan*.

2.3.2 City of Mississauga Official Plan

The City has adopted "The Green System" that incorporates the natural heritage system, the urban forest, natural hazard limits, and parks/open spaces, which all contribute to a healthy natural environment in the City (City of Mississauga 2016). The natural heritage system is protected from development by means such as tree preservation, appropriate staging area placement, grading, landscaping, and appropriate parking amenities to maintain the ecological functions of the area. The natural corridors associated with the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek are designated as

"Significant Natural Areas" under the City's natural heritage system (Figure 1). Any negative impact that cannot be avoided will require mitigation through replacement (City of Mississauga 2016).

The urban forest is made up of trees on public and private properties throughout the City that enhance the health and sustainability for residents. Any development or alteration, where tree preservation is not feasible, a replacement must be completed in compliance with the City's tree permit bylaw and a Landscape Restoration Plan may need to be developed for review and approval by the City to replace any lost trees.

3 BACKGROUND REVIEW

The following background data sources were reviewed and considered as part of the existing conditions report to determine any relevant environmental constraints from the design and construction:

- Ontario Natural Heritage Information Centre (NHIC) database (MNRF 2021)
- MNRF, Aurora District Office
- MECP
- CVC
- *Natural Heritage Reference Manual for Policy 2.3 of the PPS* (MNR 2010)
- *Significant Wildlife Habitat Technical Guide* (MNR 2000)
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
- SARA Public Registry (Government of Canada 2018)
- Lands Information Ontario (LIO) Aquatic Resources Area (MNR 2012)
- *Atlas of the Breeding Birds of Ontario (OBBA): Bird Studies Canada* (Cadman et al. 2007)
- *Ontario Reptile and Amphibian Atlas* (ORAA; Ontario Nature 2015)
- *Ontario Butterfly Atlas* (OBA; TEA 2019)
- *Mississauga Official Plan* (City of Mississauga 2016)
- *Region of Peel Official Plan* (Region of Peel 2016)
- *Credit River Fisheries Management Plan* (CVC and MNR 2002)

Initial background requests regarding fish and fish habitat, as well as terrestrial sensitivities and SAR were submitted to Ontario MECP on April 1, 2019, to MNRF on April 29, 2019, and to CVC on March 29, 2019. Information was received from the MECP on May 5, 2019, from MNRF on May 28, 2019, and from CVC on May 07, 2019. All communications with MECP, MNRF, and CVC have been included in Appendix A**.**

Background information from MECP, MNRF, and CVC was supplemented with additional data from various websites and internet sources, including the NHIC, the OBA, and the ORAA. Information regarding breeding birds in the study area was extracted from the OBBA (Cadman et al. 2007).

Background information relating to aquatic features within the study area included consultation with MECP, MNRF, as well as CVC. The *Credit River Fisheries Management Plan* (CVC 2012) was utilized to collect additional information for the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek and included fish community information, thermal regime, in-water timing windows, recommended setbacks, and drainage information for the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek.

In addition, the DFO Aquatic SAR mapping, the ESA species status list and the SARA public registry (Government of Canada 2018) were all accessed to determine occurrence of aquatic SAR within the study area.

3.1 Species at Risk Screening

During background review and agency consultation, MECP has indicated that the following SAR may be present within the study area: American Chestnut (*Castanea dentata*), American Ginseng (*Panax quinquefolius*), Butternut (*Juglans cinerea*), Eastern Small-footed Myotis (*Myotis leibii*) Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Tri-Colored Bat (*Perimyotis subflavus*), Woodland Vole (*Microtus pinetorum*) , American White Pelican (*Pelecanus erythrorhynchos*), Bald Eagle (*Haliaeetus leucocephalus*), Bank Swallow (*Riparia riparia*), Barn Owl (*Tyto alba*), Barn Swallow (*Hirundo rustica*), Bobolink (*Dolichonyx oryzivorus*), Canada Warbler (*Cardellina canadensis*), Chimney Swift (*Chaetura pelagica*), Common Nighthawk (*Chordeiles minor*), Eastern Meadowlark (*Sturnella magna*), Eastern Whip-poor-will (*Antrostomus vociferus*), Eastern Wood-Pewee (*Contopus virens*), Golden-winged Warbler (*Vermivora chrysoptera*), Henslow's Sparrow (*Ammodramus henslowii*), Horned Grebe (*Podiceps auritus*), King Rail (*Rallus elegans*), Least Bittern (*Ixobrychus exilis*) Northern Bobwhite (*Colinus virginianus*), Olive-sided Flycatcher (*Contopus cooperi*), Peregrine Falcon (*Falco peregrinus*), Piping Plover (*Charadrius melodus*), Prothonotary Warbler (*Protonotaria citrea*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Red Knot rufa subspecies (*Calidris canutus rufa*), Short-eared Owl (*Asio flammeus*), Wood Thrush (*Hylocichla mustelina*), Yellow-breasted Chat (*Icteria virens*), Monarch (*Danaus plexippus*), Mottled Duskywing (*Erynnis martialis*), Nine-spotted Ladybird Beetle (*Coccinella novemnotata*), Rapids Clubtail (*Gomphus quadricolor*), Yellow-banded Bumblebee (*Bombus terricola*), Blanding's Turtle (*Emydoidea blandingii*), Eastern Hog-nosed Snake (*Heterodon platirhinos*), Eastern Musk Turtle (*Sternotherus odoratus*), Eastern Ribbonsnake (*Thamnophis sauritus*), Jefferson Salamander (*Ambystoma jeffersonianum*), Northern Map Turtle (*Graptemys geographica*), Snapping Turtle (*Chelydra serpentina*), Wood Turtle (*Glyptemys insculpta*), American Eel (*Anguilla rostrata*), Lake Sturgeon Great Lakes - Upper St. Lawrence River population (*Acipenser fulvescens*), Redside Dace (*Clintostomus elongatus*), and Shortnose Cisco (*Coregonus reighardi*).

CVC provided a list of the following SAR with potential to be present within the study areas: Common Nighthawk, Eastern Milksnake (*Lampropeltis triangulum*), and Snapping Turtle.

3.1.1 Aquatic Species at Risk

Aquatic SAR mapping is made available by DFO. The DFO Aquatic SAR mapping for 2018 indicates that no aquatic SAR has been identified within the Credit River, Mullet Creek, or the Unnamed Tributary of Mullet Creek within the study area. DFO SAR mapping was reviewed again in June 2021, when additional field work was completed for Alignment 4, and still shows no records of aquatic SAR within the three watercourses above.

Correspondence with the MECP has indicated the presence of four aquatic SAR with potential to be present within the study area: American Eel, a species designated as "endangered" and protected under the provincial ESA and listed as "under consideration" (for listing) under the federal SARA; Lake Sturgeon Great Lakes St. Lawrence River population designated as "endangered" and protected under the ESA and "under consideration" for listing federally under the SARA; and Redside Dace and Shortnose Cisco both designated as "endangered" provincially and federally and protected under the ESA and the SARA.

3.1.2 Terrestrial Species at Risk

Information from the MECP was supplemented with additional data from various websites and internet sources, including the following:

- A NHIC search of eight 1 × 1 km squares encompassing the study area provided records for six SAR within the study area, which included Redside Dace, Lake Sturgeon -Great Lakes St. Lawrence River population, Midland Painted Turtle, Chimney Swift, Snapping Turtle, and Henslow's Sparrow.

- An OBBA search of the 10 × 10 km square (17PL03) encompassing the study area (for the period of 2001-2005) provided records for nine SAR, which included Bank Swallow, Barn Swallow, Bobolink Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Wood-Pewee, Peregrine Falcon, and Wood Thrush.

- A search of the ORAA between 2011 and present for the species recorded in one 10 × 10 km square encompassing the study area (17PJ03). The ORAA provided records for five SAR within the study area which included Blanding's Turtle, Eastern Milksnake, Northern Map Turtle, Snapping Turtle, and Western Chorus Frog. There was a historic record of Jefferson Salamander in 2004.

- A search of the OBA between 2011 and present for the species recorded in one 10 × 10 km square encompassing the study area (17PJ03). The OBA provided records for one SAR within the study area: Monarch.

A summary of all SAR with potential to be found near the study area are provided in Table 1.

TABLE 1 Species at Risk Potentially Present within Study Area

Species Common Name	Species Scientific Name	*Species at Risk Act* Status	*Endangered Species Act* Status	S-Rank
Fish				
American Eel[2]	*Anguilla rostrata*	-	Endangered	S1?
Lake Sturgeon - Great Lakes St Lawrence River population[1, 2]	*Acipenser fulvescens*	-	Endangered	S2
Redside Dace[1, 2]	*Clinostomus elongatus*	Endangered	Endangered	S2
Shortnose Cisco[2]	*Coregonus reighardi*	Endangered	Endangered	SH
Reptile & Amphibians				
Blanding's Turtle[2,4]	*Emydoidea blandingii*	Threatened	Threatened	S3
Eastern Hog-nosed Snake[2]	*Heterodon platirhinos*	Threatened	Threatened	S3
Eastern Milksnake[4,6]	*Lampropeltis triangulum)*	Special Concern	-	S4
Eastern Musk Turtle[2]	*Sternotherus odoratus*	Special Concern	Special Concern	S3
Eastern Ribbonsnake[2,4]	*Thamnophis sauritus*	Special Concern	Special Concern	S4
Jefferson Salamander[2,4]	*Ambystoma jeffersonianum*	Endangered	Endangered	S2
Midland Painted Turtle[1]	*Chrysemys picta marginata*	Special Concern	-	L3
Northern Map Turtle[2,4]	*Graptemys geographica*	Special Concern	Special Concern	S3
Snapping Turtle[1,2,4,6]	*Chelydra serpentina*	Special Concern	Special Concern	S3
Wood Turtle[2]	*Glyptemys insculpta*	Threatened	Endangered	S2
Bird				
American White Pelican[2]	*Pelecanus erythrorhynchos*	-	Threatened	S2N, S4B
Bald Eagle[2]	*Haliaeetus leucocephalus*	-	Special Concern	S2N, S4B
Bank Swallow[2,3]	*Riparia riparia*	Threatened	Threatened	S4B
Barn Owl[2]	*Tyto alba*	Endangered	Endangered	S1
Barn Swallow[2,3]	*Hirundo rustica*	Threatened	Threatened	S4B
Bobolink[2,3]	*Dolichonyx oryzivorus*	Threatened	Threatened	S4B
Canada Warbler[2]	*Cardellina canadensis*	Threatened	Special Concern	S5B
Chimney Swift[1,2,3]	*Chaetura pelagica*	Threatened	Threatened	S4B
Common Nighthawk[2,3,6]	*Chordeiles minor*	Threatened	Special Concern	S4B
Eastern Meadowlark[2,3]	*Sturnella magna*	Threatened	Threatened	S4B
Eastern Whip-poor-will[2]	*Antrostomus vociferus*	Threatened	Threatened	S4B
Eastern Wood Pewee[2,3]	*Contopus virens*	Special Concern	Special Concern	S4B
Golden-winged Warbler[2]	*Vermivora chrysoptera*	Threatened	Special Concern	S4B
Henslow's Sparrow[1, 2]	*Ammodramus henslowii*	Endangered	Endangered	SHB
Horned Grebe[2]	*Podiceps auritus*	Special Concern	Special Concern	S1B, S4N
King Rail[2]	*Rallus elegans*	Endangered	Endangered	S2B
Least Bittern[2]	*Ixobrychus exilis*	Threatened	Threatened	S4B

Species Common Name	Species Scientific Name	*Species at Risk Act* Status	*Endangered Species Act* Status	S-Rank
Northern Bobwhite[2]	*Colinus virginianus*	Endangered	Endangered	S1
Olive-sided Flycatcher[2]	*Contopus cooperi*	Threatened	Special Concern	S4B
Peregrine Falcon[2,3]	*Falco peregrinus*	Special Concern	Special Concern	S3B
Piping Plover[2]	*Charadrius melodus*	Endangered	Endangered	S1
Prothonotary Warbler[2]	*Protonotaria citrea*	Endangered	Endangered	S1B
Red-headed Woodpecker[2]	*Melanerpes erythrocephalus*	Endangered	Special Concern	S4B
Red Knot rufa subspecies[2]	*Calidris canutus rufa*	Endangered	Endangered	S1N
Short-eared Owl[2]	*Asio flammeus*	Special Concern	Special Concern	S2N, S4B
Wood Thrush[2,3]	*Hylocichla mustelina*	Threatened	Special Concern	S4B
Yellow-breasted Chat[2]	*Icteria virens*	Endangered	Endangered	S2B
Vegetation				
American Chestnut[2]	*Castanea dentata*	Endangered	Endangered	S1S2
American Ginseng[2]	*Panax quinquefolius*	Endangered	Endangered	S2B
Butternut[2]	*Juglans cinerea*	Endangered	Endangered	S2
Insects				
Monarch[2,5]	*Danaus plexippus*	Special Concern	Special Concern	S2N, S4B
Mottled Duskywing[2]	*Erynnis martialis*	-	Endangered	S2
Nine-spotted Ladybird Beetle[2]	*Coccinella novemnotata*	-	Endangered	SH
Rapids Clubtail[2]	*Gomphus quadricolor*	Endangered	Endangered	S1
Yellow-banded Bumblebee[2]	*Bombus terricola*	Special Concern	Special Concern	S5
Mammals				
Eastern Small-footed Myotis[2]	*Myotis leibii*	-	Endangered	S2S3
Northern Myotis[2]	*Myotis septentrionalis*	Endangered	Endangered	S3
Little Brown Myotis[2]	*Myotis lucifugus*	Endangered	Endangered	S3
Tri-Colored Bat[2]	*Perimyotis subflavus*	Endangered	Endangered	S3?
Woodland Vole[2]	*Microtus pinetorum*	Special Concern	Special Concern	S3?

[1] Natural Heritage Information Centre database (MNRF 2021)
[2] Appendix A
[3] *Ontario Breeding Bird Atlas* (Cadman et al. 2007)
[4] *Ontario Reptile and Amphibian Atlas* (Ontario Nature 2015)
[5] *Ontario Butterfly Atlas* (TEA 2019)
6 Credit Valley Conservation

A screening of SAR records was undertaken to identify which of the reported species have the potential to occur within the study area. The screening identified potential species and spatial distributions collected through agency consultation and literature review. Available information regarding preferred habitat was compared to existing habitat identified within the study area during field assessments to determine if suitable habitat was present. Detailed habitat information for each species and the potential for each species to be present within the study area are found in Tables 2 and 3 in Section 7.5.

3.2 Significant Wildlife Habitat Screening

The study areas are located within Ecoregion 7E. There are four categories of SWH within Ecoregion 7E, according to the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Significant Wildlife Habitat Eco-Regional Criterion Schedule* (MNRF 2015).

- Seasonal Concentration Areas
- Rare Vegetation Communities or Specialized Habitat for Wildlife
- Habitat for SCC (Not including Endangered or Threatened Species)
- Animal Movement Corridors

Habitats identified as SWH receive protection under the PPS (2020), the *Region of Peel Official Plan* (Region of Peel 2016) and the *City of Mississauga Official Plan* (City of Mississauga 2016). Development or site alteration is not permitted within SWH unless it has been demonstrated that there will be no negative impacts on the natural features, or their ecological functions as outlined in the PPS.

A desktop assessment of four SWH categories mentioned above was conducted to identify candidate SWH for the study area. This desktop assessment is summarized in Sections 3.2.1 to 3.24. A further SWH assessment was undertaken during field investigations to determine if the candidate significant features have the potential to occur along the potential alignment options. The results of the field assessment of provided in Section 7.4.

3.2.1 Seasonal Concentration Areas

At certain times of the year, some species of animals gather together from geographically wide areas to hibernate or to bask (e.g., some reptiles and bats), over-winter (e.g., deer yards), or to breed (e.g., Bullfrog breeding and nursery areas, bird breeding colonies). Maintenance of the habitat features that result in these concentrations can be critical in sustaining local or even regional populations of wildlife (MNRF 2015). The desktop SWH screening exercise identified the following Seasonal Concentration Areas SWH types as candidate (potentially present) within the alignment study areas:

- Raptor Wintering Areas
- Bat maternity Colonies
- Turtle Wintering Areas

3.2.2 Rare Vegetation Communities and Specialized Habitat for Wildlife

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. Specialized habitat for wildlife is a diversity-based category, which means that the more wildlife species a habitat contains, the more significant the habitat becomes. The largest and least fragmented habitats within an area will support the most significant populations of wildlife (MNRF 2015).

No rare vegetation communities were identified during the preliminary screening within any of the proposed alignment option study areas. However, the SWH screening exercise identified the following Specialized Habitat for Wildlife SWH types as candidate (potentially present) within the alignment study areas:

- Amphibian Breeding Habitat (Woodland)

3.2.3 Habitat for Species of Conservation Concern (not Including Endangered or Threatened Species)

Rare wildlife status is based on species listed as special concern under the ESA or SARA, Global Rank (G-rank) or Provincial Rank (S-rank) status, identified through the NHIC. According to the *Significant Wildlife Habitat Technical Guide* (MNR 2000) the highest priority for protection should be provided to habitats of the rarest species (on a scale of global through to local municipality); it also states that habitats that support large populations of a species of concern should be considered significant (MNRF 2015). The SWH screening exercise identified the following Habitat for SCC SWH types as candidate (potentially present) within the alignment study areas:

- Special Concern and Rare Wildlife Species

3.2.4 Animal Movement Corridors

Animal movement corridors are elongated areas used by wildlife as they move from one habitat to another. They are important to ensure genetic diversity in populations, to allow seasonal migration of animals, and to allow animals to move throughout their home range from feeding areas to cover areas (MNRF 2015).

No animal movement corridors were identified during the preliminary screening within any of the alignment study areas.

4 FIELD RECONNAISSANCE ASSESSMENT

4.1 Terrestrial Assessment Methodology

Matrix completed field surveys of terrestrial communities and SAR habitat in May 2019 for Alignments 1, 2a, and 2b and in June 2021 for Alignment 4. Data on existing terrestrial communities was obtained from the MECP and confirmed during field investigations.

CVC provided vegetation communities and high-level ecological land classification (ELC) within the alignment study areas and Matrix confirmed this during the preliminary screening visit. Detailed vegetation community surveys will need to be completed for the preferred alignment during the detailed design phase.

In addition to ELC confirmation, terrestrial field surveys included a preliminary arborist tree screening inventory, verification of wetland boundaries, a list of wildlife species observed (visual, auditory, or evidence of presence), as well as an assessment of habitat use and potential use based on wildlife observations and site conditions, the confirmation of presence/absence and location of any SCC and SAR (as per MNRF, COSEWIC, SARA listings), and identification of SWH was also completed.

A terrestrial photograph record of field surveys has been maintained and can be found in Appendix B.

4.2 Aquatic Assessment Methodology

A screening-level aquatic habitat assessment was completed on May 14, 2019, for Alignments 1, 2a, and 2b and on June 10, 2021, for Alignment 4. Watercourse crossings for the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek along all alignment options were assessed. Detailed aquatic habitat assessments surveys will need to be completed for the preferred alignment during the detailed design phase. The preliminary screening was completed to assess existing conditions, identify the presence of fish habitat (direct or indirect), and identify potential constraints related to aquatic resources for all proposed alignments. Fish community data was provided by MECP, MNRF, and CVC during background review. Detailed fish community information is provided in Section 6.2.

Photographs were taken of the instream habitat and bank characteristics upstream and downstream of each watercourse crossing and provided in Appendix C.

5 TERRESTRIAL FIELD ASSESSMENT RESULTS

5.1 Designated Natural Areas

Information on designated natural areas was obtained from the CVC, MNRF, MECP, Region of Peel, and the City. Review of background information revealed that no Provincially Significant Wetlands (PSW) were identified within the study area; however, CVC indicated that a portion of Turney Woods Park in the northwest of the study area is mapped as a wetland. CVC also indicated that the Erin Woods is considered an Environmentally Significant Area. No Areas of Natural and Scientific Interest were identified within 120 m of the proposed alignments during background review or preliminary field surveys.

The valleylands and riparian habitat associated with the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek are designated as “Natural Significant Areas” and are considered part of the “Green System” as per the *City of Mississauga Official Plan* (City of Mississauga 2016). In addition, the Mullet Creek valleylands upstream of Britannia Road are identified as a “Special Management Area” under the natural heritage system of the *City of Mississauga Official Plan*. The Credit River is a part of the Region of Peel’s designated Greenlands System’s “Core Areas” (Region of Peel 2016). The Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek floodplain areas are regulated by the CVC.

Based on background review and preliminary field investigations, the following designated natural areas/habitats occur within the study area:

- Credit River (warmwater feature with coldwater migratory corridor)
- Mullet Creek (warmwater feature)
- regionally significant core features
- Environmentally Significant Areas
- special management areas
- significant woodlands
- significant valleylands
- unevaluated wetlands

5.2 Vegetation Communities

As noted above, high-level ELC community information was provided by CVC. These high-level ELC communities present were confirmed during the preliminary screening visits and included forests, marshes, meadows, and cultural communities outlined below. ELC communities will need to be updated and refined during the detailed design phase.

Deciduous Forest (FOD)

FOD communities are forests (greater than 60% tree cover) with deciduous tree species representing greater than 75% of the canopy cover.

Cultural Woodland (CUW)

CUW communities have tree cover greater than 35% but less than 60% and are semi-closed tree areas. They typically have unique floras and are indicative of areas with a cultural legacy typically dominated by more invasive species. The community results from, or is maintained by, cultural or anthropogenic-based disturbances.

Cultural Meadow (CUM)

CUM communities have tree cover less than or equal to 25% and shrub cover less than or equal to 25%. The community results from, or is maintained by, cultural or anthropogenic-based disturbances.

Cultural Thicket (CUT)

CUT communities are defined as having tree cover that is less than 25%, shrub cover greater than 25%, and are communities heavily influenced by cultural or anthropogenic disturbances.

Swamp Thicket (SWT)

SWT communities are defined as having tree cover that is less than 25%, shrub cover greater than 25%, and shrub species that can tolerate conditions of standing water or seasonal pooling.

Marsh (MA)

MA communities are defined as having tree and shrub cover less than 25% and vegetation dominated by emergent hydrophytic macrophytes. These areas have variable flooding regimes and generally water depth is less than 2 m.

Open Aquatic (OA)

QA areas are defined as communities with greater than 2 m depth of water. Within the study area these areas are represented by the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek.

Commercial and Institutional (CVC)

CVC areas consist of Educational and institutional (hospitals and clinics), business, industry, and construction.

Residential (CVR)

Residential areas consist of low-density residential, high-density residential, single-family residential, and high-rise residential.

5.3 Vascular Flora

During the reconnaissance field survey, the following vascular plants were incidentally observed in the alignment study areas: American Beech (*Fagus grandifolia*), maples (*Acer sp.*), Red Oak (*Quercus rubra*), White Pine (*Pinus strobus*), Black Walnut (*Juglans nigra*), Ironwood (*Ostrya virginiana)*, Balsam Poplar (*Populus balsamifera*), Blue Spruce (*Picea pungens*), Honey Locust (*Gleditsia triacanthos*), Shagbark Hickory (*Carya ovata*), willows (*Salix sp.*), Staghorn Sumac (*Rhus typhina*), Garlic Mustard (*Alliaria petiolata*), and Trout Lily (*Erythronium americanum*). MECP noted the potential presence of American Chestnut, American Ginseng, and Butternut within the alignment study areas, however, none of these species were observed within potential alignment study areas during preliminary site investigations. A detailed botanical inventory will need to be completed for the preferred alignment option during the detailed design phase.

5.4 Wildlife Habitat

5.4.1 Birds

During field investigations, the following bird species were incidentally observed within the study area: Black-throated Blue Warbler (*Setophaga caerulescens*), Chestnut Sided Warbler (*Setophaga pensylvanica*), Red-winged Blackbird (*Agelaius phoeniceus*), Red-tailed Hawk (*Buteo jamaicensis*), Black-capped Chickadee (*Poecile atricapillus*), Mourning Dove (*Zenaida macroura*), American Robin (*Turdus migratorius*), American Crow (*Corvus brachyrhnchos*), an unidentified sparrow (*Melospiza sp.*), and Blue Jay (*Cyanocitta cristata*).

During background review, a number of SAR birds were identified as potentially present within the alignment study areas; no SAR birds were observed during preliminary field investigations. Refer to Section 7.5 for a discussion of SAR birds with potential habitat present within the study area.

5.4.2 Herpetofauna

According to the ORAA, five (5) SAR herptiles have been recorded within 10 × 10 km encompassing the alignment option study areas. Refer to Section 7.5 for a detailed discussion of SAR herptiles with potential habitat present within the study area.

No reptiles or amphibians were incidentally observed within the alignment study areas during preliminary field investigations.

5.4.3 Insects

A search of the OBA returned records for one (1) SAR insect within 10 × 10 km encompassing the study area: Monarch Butterfly. The MECP did not identify the potential for any SAR insects within the study area. Refer to Section 7.5 for a detailed discussion of SAR insects with potential habitat present within the study area.

No insects were incidentally observed within the alignment study areas during preliminary field investigations.

5.4.4 Mammals

Several Eastern Grey Squirrels (*Sciurus carolinensis*) as well as evidence of Coyote (*Canis latrans*); warning signs posted noted potential presence), were observed within Turney Woods Park. No other evidence of mammals was observed within the alignment study areas during preliminary field investigations. Several SAR mammals were identified as potentially present during background and are discussed in Section 7.5.

5.5 Preliminary Arborist Review

The purpose of the preliminary arborist review is to locate any SAR, mature, or otherwise significant trees within the study area in order to inform the development of the detailed design. Three main areas were assessed, including Turney Wood Park, Erin Woods, and trees located along roads and streets within the study area.

The Turney Wood Park was dominated by an equal mix of American Beech (*Fagus grandifolia*) and Maple species (*Acer sp.*). with occasional and rare inclusions of Red Oak (*Quercus rubra*), White Oak (*Quercus alba*) and Ironwood (*Ostrya virginiana*). The trees in this park varied in age class and diameter which provides a well distributed canopy, sub-canopy, and understory. Trees making up the canopy ranged in size from 30 to 60 cm diameter at breast height (DBH) with extensive branch canopy that in

leaf out conditions would provide full shade to the area. Along portions of the main trail there were planted conifer species providing a buffer between the residential area and the wooded area. The wooded area directly adjacent to the CVC identified wetland included a large quantity of Willow species (*Salix sp.*). During the field assessment a variety of bird species were heard calling within the wooded area and there was evidence of use by small mammals. Additionally, there was evidence of minor human impacts on the woodland such as ad-hoc trails and a fire pit. The woodland appeared to be thriving in spite of the anthropogenic influences. Due to the minimal natural cover in the regional area this woodland acts as an important natural feature of both vegetation and wildlife. Additionally, this woodland was donated to the City of Mississauga by Dr. Jack and Inge Dodds with the intention that the natural beauty of the area be preserved.

The Erin Woods area was dominated by Norway maple (*Acer platanoides*) with an abundance of Shagbark Hickory (*Carya ovata*). There were occasional Ash species (*Fraxinus sp.*), Black Cherry (*Prunus serotina*), Red Oak (*Quercus rubra*), White Oak (*Quercus alba*) and Ironwood (*Ostrya virginiana*) with rare inclusions of Basswood (*Tilia americana*), and American Elm (*Fraxinus americana*) present. The trees in this park varied in age class and diameter which provides a well distributed canopy and sub-canopy. Ground cover was minimal. Trees making up the canopy ranged in size from 30 cm to 80 cm DBH with extensive branch canopy that in leaf out conditions would provide full shade to the area. There is some evidence of human impact throughout the forested community due to an established trail. Invasive species such as European Buckthorn (*Rhamnus cathartica*) and Garlic Mustard (*Alliaria petiolata*) are occasionally present. Multiple trees qualify as potential bat habitat due to having cavities and loose bark. Erin Woods meet the criteria for significant woodland under the City of Mississauga Official Plan and is considered a Significant Natural Area and Natural Green Space. It is also considered an Environmentally Significant Area as per CVC.

Approximately 9 km of roadway was walked in order to assess the presence of trees along the proposed alignments, and included Britannia Road West, Queen Street North, Queen Street South, Eglinton Avenue East, and Erin Centre Boulevard. The large majority of trees within the RoW have been planted and the only naturally occurring trees were located adjacent to watercourse crossings. There are a variety of trees located along the RoW, as well as private property trees that have the potential to be impacted by construction (Appendix B, Photograph 1). There was a single notable tree on Britannia Road West, south of Queen Street South located at 2071 Britannia Road West (Appendix B, Photograph 2). This large diameter Willow species appears to be located on private property but due to its large dripline and root spread it should be avoided by construction work to protect its integrity. Apart from this single notable tree the remaining trees along Britannia Road West are not of significance and would not affect the detailed design.

Queen Street is highly urbanized with both commercial and residential land use (Appendix B, Photograph 3). There is a portion of Queen Street South (between Barry Avenue and Barbertown Road) that has several private and street trees that are greater than 40 cm DBH on both sides of the road (Appendix B, Photograph 4). Close attention should be paid to this area during detailed design to avoid

the unnecessary harm to trees. Outside of this 1.3 km stretch of Queen Street South, planted street trees are not significant and areas can be utilized for construction if an appropriate protection and compensation plan is created and followed.

The majority of trees along Eglinton Avenue East were located on the north side of the road, and were designated as street trees, parking lot trees, and trees used as a barrier between the road and residential dwellings (Appendix B, Photograph 5). There was a grouping of large diameter Willow sp. adjacent to the watercourse crossing on the Credit Valley Hospital property, however they were set back from the RoW and should be provided sufficient protection.

The trees along Erin Centre Boulevard have either been planted on the boulevard or are considered a private front yard tree (Appendix B, Photograph 12). The species planted in the boulevard were either Locust species (*Gleditsia sp.*), Maple species (*Acer sp.*), or Oak species (*Quercus sp.*), and private front yard trees varied, however the majority were an ornamental species or Spruce species (*Picea sp.*). Of the trees found along the road, none of them were greater than a 50 cm DBH.

Naturally occurring trees are located adjacent to the Credit River, Mullet Creek, and Unnamed Tributary of Mullet Creek crossings in the study area (Appendix B, Photographs 6 to 8 and 11). In most areas the trees are set back from the RoW providing them with sufficient protection. It should be noted that if any work is to be conducted within the watercourse or staging areas are placed near the banks additional trees would become impacted and additional considerations would be required.

No SAR species were identified within the study area during the preliminary arborist assessment. Mitigation measures to minimize potential environmental effects will be developed in the detailed design phase. An arborist report will need to be prepared as part of the detailed design which will include mitigation measures and any tree protection zones required.

6 AQUATIC HABITAT FIELD ASSESSMENT RESULTS

Three watercourses are located within the study area and include the Credit River, Mullet Creek, and an Unnamed Tributary of Mullet Creek. Screening level habitat assessments were completed to observe existing conditions and identify the presence of fish habitat for all watercourses within the alignment study areas. Detailed aquatic habitat assessments surveys will need to be completed for the preferred alignment during the detailed design phase.

6.1 Aquatic Habitat

6.1.1 Credit River

According to the Credit River Fisheries Management Plan (CVC and MNR 2002) the Credit River within the study area is a coolwater/warmwater community and is managed as a large warmwater community. Recent correspondence from MNRF indicated the Credit River is considered a resident warmwater system with a coldwater migratory corridor.

Preliminary field investigations confirmed that within the vicinity of the proposed Britannia Road crossing and Falconer Drive easement the Credit River is a permanent watercourse which provides direct fish habitat that supports bait/forage fish and sensitive coldwater sport fish. The Credit River flowed as a natural watercourse within a deep river valley with a relatively wide floodplain (see Appendix C for photographs). The reach provided quality and diverse instream habitat for a variety of fish species; however, it has been noted that water quality within the main stem of the Credit River downstream of Highway 401 is generally poor (CVC and MNR 2002).

6.1.2 Mullet Creek

The Credit River Fisheries Management Plan prepared by CVC and MNR in 2002, indicated that Mullet Creek within the vicinity of the alignment crossings is a small warmwater fish community dominated by cyprinids. The plan indicates that species typical of this habitat classification include Creek Chub, Blacknose Dace, Brook Stickleback, Bluntnose Minnow, and Fathead Minnow.

Preliminary field investigations confirmed that Mullet Creek is typical of many small urban streams which have had sections channelized and hardened. Within the alignment crossings at Britannia Road., Erin Centre Boulevard, and Eglinton Avenue., the creek was considered a highly altered permanent watercourse which provides direct habitat for bait/forage fish. The aquatic ecosystem has experienced significant change and negative influences from landscape change and urbanization within the subwatershed (see Appendix C for photographs). Mullet Creek has experienced the same trend as other highly urbanized subwatersheds, having lost most of its species' diversity over time as a result of habitat degradation. As such, habitat present likely supports a fish community comprised of habitat generalists that are tolerant of turbidity and poor water quality.

6.1.3 Unnamed Tributary of Mullet Creek

Preliminary field investigations identified the Unnamed Tributary of Mullet Creek as a permanent watercourse which provides direct habitat for bait/forage fish. The reach near the proposed Eglinton Avenue crossing had been altered upstream through the creation of two online stormwater management ponds, while the downstream reach had been channelized and hardened with gabion baskets (see Appendix C for photographs). Similar to Mullet Creek, it is likely that the limited habitat present supports a bait/forage fish community tolerant of degraded habitat and poor water quality.

6.2 Fish Community

Fish community sampling was not conducted during the preliminary site investigations. Fish community information for watercourses within the study area was compiled from various sources during background review and is provided below. Fish species records for the Credit River watershed are available from 1954 to 2018.

6.2.1 Credit River

Information obtained from MNRF via the LIO database indicated that the Credit River supports the following species in the vicinity of the Britannia Road crossing: American Eel (*Anguilla rostrata*), Chinook Salmon (*Oncorhynchus tshawytscha*), Bluntnose Minnow (*Pimephales notatus*), Brook Stickleback (*Culaea inconstans*), Brook Trout (*Salvelinus fontinalis*), Brown Bullhead (*Ameiurus nebulosus*), Brown Trout (*Salmo trutta*), Central Mudminnow (*Umbra limi*), Coho Salmon (*Oncorhynchus kisutch*), Common Carp (*Cyprinus carpio*), Common Shiner (*Luxilus cornutus*), Creek Chub (*Semotilus atromaculatus*), Eastern Blacknose Dace (*Rhinichthys atratulus*), Fantail Darter (*Etheostoma flabellare*), Fathead Minnow (*Pimephales promelas*), Golden Shiner (*Notemigonus crysoleucas*), Goldfish (*Carassius auratus)*, Hornyhead Chub (*Nocomis biguttatus*), Johnny Darter (*Etheostoma nigrum*), Largemouth Bass, Longnose Dace (*Rhinichthys cataractae*), Mottled Sculpin (*Cottus bairdii*), Northern Hog Sucker (*Hypentelium nigricans*), Northern Redbelly Dace (*Chrosomus eos*), Pumpkinseed (*Lepomis gibbosus*), Rainbow Darter (*Etheostoma caeruleum)*, Rainbow Trout (*Oncorhynchus kisutch*), Redside Dace (*Clinostomus elongatus*), River Chub (*Nocomis micropogon*), Rock Bass (*Ambloplites rupestris)*, Sea Lamprey (*Petromyzon marinus*), Smallmouth Bass (*Micropterus dolomieu*), Stonecat (*Noturus flavus*), and White Sucker (*Catostomus commersonii*). Historical fish community sampling information for the Britannia Road crossing of the Credit River from 1954, 1983, and 1984 was provided by CVC and included observations of Eastern Blacknose Dace, Blacknose Shiner (*Notropis heterolepis*), Bluntnose Minnow, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Longnose Dace, Northern Hog Sucker, Rock Bass, Rainbow Darter, Stonecat and White Sucker (Appendix A).

6.2.2 Mullet Creek

Information obtained from MNRF via the LIO database indicated that Mullet Creek supports the following species throughout the subwatershed: Chinook Salmon, Bluntnose Minnow, Brook Stickleback, Coho Salmon, Common Shiner, Creek Chub, Eastern Blacknose Dace, Fantail Darter, Fathead Minnow, Goldfish, Longnose Dace, Pumpkinseed, Rainbow Trout, Smallmouth Bass, and White Sucker. Many of these species are migratory species which access the creek from the Credit River and are likely only present seasonally near the confluence with the Credit River.

Britannia Road Crossing

Based on information from CVC, historical fish sampling within the vicinity of the Mullet Creek Britannia Road crossing between 1954 and 1995 captured Brook Stickleback, Bluntnose Minnow, Common Shiner, Creek Chub, Johnny Darter, Pumpkinseed, Rainbow Darter, Rock Bass, and White Sucker (Appendix A).

Eglinton Avenue Crossing

Information provided by CVC for historical fish sampling events at the Mullet Creek Eglinton Avenue crossing in 1954, 1965, and 1973 captured Blacknose Dace, Bluntnose Minnow, Common Shiner, Creek Chub, Fathead Minnow, Fantail Darter, Rainbow Darter, Rock Bass, and White Sucker. Many of

these species are likely no longer present as recent sampling events upstream of Erin Centre Boulevard (approximately 1 km upstream of Eglinton Avenue) between 1999 and 2011 resulted in the capture of the following species: Blacknose Dace, Brook Stickleback, Creek Chub, and Fathead Minnow. Additionally, CVC conducts semi-annual fish community monitoring approximately 900 m downstream of the Eglinton Avenue crossing near Highway 403 and collected the following species between 2012 and 2018: Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Creek Chub, Fathead Minnow and Pumpkinseed (Appendix A).

Erin Centre Boulevard Crossing

Due to the close proximity of the Erin Centre Boulevard crossing to the Eglinton Avenue crossing the same fish community information can be appropriately applied to both crossings.

6.2.3 Unnamed Tributary of Mullet Creek

Information provided by CVC for historical fish sampling events at the Eglinton Avenue crossing for the Unnamed Tributary of Mullet Creek in 1954 and 1965 captured Blacknose Dace, Common Shiner, Creek Chub, Hornyhead Chub and White Sucker (Appendix A). There has been no recent fish sampling conducted for the Unnamed Tributary of Mullet Creek.

7 SIGNIFICANCE AND SENSITIVITY OF NATURAL FEATURES

7.1 Wetlands

Wetlands are defined as “Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants” (MNR 2013). Wetlands provide important ecological functions including necessary groundwater and surface water interactions, water collection and storage, and providing unique habitats for plants, wildlife, and fish.

The PPS (MMAH 2020) prohibits development and site alteration in significant wetlands, also referred to as PSWs. Significant wetlands are identified and evaluated by the MNRF to determine the significance of the wetland. After being identified, wetlands must then be designated as such in municipal official plans for the PPS protection provisions to apply.

During background review, CVC indicated that a portion of Turney Woods Park near the intersection of Britannia Road and Erin Mills Parkway has been mapped as wetland. However, this wetland has not been identified as provincially significant. Field investigations confirmed the presence of the wetland identified by CVC within Turney Woods Park and did not identify any additional wetlands (evaluated or unevaluated) within 120 m of the proposed alignment study areas.

Site alteration within regulated wetlands is prohibited unless permitted by the CVC. A 30 m development setback is recommended for any wetlands located within the preferred alignment study area. If a 30 m setback is not achieved, the precise wetland boundaries of the wetlands within 30 m of the preferred alternative should be delineated in the field with agency staff during detailed design and permitting.

7.2 Watercourses

Three watercourses were identified within alternative alignment study areas, the Credit River, Mullet Creek, and an Unnamed Tributary of Mullet Creek. These watercourses have been documented to support fish, as defined under the *Fisheries Act* or provide habitat for bait/forage fish species which support fish defined under the *Fisheries Act*. Additionally, MECP has indicated that the Credit River provides potential habitat for American Eel, an endangered species protected under the provincial ESA.

Due to the presence of resident warmwater fish species and migratory coldwater fish species within the Credit River, it is likely that any required in-water works or work on channel banks will only be permitted between July 1 and August 31. Due to the presence of warmwater fish communities within Mullet Creek and the Unnamed Tributary of Mullet Creek it is likely that any in- water works or near water works will only be permitted between July 1 and March 31. In-water construction timing windows (where works are permitted) should be confirmed with MNRF and MECP during the detailed design phase.

As watercourses within the alignment study areas support fish and fish habitat, construction works associated with the alignments should be assessed to determine the likelihood of death of fish or HADD within the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek. A detailed DFO self-assessment should be completed during the design phase of the project for the preferred alignment to determine the likelihood of construction works associated with the project that could result in death of fish or HADD and identify whether project works can comply with measures to protect fish and fish habitat or if it will require review by DFO under the Fisheries Protection Provisions of the *Fisheries Act*.

Due to the potential presence of American Eel, any in-water works or work along channel banks of the Credit River which may disrupt American Eel habitat may require authorization from MECP under the ESA.

Site alteration is not permitted within watercourses or the associated floodplain or river valley within CVC regulated area unless authorized by CVC and conducted in accordance with provincial and federal requirements. To avoid potential negative impacts of development to fish habitat, it is recommended that a naturally vegetated buffer is maintained and set aside for no development or site alteration. The Credit River Fisheries Management Plan identifies setbacks which protect riparian areas and provide recommended natural buffers for watercourses. For the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek, the minimum setback is considered whichever is greater of the watercourse meander belt width or 30 m.

7.3 Significant Woodlands

Significant Woodlands are areas which are ecologically important in terms of features such as species composition, age of trees, and stand history; functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history.

The City of Mississauga Official Plan (City of Mississauga 2016) identifies significant woodlands as:

I. *those woodlands, excluding cultural savannahs, which are greater than or equal to 4 hectares (ha);*

II. *woodlands, excluding cultural woodlands and cultural savannahs, which are greater than or equal to 2 ha and less than 4 ha;*

III. *any woodland greater than 0.5 ha that supports old growth trees (greater than or equal to 100 years old), supports a significant linkage function as determined through an Environmental Impact Study, is located within 100 m of another Significant Natural Area, is located within 30 m of a watercourse or significant wetland or supports significant species or communities.*

Based on background review and preliminary site screening, Turney Woods Park and Erin Woods meet the criteria for significant woodland under the City of Mississauga Official Plan and area are considered Significant Natural Areas and Natural Green Spaces. Additionally, due to their close proximity to watercourses, the woodland associated with the Credit River and Mullet Creek valley corridors would also be considered significant.

7.4 Significant Wildlife Habitat

Information collected through a background review, agency consultation, and vegetation community mapping was used to screen for/identify candidate SWH types within the study area based on the PPS, the Natural Heritage Reference Manual (MNR 2010), the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Significant Wildlife Habitat Eco-Regional Criterion Schedule* (MNRF 2015).

Based on the results of the preliminary screening exercise, background review and initial field visit the SWH types as candidate (potentially present) listed below were identified within alignment study areas. Confirmation of SWH present will need be completed during the design phase once the preferred alignment has been identified.

7.4.1 Raptor Wintering Areas

Raptor wintering areas must provide a combination of forest communities and field/meadow communities to provide opportunities for roosting, foraging, and resting to ensure winter survival. Bald Eagle in particular, require forest communities in close proximity to large rivers or open water for hunting. The SWH screening exercise indicated that the alignment study areas do not provide a suitable

combination of forest and meadow communities to support overwintering raptors, however the Credit River valley likely provides suitable overwintering habitat for Bald Eagle.

7.4.2 Bat Maternity Colonies

Many species of bats form roosting colonies during the day in small spaces found in loose bark, hollow trees, rock faces, and human structures. Other species will roost in foliage high up in the tree canopy. Based on the SWH screening exercise, there are two wooded areas within alignment study areas which may provide suitable bat maternity: Turney Woods Park and Erin Woods. No formal assessment has been completed for these areas, and additional bat habitat surveys may be required as a result of the design of the preferred alignment and its potential to impact this SWH type.

7.4.3 Turtle Wintering Areas

Turtle wintering areas are the same general area as their core habitat. Over wintering waterbodies must have soft, muddy bottoms and adequate water depth so as not to completely freeze over. The Credit River provides suitable overwintering habitat for Snapping Turtle within the alignment study areas. Additional surveys may be required depending on the design of the preferred alignment and the potential for impact to this SWH type.

7.4.4 Special Concern and Rare Wildlife Species

The SWH screening exercise resulted in the identification of habitat potential for several SCC within the alignment study areas including Monarch, Bald Eagle, Eastern Wood-Pewee, Peregrine Falcon, Eastern Milksnake, and Snapping Turtle. These species habitat preferences and their potential within the study area are discussed in Table 2.

Development or site alteration within habitats of SCC is not permitted under the PPS unless it can be demonstrated that there will be no negative impacts to the form or function of these areas. Impacts to habitat for these species will need to be considered during identification of the preferred alignment as well as detailed design and permitting.

TABLE 2 Species of Conservation Concern Habitat Suitability within the Study Area

Common Name	Scientific Name	ESA	SARA	S-Rank	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Insects (2)						
Monarch	*Danaus plexippus*	SC	SC	S2N, S4B	The species uses three different types of habitat throughout their life cycle. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. During late summer and fall, Monarchs migrate south to Mexico and can be found in large numbers along the northern shores of Lake Erie and Lake Ontario.[1]	**Potential** - Suitable habitat may be present within the study area.
Yellow-banded Bumblebee	*Bombus terricola*	SC	-	S5	A habitat generalist and can be found in mixed woodlands especially for nesting and overwintering as well as open habitats such as grasslands, farmlands, and urban areas. They often nest in underground abandoned rodent burrows and decomposing logs.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Birds (5)						
Bald Eagle	*Haliaeetus leucocephalus*	SC	-	S2N,S4B	The species usually nest in large trees such as pine and poplar in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River or in places with a high deer population where carcasses might be found.[1]	**Potential** - Suitable habitat is present within deciduous forest communities adjacent to the Credit River in the Credit River valley corridor.
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B	Prefers open deciduous, mixed, or coniferous forests with little understory. It can also be found in forest clearings and edges, farm woodlots, or parks.[1]	**Potential -** Suitable habitat is present within Turney Woods Park and Erin Woods.
Horned Grebe	*Podiceps auritus*	SC	SC	S1B,S4N	The species nests in small ponds, marshes, shallow bays, and areas of open water with emergent vegetation nearby. Prefers to occupy natural habitats more often than man-made reservoirs and artificial ponds.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Peregrine Falcon	*Falco peregrinus*	SC	-	S3B	Usually nest on tall, steep cliff ledges close to large bodies of water; however, some birds have adapted to urban environments and will nest on ledges of tall buildings. Urban areas offer good feeding opportunities provided by pigeons and starlings.[1]	**Potential** - Suitable habitat is present throughout the study area due to the close proximity to the Credit River, tall buildings throughout, and an ample supply of pigeons and starlings.
Short-eared Owl	*Asio flammeus*	SC	SC	S2N,S4B	Prefers open areas such as grasslands, marshes, and tundra where it nests on the ground and hunts for small mammals, especially voles.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Mammals (1)						
Woodland Vole	*Pitymys pinetorum*	SC	SC	S3?	Found in mature forest within the Carolinian zone, with a deep litter layer that allows it to burrow.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Herpetofauna (5)						
Eastern Milksnake	*Lampropeltis triangulum*	NAR	SC	S4	Lives in a wide variety of habitats including prairies, meadows, pastures, rocky outcrops and hillsides, and forests. The species is well-known for occupying barns, sheds, and houses in rural regions.[2]	**Present** - Suitable habitat is present within meadow, field, and forest communities within the study area. CVC provided recent observations of the species for the study area.
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	Generally found in ponds, lakes, marshes, and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms for burrowing. Nesting habitat varies but must be close to water and receive direct sunlight.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Eastern Ribbonsnake	*Thamnophis sauritus*	SC	SC	S4	Usually found close to water, especially in marshes with abundant frogs and small fish. Hibernates in underground burrows or rock crevices.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	Prefers rivers and lakeshores with abundant emergent rocks and fallen trees for basking during summer months. Hibernates during winter on the bottom of deep slow-moving sections of river. The species requires high-quality water that supports the female's mollusc prey.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	Normally found in permanent or semi-permanent fresh water, or in marshes, swamps, or bogs. They prefer rivers and streams with soft, muddy banks or bottoms and often use soft soil or clean dry sand on south-facing slopes for nest sites.[1]	**Present** - Suitable habitat is present within the Credit River within the study area. CVC provided recent records for Snapping Turtle within the study area.

Notes:
1 *Species at Risk in Ontario List* (MNRF 2018)
2 Management Plan for the Eastern Milksnake (Lampropeltis triangulum) in Canada (Environment Canada 2015)

7.5 Species at Risk

Species which are listed as threatened or endangered and are protected by the provincial ESA or the federal SARA, their habitat preferences and their potential within the study area are discussed in Table 3. The following SAR species were identified to have potential habitat available within the study area: American Chestnut, Butternut, Nine-spotted Ladybird Beetle, Barn Swallow, Chimney Swift, Little Brown Myotis, Northern Myotis, Tri-Color Bat, and American Eel.

TABLE 3 Species at Risk Habitat Suitability within the Study Area

Common Name	Scientific Name	ESA Listing	SARA Listing	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Flora (3)					
American Chestnut	*Castanea dentata*	END	END	Occurs in a variety of habitats but is most abundant in areas of well-drained soils, predominately in upland forest or woodlands. Grows best within a well-developed canopy (exceeds 70% canopy coverage) and is often found growing in association with Red Oak, Black Cherry, Sugar Maple, Red Maple, American Beech, White Ash, White Oak, Sassafras, Shagbark Hickory, and Eastern White Pine.[2]	**Potential** - Suitable habitat is present within Turney Woods Park
American Ginseng	*Panax quinquefolius*	END	END	A shade tolerant plant that requires relatively large and undisturbed, mature Sugar Maple-dominated deciduous forests for optimal growth. It is sensitive to edge effects and is unlikely to grow in areas with a shrubby understory. The species is restricted to areas that have moist but well-drained conditions and therefore has a strong dependence on ground or surface water.[1]	**Unlikely -** Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Butternut	*Juglans cinerea*	END	END	A shade intolerant tree that is often found as a minor component of deciduous stands, or as large populations in certain floodplains. They grow in rich, moist, and well-drained soil often found along streams. They may also be found on well-drained gravel sites, especially those made up of limestone.[1]	**Potential** - Suitable habitat may be present within Turney Woods Park, Erin Woods, as well as within the valley corridors of the Credit River and Mullet Creek
Insects (3)					
Mottled Duskywing	*Erynnis martialis*	END	-	Closely associated with their larval food plants (Prairie Redroot and New Jersey Tea in Ontario). Prefer lush meadows and tend to live in dry habitats with sparse vegetation. These include open barrens, sandy patches among woodlands, and alvars. (Alvars are areas of limestone with shallow soil and sparse vegetation of grasses, shrubs, and wildflowers.).[1]	**Unlikely -** Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Nine-spotted Ladybird Beetle	*Coccinella novemnotata*	END	-	May occur in a wide variety of areas including agricultural areas, suburban gardens, parks, coniferous forests, deciduous forests, prairie grasslands, meadows, riparian areas, and isolated natural areas.[1]	**Potential** - Suitable habitat is present within Turney Woods Park, Erin Woods, and urban areas with gardens within the study area
Rapids Clubtail	*Gomphus quadricolor*	END	END	Occurs in natural, unpolluted, unaltered habitat of a medium to large, swift-flowing river. Requires clear cool water with wooded shorelines, gravel and cobble riffles, and projecting boulders interspersed with muddy pools.[3]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Birds (22)					
American White Pelican	*Pelecanus erythrorhynchos*	THR	-	Nest in slight depressions in the ground with sticks and vegetation piled up around them in groups on remote islands in lakes, reservoirs, or on large rivers. Nesting islands are barren or sparsely vegetated with trees located in lakes, reservoirs, or on large rivers.	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Bank Swallow	*Riparia*	THR	THR	Nest in burrows in natural and human made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Barn Owl	*Tyto alba*			Nests and roosts within 50 kms of the Great Lakes in barns and abandoned buildings and may also use natural cavities in trees or holes in cliff faces. Prefers orchards and grasslands such as farmlands, fallow fields, and meadows.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Barn Swallow	*Hirundo rustica*	THR	THR	Have a preference for farmlands or rural areas but are also found in open forests or in close proximity to water for feeding. They prefer buildings or other manmade structures to construct their nests on.[1]	**Potential** - Suitable habitat is present in the vicinity of all watercourse crossings with bridges or box culverts within the study area

Common Name	Scientific Name	ESA Listing	SARA Listing	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Bobolink	*Dolichonyx oryzivorus*	THR	THR	Bobolink historically lived in North American tallgrass prairie and other open meadows. Since the clearing of native prairies in Ontario, Bobolinks have started residing in hayfields. They live in large, open expansive grasslands with dense ground cover, hayfields, meadows, or fallow fields, or marshes and often build their nests on the ground in dense grasses.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Canada Warbler	*Cardellina canadensis*	SC	THR	Breed in a variety of deciduous and coniferous forest types but are most abundant in wet forests with a well-developed shrub layer. Nests are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Chimney Swift	*Chaetura pelagica*	THR	THR	Prior to European settlement, Chimney Swift nested on cave walls and in hollow trees and cavities in old growth forests. More recently they have been found to prefer areas near urban settlement and nest or roost in chimneys and other manmade structures with a preference for areas near water.[1]	**Potential -** Suitable habitat may be present within the study area.
Common Nighthawk	*Chordeiles minor*	SC	THR	Commonly found on open ground, clearings in dense forests or ploughed fields. They are also found on gravel beaches or barren areas with rocky soils, open woodlands, and flat gravel roofs.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Eastern Meadowlark	*Sturnella magna*	THR	THR	Prefer open, grassy meadows, farmland, pastures, hayfield, or grasslands with elevated singing perches. They are also found on cultivated land, in weedy areas, or in old orchards with nearby open grassy areas greater than 10 ha in size.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	Prefers a mix of open areas and forests, such as savannahs, open woodlands, or forest clearings in mature deciduous, coniferous, and mixed forests. Nests and roosts in forest areas and uses open clearings for foraging.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Golden-winged Warbler	*Vermivora chrysoptera*	SC	THR	They prefer to nest in areas with young shrubs surrounded by mature forest that have recently been disturbed, such as field edges, hydro or utility rights-of-way, or logged areas.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Henslow's Sparrow	*Ammodramus henslowii*	END	END	They have been found in abandoned farm fields, pastures, and wet meadows. Henslow's Sparrow tends to avoid fields that have been grazed or are crowded with trees and shrubs. It prefers large, dense, tall grasslands where it can more easily conceal its small ground nest.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
King Rail	*Rallus elegans*	END	END	Fund mainly in densely vegetated freshwater marshes with open shallow water and shrubby areas. Can sometimes found in smaller isolated marshes but most often seem to prefer larger, coastal wetlands. Nest in shrubs or clumps of marsh plants just above the water.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Least Bittern	*Ixobrychus exilis*	THR	THR	Found in a variety of wetland habitats, but mainly prefers cattail marshes with a combination of open pools and channels. Nests above the water in stands of dense vegetation, hidden among the cattails.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Northern Bobwhite	*Colinus virginianus*	END	END	Prefers savannahs, grasslands, around abandoned farm fields, along brushy fencerows, and other similar sites. During winter, may move to small forest areas to find snow-free areas for foraging.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Olive-sided Flycatcher	*Contopus cooperi*	SC	THR	Prefers natural forest edges and openings near ponds, lakes, or rivers. It may use forests that have been logged or burned if there are tall snags and trees to use for foraging perches. They prefer coniferous or mixed forests adjacent to rivers or wetlands from breeding, in Ontario they prefer to nest in spruce, pine, and fir.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Piping Plover	*Charadrius melodus*	END	END	Occurs along lake shorelines between the water's edge and the back of the beach. Nest exclusively on dry sandy or gravelly beaches above the reach of high water and waves.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Prothonotary Warbler	*Protonotaria citrea*	END	END	Occurs in flooded woodlands or swamps commonly vegetated with Silver Maple, Ash, and Yellow Birch. Nests in small, shallow holes, found low in the trunks of dead or dying trees, will also readily use artificial nesting boxes if available.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.

Common Name	Scientific Name	ESA Listing	SARA Listing	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	END	Prefers open woodland and woodland edges will ample dead trees for perching and nesting, and is often found in parks, golf courses, and cemeteries.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Red Knot rufa subspecies	*Calidris canutus rufa*	END	END	Prefer open beaches, mudflats, and coastal lagoons, where they feed on molluscs, crustaceans, and other invertebrates. Most often seen in Ontario during migration along Great Lakes beaches and mudflats.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations
Wood Thrush	*Hylocichla mustelina*	SC	THR	Prefer mature deciduous and mixed (conifer/deciduous) forests with moist stands of trees, well-developed undergrowth, and tall trees for singing perches. These birds prefer large forests but will also use smaller stands of trees. They build their nests in living saplings, trees, or shrubs, usually Sugar Maple or American Beech.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Yellow-breasted Chat	*Icteria virens*	END	END	Normally found in thickets and scrub areas, especially in clearing areas which have become overgrown. Winters in coastal marshes.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Mammals (4)					
Eastern Small-footed Myotis	*Myotis leibii*	END	END	Will roost in a variety of habitats including rock outcrops, buildings, bridges, caves, mines, or hollow trees in spring and summer. Normally overwinter in caves and abandoned mines and appear to choose sites drier and colder than similar bats and will return to the same overwintering location each year.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Little Brown Myotis	*Myotis lucifugus*	END	END	During the day they roost in trees and buildings. They often select attics, abandoned buildings, and barns for summer colonies where they can raise their young. Little Brown Myotis hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing.[1]	**Potential** - Suitable habitat may be present within Turney Woods Park and Erin Woods.
Northern Myotis	*Myotis septentrionalis*	END	END	Live in boreal forests, choosing to roost under loose bark and in the cavities of trees. Northern Myotis hibernate from October or November to March or April, most often in caves or abandoned mines.[1]	**Potential** - Suitable habitat may be present within Turney Woods Park and Erin Woods.
Tri-Colored Bat	*Perimyotis subflavus*	END	END	Is found in a variety of forested habitats during summer. It normally forms day roots and maternity colonies in older forests but may occasionally roost in barns and manmade structures. They overwinter in caves or underground locations.[1]	**Potential** – Suitable habitat may be present within Turney Woods Park and Erin Woods.
Herpetofauna (4)					
Blanding's Turtle	*Emydoidea blandingii*	THR	THR	Lives in shallow water, normally in large wetlands and shallow lakes with abundant aquatic macrophytes.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	Prefer sandy, well-drained habitats such as beaches and dry forest areas to lay eggs and hibernate. They specialize in hunting and eating toads and are usually only found where toads can be found.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Jefferson Salamander	*Ambystoma jeffersonianum*	END	END	Lives mostly in moist, loose soil under logs and leaf litter. Breed in woodland ponds and lay eggs attached to submerged vegetation.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Wood Turtle	*Glyptemys insculpta*	END	THR	Prefers clear rivers, streams, or creeks with a slight current and sandy or gravelly bottom in close proximity to wooded areas. Will also occupy wet meadows, swamps, and fields.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Fish (4)					
American Eel	*Anguilla rostrata*	END	-	Can be found in both freshwater and saltwater. Occupies the broadest diversity of habitats of any freshwater fish species.[1]	**Potential -** Suitable habitat is present within the Credit River**.**
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	*Acipenser fulvescens*	END	-	Usually found in large rivers and lakes in depths normally less than 30 feet.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.

Common Name	Scientific Name	ESA Listing	SARA Listing	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Redside Dace	*Clinostomus elongatus*	END	END	Prefers pools and slow-moving areas of small streams and headwater areas with gravel bottoms and overhanging grasses and shrubs. Spawns in riffle areas near resident pool habitats often in popular spawning areas for other minnow species.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.
Shortnose Cisco	*Coregonus reighardi*	END	END	Is only found in the Great Lakes. Last seen ion Lake Ontario in 1964.[1]	**Unlikely** - Preferred habitat is not available within the study area. Species was not observed within the study area during field investigations.

Notes:
1 *Species at Risk in Ontario List* (MNRF 2018)
2 *Recovery Strategy for the American Chestnut (Castanea dentata) in Ontario* (Boland et al. 2012)
3 *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario* (Hamill 2012)

8 EVALUATION OF ALTERNATIVES

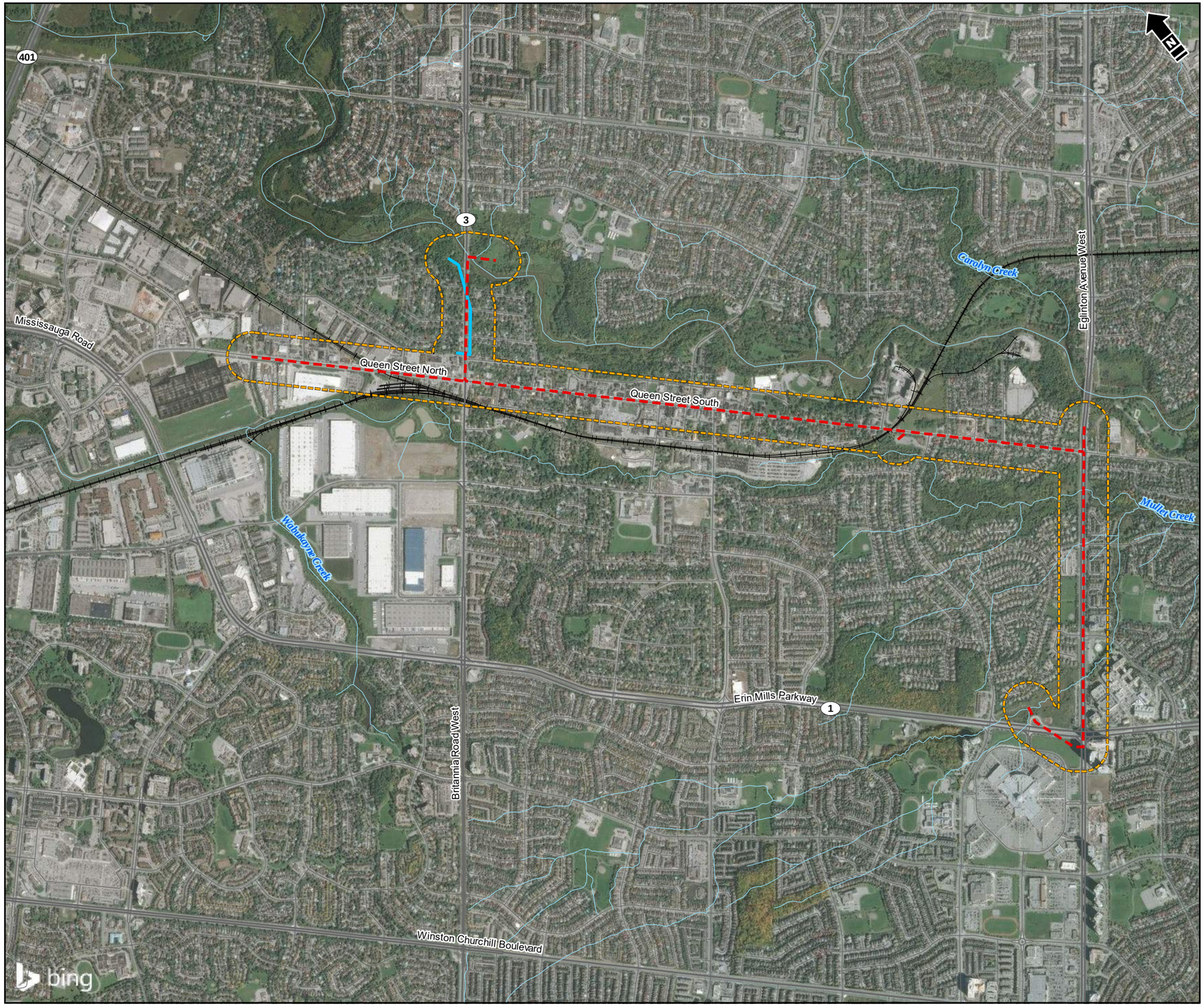
During the EA phase of the project four alignment options were being evaluated (as part of Schedule B), in addition to the Falconer Drive diversion (as part of Schedule A/A+). At present, the Falconer Drive diversion has been chosen and is moving forward to 100% design submission. As the preferred alignment has been chosen, no further evaluation of alternatives is needed for the Falconer Drive diversion portion of the study area.

Based on social, technical, and environmental criteria the Single Diversion Concept (Alignment 1) and Alignment Alternative 4 (Erin Centre Boulevard) were chosen as the preferred alignments for the Schedule B EA. The proposed Alignment 1 concept involves construction of one diversion system which would consist of a trunk sewer located with the following road sections shown in Figure 2:

- Britannia Road from the Credit River to Queen Street South
- Mississauga Road/Queen Street South from approximately 100 m north of Matlock Avenue to Eglinton Avenue West
- Eglinton Avenue West from Mississauga Road to Erin Mills Parkway

The proposed Alignment 4 concept involves construction of one diversion system which would consist of a trunk sewer located with the following road sections shown in Figure 3:

- Britannia Road from the Credit River to Queen Street South
- Mississauga Road/Queen Street South from approximately 100 m north of Matlock Avenue to Erin Centre Boulevard
- Erin Centre Boulevard from Queen Street South to Erin Mills Parkway



Study Area
Watercourse
Railway
Highway
Road

West Diversion Alignment Options

Proposed Britannia Rd. West Diversion (Alignment 1)
Proposed Falconer Dr. Easement Diversion (All Alignments)

1:20,000 metres
210 0 210 420
NAD 1983 UTM Zone 17N

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Hatch
West Diversion Sanitary Sewer

Alternative Alignment 1: Britannia Road West and Falconer Drive Easement

Date:	Project:	Submitter:	Reviewer:
June 2021	27404	E. Wilkinson	A. Fausto

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Figure 2

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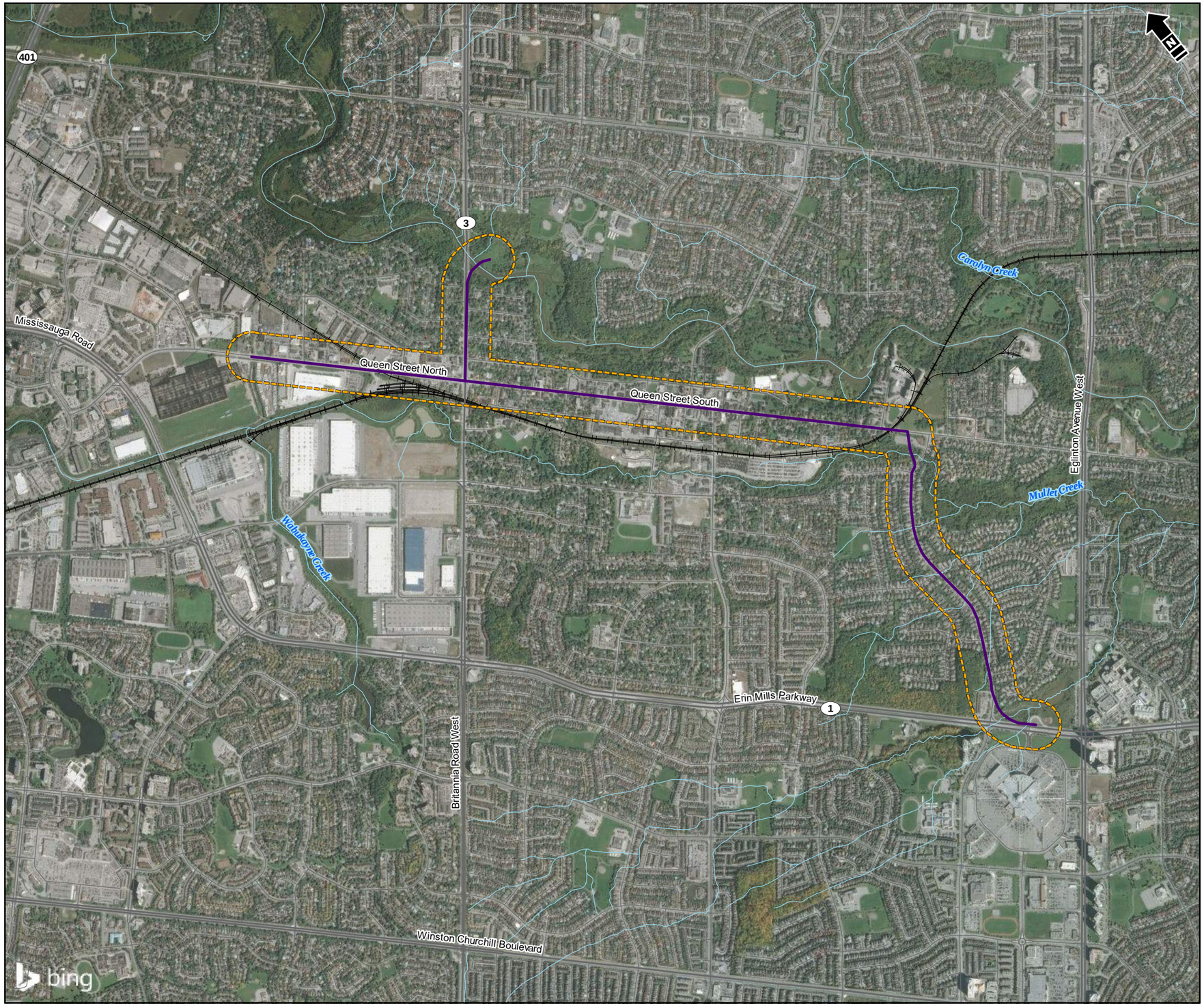

Study Area
Watercourse
Railway
Highway
Road

West Diversion Alignment Options

Proposed Erin Centre Blvd. Diversion (Alignment 4)

1:20,000 metres
210 0 210 420
NAD 1983 UTM Zone 17N

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West Diversion Sanitary Sewer

Alternative Alignment 4: Erin Centre Boulevard

Date:	Project:	Submitter:	Reviewer:
June 2021	27404	E. Wilkinson	A. Fausto

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Figure 3

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8.1 Preliminary Evaluation of Single Diversion Concept (Alignment 1)

The proposed sewer alignment will be located in primarily urbanized areas: either on roads, sidewalks, or public lands and valley corridors adjacent to infrastructure. Due to the proposed tunnelling method of sanitary sewer construction, potential impacts will be limited to construction shaft locations and associated laydown and staging areas. Accordingly, it is recommended that shaft locations should be situated outside valley corridors and significant natural features to minimize the impact on environmental resources within the alignment study areas.

8.2 Preliminary Evaluation of Alignment Alternative 4 (Erin Centre Boulevard)

The proposed sewer alignment follows the same route as Alignment 1 south on Queen Street, until turning west along Erin Centre Boulevard where it meets Erin Mills Parkway. This alignment will be located primarily in an urbanized area, either on roads or sidewalks of commercial or residential areas, or public lands and valley corridors adjacent to infrastructure. This alignment does include an Environmentally Significant Area (Erin Woods); however, the proposed tunnelling method of sanitary sewer construction will limit the impacts to only the construction shaft locations (SA10 and SA17 located at either end of Erin Centre Boulevard) and associated laydown and staging areas. It is still recommended that shaft locations and laydown/staging areas be situated outside valley corridors and significant natural features to minimize the impact on environmental resources within the alignment study areas.

8.3 Summary of Natural Heritage Constraints

Table 4 provides a summary of natural features identified as constraints within the Alignment 1 and Alignment 4 study areas. Table 4 also provides anticipated regulatory and permitting requirements and recommended setbacks and other mitigation recommendations to reduce or eliminate adverse impacts to natural features within the study areas. Figure 4 identifies areas of constraint based on the significance and sensitivity of the natural features present within the study areas.

TABLE 4 Summary of Environmental Constraints within the Alignment 1 and Alignment 4 Study Areas

Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
Wetlands	Credit Valley Conservation (CVC) Ontario Regulation 160/06	Site alteration within regulated wetlands (evaluated or unevaluated) is prohibited unless permitted by the CVC.	**No** - there are no wetlands within 120 m of chosen alignment	**No** - there are no wetlands within 120 m of chosen alignment
	Region of Peel Official Plan (Region of Peel 2014)	It must be demonstrated that the preferred alternative for the diversion sanitary sewer will not negatively impact the wetland or its ecological functions through the completion of an impact assessment.	**No** - there are no wetlands within 120 m of chosen alignment	**No** - there are no wetlands within 120 m of chosen alignment
	City of Mississauga Official Plan (City of Mississauga 2016)	It must be demonstrated that the preferred alternative for the diversion sanitary sewer will not negatively impact the wetland or its ecological functions through the completion of an impact assessment.	**No** - there are no wetlands within 120 m of chosen alignment	**No** - there are no wetlands within 120 m of chosen alignment
Fish Habitat, Watercourses, and Floodplains	*Fisheries Act*	Work can not cause the death of fish of harmful alteration, disruption, or destruction (HADD). A review of "measures to protect fish and fish habitat" as well as the steps associated with whether or not the project needs a review should be completed during the detailed design phase. Review of these two Fisheries and Oceans Canada (DFO) webpages will determine the need for DFO project review.	**Potential** - If death of fish or HADD will occur in Mullet Creek or the Unnamed Tributary of Mullet Creek then a request for review from DFO will be required	**Potential** - If death of fish or HADD will occur in Mullet Creek then a request for review from DFO will be required
	CVC Ontario Regulation 160/06	Site alteration within watercourses and their associated floodplain areas within CVC regulated area are prohibited unless permitted by CVC. CVC must be consulted during the detailed design phase to understand permitting requirements.	**Potential** - If site alteration occurs within the CVC regulation boundary a CVC permit will be required	**Potential** - If site alteration occurs within the CVC regulation boundary a CVC permit will be required

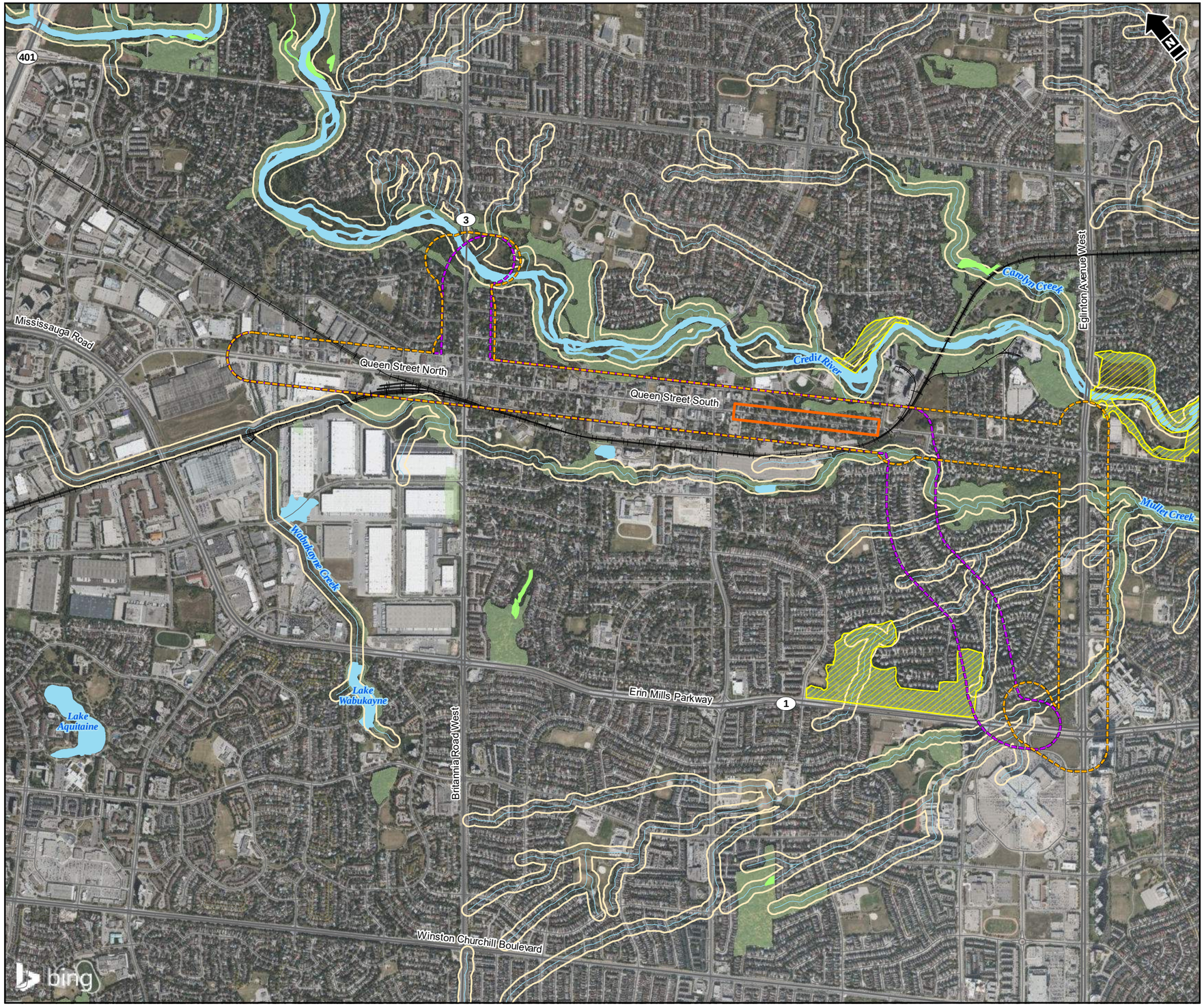
Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
	Region of Peel Official Plan (Region of Peel 2014))	If any areas designated as Greenlands are impacted through development or alteration, the *Region of Peel Official Plan* requires rehabilitation of the ecological features lost through replacement.	**No** - Any negative impact that cannot be avoided will require rehabilitation. The natural corridor associated with the Credit River valley system is designated as a Core Area under the *Region of Peel Official Plan*.	**No** - Any negative impact that cannot be avoided will require rehabilitation. Mullet Creek crossing at Erin Centre Boulevard is a Core Area under the *Region of Peel Official Plan*.
	City of Mississauga Official Plan (City of Mississauga 2016)	If any areas designated as "Significant Natural Areas" are impacted through development or alteration, the *City of Mississauga Official Plan* requires mitigation through replacement.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement. The natural corridors associated with the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek are designated as "Significant Natural Areas" under the City's natural heritage system.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement. The natural corridors associated with Mullet Creek are designated as "Significant Natural Areas" under the City's natural heritage system.

Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
Significant Woodlands	Region of Peel Official Plan (Region of Peel 2014))	If any areas designated as Greenlands are impacted through development or alteration, the *Region of Peel Official Plan* requires rehabilitation of the ecological features lost through replacement.	**No** - Any negative impact that cannot be avoided will require rehabilitation. The natural corridor associated with the Credit River valley system is designated as a Core Area under the *Region of Peel Official Plan*.	**No** - Any negative impact that cannot be avoided will require rehabilitation. Erin Woods is designated as a Core Area under the *Region of Peel Official Plan*.
	City of Mississauga Official Plan (City of Mississauga 2016)	Woodlands located within 30 m of a water body are considered significant.	**No**- Any negative impact that cannot be avoided will require mitigation through replacement. The natural corridors associated with the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek are designated as "Significant Natural Areas" under the City's natural heritage system.	**No**- Any negative impact that cannot be avoided will require mitigation through replacement. The natural corridor associated with Mullet Creek is designated as "Significant Natural Areas" under the City's natural heritage system.

Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
Environmentally Significant Area	Region of Peel Official Plan (Region of Peel 2014))	Environmentally Significant Areas are a part of the Region of Peel's Greenland System. If any areas designated as Greenlands are impacted through development or alteration, the *Region of Peel Official Plan* requires rehabilitation of the ecological features lost through replacement.	**No** - No Environmentally Significant Areas are located along proposed route.	**No** - Proposed shaft is not located in or directly adjacent to Environmentally Significant Areas. Erin Woods is designated as an Environmentally Significant Area under the *Region of Peel Official Plan*.
Significant Wildlife Habitat (SWH)	Provincial Policy Statement (PPS; MMAH 2020)	Development or site alteration within SWH is not permitted under the PPS unless it can be demonstrated that there will be no negative impacts to the form or function of these areas. The following candidate SWH types have potential within the study area: • Raptor Wintering Area • Bat Maternity Colonies • Amphibian Breeding Habitat (Woodland) • Turtle Nesting Area • Special Concern and Rare Wildlife Species	**No** - permits not supplied by PPS. A setback of 30 m is recommended for all SWH types.	**No-** permits not supplied by PPS. A setback of 30 m is recommended for all SWH types.
	Region of Peel Official Plan (Region of Peel 2014))	SWH is covered under the Core Area definition in the *Region of Peel Official Plan*. The natural corridor associated with the Credit River valley system, the Mullet Creek crossing at Erin Centre Boulevard, and Erin Woods are designated as a Core Area under the *Region of Peel Official Plan*. These corridors may fall under multiple categories of SWH.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement.

Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
	City of Mississauga Official Plan (City of Mississauga 2016)	SWH is covered under the "Significant Natural Areas" definition in the *City of Mississauga Official Plan*. The natural corridors associated with the Credit River, Mullet Creek, and the Unnamed Tributary of Mullet Creek are designated as "Significant Natural Areas" under the City's natural heritage system. These corridors may fall under multiple categories of SWH.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement.	**No** - Any negative impact that cannot be avoided will require mitigation through replacement.
Habitat for Endangered and Threatened Species	*Endangered Species Act*	The following species at risk (SAR) are considered to have the potential to have habitat within the study area: • American Eel • American Chestnut • Butternut • Barn Swallow • Chimney Swift • Little Brown Myotis • Northern Myotis • Nine Spotted Ladybird Beetle Section 9 and 10 of the *Endangered Species Act* prohibits activities which result in direct impacts to SAR such as killing, harming, harassing, and damage or destruction of habitat for SAR. Potential impacts to SAR will need to be dealt with in consultation with the Ministry of the Environment, Conservation and Parks (MECP) during detailed design and permitting. Specific mitigation plans and/or permitting under the *Endangered Species Act* may be required.	**Potential** - If habitat being used by any of the listed species is negatively impacted a permit from the MECP will be required. • Recommend a SAR bat habitat assessment be conducted should tree removals be needed in the preferred alternative alignment. • Recommend a breeding bird survey be conducted should tree removals be needed. • Recommend SAR trees be noted during the detailed tree inventory.	**Potential** - If habitat being used by any of the listed species is negatively impacted a permit from MECP will be required. • Recommend a SAR bat habitat assessment be conducted should tree removals be needed in the preferred alternative alignment. • Recommend a breeding bird survey be conducted should tree removals be needed. • Recommend SAR trees be noted during the detailed tree inventory.

Natural Feature	Regulatory and Permitting Considerations	Potential Natural Feature Constraint	Alignment 1- Permit Required?	Alignment 4- Permit Required?
	Species at Risk Act (SARA)	The following SAR are considered to have the potential to have habitat within the study area: • Butternut • Barn Swallow • Chimney Swift • Little Brown Myotis • Northern Myotis Section 32 and 33 of the SARA prohibit individuals from conducting activities which may kill, harm, harass, capture, or take SAR or damage or destroy their habitat. Potential impacts to SAR will need to be dealt with in consultation with DFO and Environment Canada during detailed design and permitting. Specific mitigation plans and/or permitting under the SARA may be required.	**Potential** - If habitat being used by any of the listed species is negatively impacted a permit from DFO and/or Environment Canada will be required. • Recommend a SAR bat habitat assessment be conducted should tree removals be needed in the preferred alternative alignment. • Recommend a breeding bird survey be conducted should tree removals be needed. • Recommend SAR trees be noted during the detailed tree inventory.	**Potential** - If habitat being used by any of the listed species is negatively impacted a permit from DFO and/or Environment Canada will be required. • Recommend a SAR bat habitat assessment be conducted should tree removals be needed in the preferred alternative alignment. • Recommend a breeding bird survey be conducted should tree removals be needed. • Recommend SAR trees be noted during the detailed tree inventory.



- Significant Street Trees
- Environmentally Significant Area
- Recommended 30 m Setback from Watercourse
- Wooded Area
- CVC Wetland
- Water Body
- Watercourse
- Railway
- Highway
- Road

Study Area

- Alignment 1
- Alignment 4

1:20,000 metres

210 0 210 420

NAD 1983 UTM Zone 17N

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West Diversion Sanitary Sewer

Areas of Constraint- Alignment 1 and 4

Date:	Project:	Submitter:	Reviewer:
November 2021	27404	E. Wilkinson	A. Fausto

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Figure 4

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9 MITIGATION MEASURES

Mitigation measures to avoid and minimize potential effects to environmental features will be developed during detailed design. Mitigation measures for environmental features may include:

- siting laydown and staging areas to avoid sensitive features (e.g., away from woodlands and watercourses)

- consideration of construction methods to minimize potential effects.

  - For example, construction activities (including permeable/impervious surfaces) will need to consider water quality and quantity and ensure pre-construction pathways and flows are maintained or similar to existing conditions. This will minimize potential impacts to both terrestrial and aquatic resources.

- implementing setbacks and tree protection zones (e.g., set distance from rooting zone; to be determined in the arborist report)

- development of the following plans during the detailed design phase:

  - Erosion and Sediment Control Plan
  - Environmental Management Plan
  - Tree Protection Plan
  - Restoration Plan

- developing a wildlife protocol and rescue plan to educate staff on wildlife occurrences (including SAR) and measures to take to minimize potential for injury and incidental take, including environmental controls such as exclusionary fencing to prevent wildlife from entering the site

- implementing construction monitoring to ensure mitigation measures and contingency measures are implemented according to design and that objectives are being met

10 CONCLUSIONS

Matrix Solutions was retained by Hatch Corporation to complete the natural heritage component of the Schedule B Municipal Class Environmental Assessment (EA), detailed design, and construction administration associated with the West Trunk Sanitary Sewer Diversion Project as well as the Schedule A/A+ EA associated with the Falconer Drive Easement West. This report summarizes background information on natural heritage features, as well as results of a reconnaissance level field survey completed within the proposed alignment study areas. This was used to inform an analysis of the significance and sensitivity of natural features within the study areas and identify areas of constraint and opportunities.

The Alignment 1 Concept (preferred alternative) is considered the preferred alignment concept option from a natural heritage standpoint as it eliminates the need for the Britannia Road crossing of Mullet Creek and its valley corridor and avoids any construction in the vicinity of Turney Woods Park and any potential negative impacts to this sensitive area.

Recommendations for mitigation measures to be developed and implemented during construction have been proposed to offset potential negative impacts on the natural environment and any species which may occur within the study area. Since the preferred alignment has been identified, detailed site investigations will need to be completed for natural features which may be affected by the proposed alignment. Should species specific SAR surveys be required as a result of the preferred alignment design, these will be determined through consultation with MECP. Potential enhancements or compensation measures that can be achieved will be developed through detailed design and permitting.

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APPENDIX A
Agency Correspondence

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: Thursday, May 9, 2019 12:21 PM
To: Brydon MacVeigh
Subject: [EXTERNAL] RE: SAR information request for Region of Peel West Trunk Diversion
Attachments: InfoRequestGuide_2018-12-18-FINAL.PDF; CITY_OF_MISSISSAUGA.xlsx

Hello,

Thank you for your request for information on natural heritage features. In order to provide the most efficient service possible, the attached *Natural Heritage Information Request Guide* has been developed to assist you with accessing natural heritage data and values from convenient online sources.

It remains the proponent's responsibility to complete a preliminary screening for each project, to obtain available information from multiple sources, to conduct any necessary field studies, and to consider any potential environmental impacts that may result from an activity. We wish to emphasize the need for the proponents of development activities to complete screenings prior to contacting the Ministry or other agencies for more detailed technical information and advice.

The Ministry continues to work on updating data housed by Lands Information Ontario and the Natural Heritage Information Centre, and ensuring this information is accessible through online resources. Species at risk data is regularly being updated. In order to ensure access to reliable and up to date information, the attached list provides a summary of species at risk that have been observed, or may potentially be present, at a geographic township / municipal level.

This information will assist in scoping the necessary field assessments for an area if development or site alteration is proposed. This information is not meant to circumvent the responsibility of the proponent to undertake species and / or habitat surveys. Surveys or additional site level assessment are often required to confirm presence or absence of natural heritage features and values. Environmental consulting firms have the professional and technical expertise to assess sites for natural heritage features and can gauge the potential for such features to exist.

Absence or lack of information for a given geographic area does not necessarily mean the absence of natural heritage features. Many areas in Ontario have never been surveyed and new plant and animal species records are still being discovered for many localities. In addition, new species may be listed and new natural heritage features may be defined over time. For these reasons, the Ministry cannot provide a definitive statement on the presence, absence or condition of natural heritage features in all parts of Ontario.

Thank you for your inquiry.

SAR Ontario

From: BMacVeigh@matrix-solutions.com <BMacVeigh@matrix-solutions.com>
Sent: April 1, 2019 9:19 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: SAR information request for Region of Peel West Trunk Diversion

Good morning,

Matrix Solutions Inc. has been retained by Hatch Corporation Inc. to complete natural heritage evaluations for the Region of Peel West Trunk Diversion project in the City of Mississauga. We are required to complete terrestrial and fisheries investigations for this project and would kindly like to request any background information you may have on file pertaining to environmental resources for the study area.
Please refer to the attached Information Request Letter and study area maps. Please note we have consulted the Credit River Fisheries Management Plan as well as available online databases and atlases and compiled available information.

If you require additional information regarding this project or have any questions, please don't hesitate to contact me,

Kind regards,
Brydon

Brydon M^ac^Veigh
Aquatic Ecologist

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District	Township	Species ID	Scientific Name	Common Name	S Rank	SARO Status	Year of most Recent Observation	
Aurora	CITY_OF_MISSISSAUGA	46000	Castanea dentata	American Chestnut	S1S2	END		2014
Aurora	CITY_OF_MISSISSAUGA	180516	Anguilla rostrata	American Eel	S1?	END		2015
Aurora	CITY_OF_MISSISSAUGA	128014	Panax quinquefolius	American Ginseng	S2	END		1937
Aurora	CITY_OF_MISSISSAUGA	180056	Pelecanus erythrorhynchos	American White Pelican	S2B	THR		2009
Aurora	CITY_OF_MISSISSAUGA	180123	Haliaeetus leucocephalus	Bald Eagle	S2N,S4B	SC		2018
Aurora	CITY_OF_MISSISSAUGA	180320	Riparia riparia	Bank Swallow	S4B	THR		2017
Aurora	CITY_OF_MISSISSAUGA	180258	Tyto alba	Barn Owl	S1	END		2005
Aurora	CITY_OF_MISSISSAUGA	180323	Hirundo rustica	Barn Swallow	S4B	THR		2018
Aurora	CITY_OF_MISSISSAUGA	180752	Emydoidea blandingii	Blanding's Turtle	S3	THR		2015
Aurora	CITY_OF_MISSISSAUGA	180471	Dolichonyx oryzivorus	Bobolink	S4B	THR		2018
Aurora	CITY_OF_MISSISSAUGA	44012	Juglans cinerea	Butternut	S2?	END		2018
Aurora	CITY_OF_MISSISSAUGA	180427	Cardellina canadensis	Canada Warbler	S4B	SC		2017
Aurora	CITY_OF_MISSISSAUGA	180275	Chaetura pelagica	Chimney Swift	S4B,S4N	THR		2017
Aurora	CITY_OF_MISSISSAUGA	180271	Chordeiles minor	Common Nighthawk	S4B	SC		2010
Aurora	CITY_OF_MISSISSAUGA	180769	Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR		1924
Aurora	CITY_OF_MISSISSAUGA	180473	Sturnella magna	Eastern Meadowlark	S4B	THR		2017
Aurora	CITY_OF_MISSISSAUGA	180758	Sternotherus odoratus	Eastern Musk Turtle	S3	SC		1969
Aurora	CITY_OF_MISSISSAUGA	182542	Thamnophis sauritus	Eastern Ribbonsnake	S4	SC		1990
Aurora	CITY_OF_MISSISSAUGA	180670	Myotis leibii	Eastern Small-footed Myotis	S2S3	END		2016
Aurora	CITY_OF_MISSISSAUGA	180274	Antrostomus vociferus	Eastern Whip-poor-will	S4B	THR		2012
Aurora	CITY_OF_MISSISSAUGA	180294	Contopus virens	Eastern Wood-pewee	S4B	SC		2016
Aurora	CITY_OF_MISSISSAUGA	180386	Vermivora chrysoptera	Golden-winged Warbler	S4B	SC		1974
Aurora	CITY_OF_MISSISSAUGA	180455	Ammodramus henslowii	Henslow's Sparrow	SHB	END		1932
Aurora	CITY_OF_MISSISSAUGA	180045	Podiceps auritus	Horned Grebe	S1B,S4N	SC		2018
Aurora	CITY_OF_MISSISSAUGA	180001	Ambystoma jeffersonianum	Jefferson Salamander	S2	END		2018
Aurora	CITY_OF_MISSISSAUGA	201116	Ambystoma hybrid pop. 1	Jefferson X Blue-spotted Salamander, Jefferson genome dominates	S2	END		1999
Aurora	CITY_OF_MISSISSAUGA	180151	Rallus elegans	King Rail	S2B	END		1974
Aurora	CITY_OF_MISSISSAUGA	17329	Acipenser fulvescens pop. 3	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	S2	THR		2001
Aurora	CITY_OF_MISSISSAUGA	180063	Ixobrychus exilis	Least Bittern	S4B	THR		2013
Aurora	CITY_OF_MISSISSAUGA	180669	Myotis lucifugus	Little Brown Myotis	S4	END		2011
Aurora	CITY_OF_MISSISSAUGA	181033	Danaus plexippus	Monarch	S2N,S4B	SC		2018
Aurora	CITY_OF_MISSISSAUGA	180858	Erynnis martialis	Mottled Duskywing	S2	END		1950
Aurora	CITY_OF_MISSISSAUGA	195270	Coccinella novemnotata	Nine-spotted Ladybird Beetle	SH	END		1958
Aurora	CITY_OF_MISSISSAUGA	180148	Colinus virginianus	Northern Bobwhite	S1	END		1905
Aurora	CITY_OF_MISSISSAUGA	180753	Graptemys geographica	Northern Map Turtle	S3	SC		2015
Aurora	CITY_OF_MISSISSAUGA	180671	Myotis septentrionalis	Northern Myotis	S3	END		2007
Aurora	CITY_OF_MISSISSAUGA	180292	Contopus cooperi	Olive-sided Flycatcher	S4B	SC		2016
Aurora	CITY_OF_MISSISSAUGA	193996	Falco peregrinus	Peregrine Falcon	S3B	SC		2018
Aurora	CITY_OF_MISSISSAUGA	193999	Charadrius melodus	Piping Plover	S1B	END		2018
Aurora	CITY_OF_MISSISSAUGA	180414	Protonotaria citrea	Prothonotary Warbler	S1B	END		2013
Aurora	CITY_OF_MISSISSAUGA	181125	Gomphus quadricolor	Rapids Clubtail	S1	END		1939
Aurora	CITY_OF_MISSISSAUGA	180283	Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	SC		1974
Aurora	CITY_OF_MISSISSAUGA	17271	Calidris canutus rufa	Red Knot rufa subspecies	S1N	END		1987
Aurora	CITY_OF_MISSISSAUGA	180552	Clinostomus elongatus	Redside Dace	S2	END		2014
Aurora	CITY_OF_MISSISSAUGA	180267	Asio flammeus	Short-eared Owl	S2N,S4B	SC		2017
Aurora	CITY_OF_MISSISSAUGA	180528	Coregonus reighardi	Shortnose Cisco	SH	END		1927
Aurora	CITY_OF_MISSISSAUGA	180745	Chelydra serpentina	Snapping Turtle	S3	SC		2017

Aurora	CITY_OF_MISSISSAUGA	180750	Clemmys guttata	Spotted Turtle	S2	END	0
Aurora	CITY_OF_MISSISSAUGA	180673	Perimyotis subflavus	Tricolored Bat	S3?	END	2007
Aurora	CITY_OF_MISSISSAUGA	180359	Hylocichla mustelina	Wood Thrush	S4B	SC	2016
Aurora	CITY_OF_MISSISSAUGA	180751	Glyptemys insculpta	Wood Turtle	S2	END	1979
Aurora	CITY_OF_MISSISSAUGA	180700	Microtus pinetorum	Woodland Vole	S3?	SC	2014
Aurora	CITY_OF_MISSISSAUGA	201368	Bombus terricola	Yellow-banded Bumblebee	S5	SC	1936
Aurora	CITY_OF_MISSISSAUGA	180429	Icteria virens	Yellow-breasted Chat	S2B	END	1974

From: Heaton, Mark (MNRF) <mark.heaton@ontario.ca>
Sent: Thursday, April 25, 2019 2:12 PM
To: Brydon MacVeigh
Subject: RE: [EXTERNAL] RE: LCFSP application for West Trunk Diversion project

Hello Brydon,

Yes – confirm American Eel timing window with MECP.

So no need for a licence? Did you want to see what we have for species records for Mullet Creek?

Regards

Mark Heaton
OMNRF Aurora

From: BMacVeigh@matrix-solutions.com <BMacVeigh@matrix-solutions.com>
Sent: April 24, 2019 9:50 AM
To: Heaton, Mark (MNRF) <mark.heaton@ontario.ca>
Subject: RE: [EXTERNAL] RE: LCFSP application for West Trunk Diversion project

Hi Mark,

I have consulted the Credit River Fisheries Management Plan, as well as the Aquatic Resource Area layer available through LIO to obtain relevant fisheries information. Both provide information mostly at a subwatershed scale for Mullet Creek (ie the ARA layer provides information from 2010 that includes Chinook Salmon and Coho Salmon, my assumption is that these species would only present below Wahoosh Falls downstream to the confluence with the Credit River).

Note – information available for the Credit River is likely sufficient. Similar to other projects, my guess is that the Credit River would be considered SAR habitat (American Eel) and the more restrictive timing window of Nov 15 to January 31 would likely apply to avoid conflict with migratory salmonids and American Eel (but this would be something to confirm with MECP now that responsibilities for the ESA have transferred?)

Regards,
Brydon

From: Heaton, Mark (MNRF) [mailto:mark.heaton@ontario.ca]
Sent: Thursday, April 18, 2019 12:33 PM
To: Brydon MacVeigh
Subject: [EXTERNAL] RE: LCFSP application for West Trunk Diversion project

Hello Brydon

The Credit River Fisheries Management Plan provides fish community designations for the Credit River and its tributaries.

It can be found here:

https://www.ontariostreams.on.ca/Resources-Publications

Please use the plan to inform natural heritage evaluations

A License to Collect Fish for Scientific Purposes (LCFSP) are issued where current data gaps exist.

Regards

Mark Heaton
OMNRF Aurora

From: BMacVeigh@matrix-solutions.com <BMacVeigh@matrix-solutions.com>
Sent: April 1, 2019 9:35 AM
To: Scientific Collection Permits Aurora (MNRF) <scp.aurora@ontario.ca>
Subject: LCFSP application for West Trunk Diversion project

Good morning,

Matrix Solutions Inc. has been retained by Hatch Corporation Inc. to complete natural heritage evaluations for the Region of Peel West Trunk Diversion project in the City of Mississauga which falls within the jurisdiction of Aurora District MNRF. We are required to complete fisheries investigations as part of this project and we would kindly like to request a License to Collect Fish for Scientific Purposes (LCFSP) to complete our investigations and assessment.

Please find attached the LCFSP application form, completed VHS questionnaire and a map of watercourse crossings within the study area.

Kind Regards,
Brydon

Brydon M^ac^Veigh
Aquatic Ecologist

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From: Vir, Aanchal <Aanchal.Vir@cvc.ca>
Sent: Tuesday, May 7, 2019 8:50 AM
To: Brydon MacVeigh
Subject: RE: [EXTERNAL] RE: Natural Heritage Information Request
Attachments: ELC_Land_Use_201909313_Streetsvilleshp.cpg; ELC_Land_Use_201909313_Streetsvilleshp.dbf; ELC_Land_Use_201909313_Streetsvilleshp.prj; ELC_Land_Use_201909313_Streetsvilleshp.sbn; ELC_Land_Use_201909313_Streetsvilleshp.sbx; ELC_Land_Use_201909313_Streetsvilleshp.shp; ELC_Land_Use_201909313_Streetsvilleshp.shp.xml; ELC_Land_Use_201909313_Streetsvilleshp.shx; ESAs_near_Streetsville.cpg; ESAs_near_Streetsville.dbf; ESAs_near_Streetsville.prj; ESAs_near_Streetsville.sbn; ESAs_near_Streetsville.sbx; ESAs_near_Streetsville.shp; ESAs_near_Streetsville.shp.xml; ESAs_near_Streetsville.shx; Fish_community2018_.cpg; Fish_community2018_.dbf; Fish_community2018_.prj; Fish_community2018_.sbn; Fish_community2018_.sbx; Fish_community2018_.shp; Fish_community2018_.shp.xml; Fish_community2018_.shx; wetlands_NHP_Streetsville_area.cpg; wetlands_NHP_Streetsville_area.dbf; wetlands_NHP_Streetsville_area.prj; wetlands_NHP_Streetsville_area.sbn; wetlands_NHP_Streetsville_area.sbx; wetlands_NHP_Streetsville_area.shp; wetlands_NHP_Streetsville_area.shp.xml; wetlands_NHP_Streetsville_area.shx; dta_fish_iwmp_mulletcreek.xlsx; FishCollectionRecords_RQ0406_BrittaniaRD.pdf; FishCollectionRecords_RQ0406_EglintonRD.pdf; FishCollectionSpecies_RQ0406_BrittaniaRD.pdf; FishCollectionSpecies_RQ0406_EglintonRD.pdf; RQ0406_SpeciesData.xlsx

Hi Brydon,

Please see attached data as outlined in the DSA. Please let me know if you have any further questions.

As well please see additional notes:

- The consultant should be directed to MNRF for additional SAR records and details
- Due to the timing of most fish surveys, the migratory trout and salmon in this reach usually get missed. Though not formally recorded, there are also migratory Rainbow and Brown Trout and Chinook, Coho and Atlantic Salmon.
- CVC has not conducted extensive inventory and ELC mapping in the area and they should contact City of Mississauga for their NAS data and mapping

[http://mississauga.maps.arcgis.com/apps/View/index.html?appid=6a7d0e83a2f84d8eb487d9be83537725]

- There is no SWH identified for the area, but they are responsible for fully assessing the area based on data and mapping for potential SWH.

Should you have any questions, please contact me.

Regards,

Aanchal Vir
Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | http://cvc.ca

From: BMacVeigh@matrix-solutions.com [mailto:BMacVeigh@matrix-solutions.com]
Sent: May 2, 2019 3:53 PM
To: Vir, Aanchal
Subject: RE: [EXTERNAL] RE: Natural Heritage Information Request

Hi Aanchal,

Attached is the data sharing agreement, signed by myself and the Region of Peel.

Thanks,
Brydon

From: Vir, Aanchal [mailto:Aanchal.Vir@cvc.ca]
Sent: Thursday, April 18, 2019 9:16 AM
To: Brydon MacVeigh
Subject: RE: [EXTERNAL] RE: Natural Heritage Information Request

Hi Brydon,

Please see attached CVC's Data Sharing Agreement (DSA). Please sign, obtain a signature from the Proponent, and complete Schedule 2 with the user information. Upon receiving the completed DSA, CVC will release the data outlined in Schedule 1.

Regards,

Aanchal Vir
Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | http://cvc.ca

From: BMacVeigh@matrix-solutions.com [mailto:BMacVeigh@matrix-solutions.com]
Sent: April 1, 2019 9:21 AM

To: Vir, Aanchal
Subject: RE: [EXTERNAL] RE: Natural Heritage Information Request

Hi Aanchal,

The project name is West Trunk Diversion. The data will be used to access natural heritage features within the study area and will be included in a Natural Heritage report to identify environmental constraints and complete an assessment of potential impacts.

Thanks,
Brydon

From: Vir, Aanchal [mailto:Aanchal.Vir@cvc.ca]
Sent: Monday, April 1, 2019 8:31 AM
To: Brydon MacVeigh
Subject: [EXTERNAL] RE: Natural Heritage Information Request

Hi Brydon,

Can you please provide the following information.

- Project name
- Intended use and publications

Please note that a Data Sharing Agreement will be required and the process can take up to 4 weeks from the date of the receipt of the above information.

If you have any questions, please contact me.

Regards,

Aanchal Vir
Technician, Planning | Credit Valley Conservation
905.670.1615 ext 304 | 1-800-668-5557
aanchal.vir@cvc.ca | http://cvc.ca

From: BMacVeigh@matrix-solutions.com [mailto:BMacVeigh@matrix-solutions.com]
Sent: March 29, 2019 9:03 AM
To: Vir, Aanchal
Subject: Natural Heritage Information Request

Good morning,

Matrix Solutions Inc. has been retained by Hatch Corporation Inc. to complete natural heritage evaluations for the Region of Peel West Trunk Diversion project in the City of Mississauga which falls

within the jurisdiction of Credit Valley Conservation. Please note we have already been in contact with Aurora District MNRF, they have provided us the relevant SAR data/information they have available.

We are required to complete terrestrial and fisheries investigations for this project and as this project falls within your jurisdiction we would kindly like to request any background information you may have on file pertaining to environmental resources for the study area. Site maps of the study area have been attached with this correspondence and a list of watercourse crossings within the study area is provided below.

Fisheries – fish community data, SAR and important habitat features (critical or regulated habitat) for the following watercourse crossings:
Credit River (17T 603520 4827414) – Britannia Rd Crossing
Mullet Creek (17T 602940 4826690) – Britannia Rd crossing
Mullet Creek (17T 605190 4824644) – Eglinton Ave W crossing
Mullet Creek Tributary (17T 604620 4823908)– Eglinton Ave W crossing

Terrestrial – Environmentally Significant Areas, significant wildlife, wetlands, woodlots etc.

Species at Risk - Any information from previously recorded observations of SAR within the project areas would be greatly appreciated.

If you do not have any information available, please let us know so we can document it accordingly. Should you have any questions or concerns regarding our request, please do not hesitate to contact me

Brydon M^ac^Veigh
Aquatic Ecologist

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APPENDIX B
Arborist Photograph Inventory

Matrix Solutions Inc.
May 14, 2019

1. Very few trees located along north side of road and sporadic planted trees along south side of road

Matrix Solutions Inc.
May 14, 2019

2. Large diameter Willow sp. Located at 2071 Britannia Road West

Matrix Solutions Inc.
May 14, 2019

3. Queen Street South- highly urbanized with parking lot trees

Matrix Solutions Inc.
May 14, 2019

4. Large diameter trees along older area of Queen Street South

Matrix Solutions Inc.
May 14, 2019

5. Boulevard trees along north side of Eglinton Avenue East

Matrix Solutions Inc.
May 14, 2019

6. Trees adjacent to Credit River crossing (north east side)- trees set back from right-of-way

Matrix Solutions Inc.
May 14, 2019

7. Trees adjacent to Unnamed Tributary to Mullet Creek crossing (south side)- trees set back from right-of-way

Matrix Solutions Inc.
May 14, 2019

8. Trees adjacent to Mullet Creek crossing (south east side)- trees set back from right-of-way

Matrix Solutions Inc.
May 14, 2019

9. Trees adjacent to Unnamed Tributary to Mullet Creek crossing (south side)- trees set back from right-of-way

Matrix Solutions Inc.
May 14, 2019

10. Trees adjacent to Mullet Creek crossing (south east side)- trees set back from right-of-way

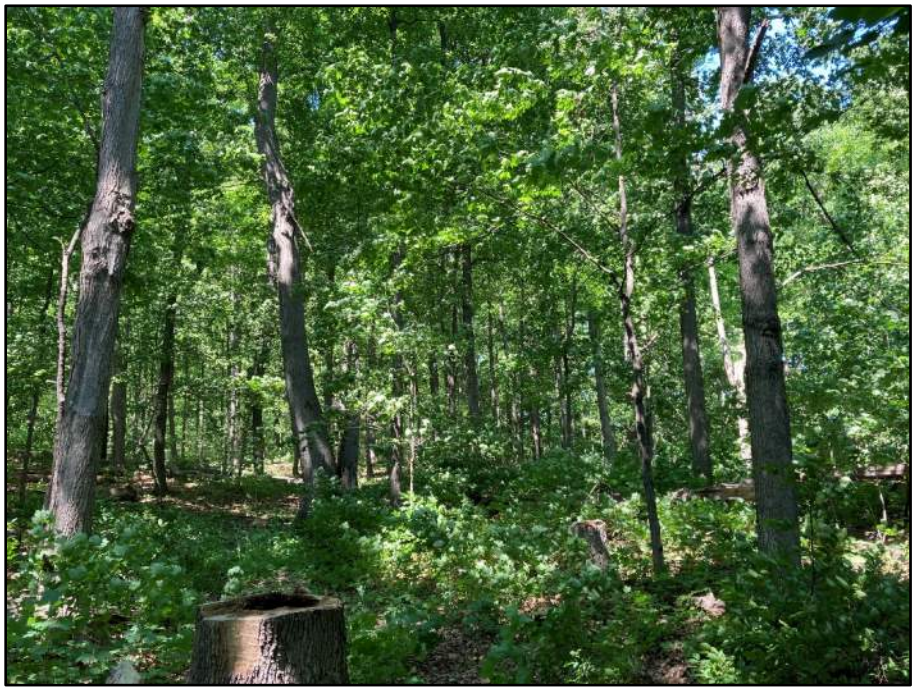
Matrix Solutions Inc.
June 10, 2021

11. A forested riparian area around Mullet Creek at Erin Centre Boulevard crossing.

Matrix Solutions Inc.
June 10, 2021

12. A representative photo of street trees along Erin Centre Boulevard.

Matrix Solutions Inc.
June 10, 2021



13. Erin Woods, a deciduous forest with minimal ground cover.

APPENDIX C
Aquatic Photograph Inventory

Matrix Solutions Inc.
May 14, 2019

1. View of the Credit River upstream of Britannia Road looking north from the bridge

Matrix Solutions Inc.
May 14, 2019

2. View of the Credit River downstream of Britannia Road looking south from west bank under the bridge

Matrix Solutions Inc.
May 14, 2019

3. View of Mullet Creek upstream of Britannia Road west of Mississauga Road/Queen Street looking north from the Britannia Road bridge

Matrix Solutions Inc.
May 14, 2019

4. View of turbid roadside drainage input to Mullet Creek at Britannia Road brige

Matrix Solutions Inc.
May 14, 2019

5. View of Mullet Creek upstream of Eglinton Avenue west of Mississauga Road looking north

Matrix Solutions Inc.
May 14, 2019

6. View of potential barrier to fish movement in Mullet Creek at the inlet of the culvert (upstream) of Eglinton Avenue

Matrix Solutions Inc.
May 14, 2019

7. View of Mullet Creek downstream of Eglinton Avenue west of Mississauga Road looking south

Matrix Solutions Inc.
May 14, 2019

8. View of Stormwater Management (SWM) Ponds representing upstream reach of the Unnamed Tributary of Mullet Creek north of Eglinton Avenue.

Matrix Solutions Inc.
May 14, 2019

9. View of Unnamed Tributary of Mullet Creek downstream of Eglinton Avenue looking south adjacent to Credit Valley Hospital

Matrix Solutions Inc.
June 10, 2021

10. View of Mullet Creek, upstream of Erin Centre Boulevard.

Matrix Solutions Inc.
June 10, 2021

11. View of Mullet Creek, downstream of Erin Centre Boulevard.

APPENDIX D
Wildlife Desktop Study DRAFT

Water Street Sanitary Sewage Pumping Station (SSPS) Service Area Municipal Class Environmental Assessment (EA) in Port Perry Ontario.

Species Inventory from Desktop Study

Species		Conservation Rank				Source										
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Provincial or National Conservation Priorities	NHIC Squares - 17PJ0524, 17PJ0424, 17PJ0423, 17PJ0225, 17PJ0226, 17PJ0326, 17PJ0327 &	Ontario Reptile and Amphibian Atlas - 17PJ02	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ02	Ontario Butterfly Atlas - 17PJ02	Ministry of Environment, Conservation and Parks	CVC Data	Aquatic Resource Area (LIO Database)	Credit River Fisheries Management Plan	Derry Rd & Argentia Rd Intersection Improvements Class	Matrix Field Inventory 2019 and 2021
AMPHIBIANS																
American Toad	*Bufo americanus*	S5					x									
American Bullfrog	*Lithobates catesbeianus*	S5					x									
Blue-spotted Salamander	*Ambystoma laterale*	S4					x									
Eastern Red-backed Salamander	*Plethodon cinereus*	S5					x									
Grey Treefrog	*Hyla versicolor*	S5					x									
Green Frog	*Rana clamitans*	S5					x									
Jefferson Salamander	*Ambystoma jeffersonianum*	S2	END	END			x									
Mudpuppy	*Necturus maculosus*	S4					x									
Northern Leopard Frog	*Lithobates pipiens*	S5					x									
Red-spotted Newt	*Notophthalmus viridescens viridescens*	S5					x									
Spotted Salamander	*Ambystoma maculatum*	S4					x									
Spring Peeper	*Pseudacris crucifer*	S5					x									
Western Chorus Frog	*Pseudacris maculata*	S3	THR				x									
Wood Frog	*Rana sylvatica*	S5					x									
REPTILES																
Blanding's Turtle	Emydoidea blandingii	S3	THR	THR			x									
Dekay's Brownsnake	Storeria dekayi	S5					x									
Eastern Gartersnake	*Thamnophis sirtalis*	S5					x									
Eastern Milksnake	*Lampropeltis triangulum*	S4	SC				x					x				
Eastern Ribbonsnake							x									
Midland Painted Turtle	*Chrysemys picta marginata*	S4					x									
Northern Leopard Frog	*Lithobates pipiens*	S5					x									
Northern Watersnake							x									
Red-bellied Snake	*Storeria occipitomaculata*	S5					x									
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC			x					x				

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MAMMALS																
Beaver	*Castor canadensis*	S5						x								
Big Brown Bat	*Eptesicus fuscus*	S4						x								
Coyote	*Canis latrans*	S5						x								x
Deer Mouse	*Peromyscus maniculatus*	S5						x								
Eastern Chipmunk	*Tamias striatus*	S5						x								
Eastern Cottontail	*Sylvilagus floridanus*	S5						x								
Eastern Grey Squirrel	*Sciurus carolinensis*	S5						x								X
Eastern Small-footed *Myotis*	*Myotis leibii*	S2S3	END	END				x			x					
Eastern Red Bat	*Lasiurus borealis*	S4						x								
Ermine	*Mustela erminea*	S5						x								
Hairy-tailed Mole	*Parascalops breweri*	S4						x								
Hoary Bat	*Lasiurus cinereus*	S4						x								
House Mouse	*Mus musculus*	SNA						x								
Little Brown *Myotis*	*Myotis lucifugus*	S4	END	END				x			x					
Long-tailed weasel	*Mustela frenata*	S4						x								
Masked Shrew	*Sorex cinereus*	S5						x								
Meadow Jumping Mouse	*Zapus hudsonicus*	S5						x								
Meadow Vole	*Microtus pennsylvanicus*	S5						x								
Mink	*Mustela vison*	S4						x								
Muskrat	*Ondatra zibethicus*	S5						x				x				
Northern *Myotis*	*Myotis septentrionalis*	S3	END	END				x			x					
Northern Short-tailed Shrew	*Blarina brevicauda*	S5						x								
Norway Rat	*Rattus norvegicus*	SNA						x								
Porcupine	*Erethizon dorsatum*	S5						x								
Raccoon	*Procyon lotor*	S5						x								
Red Fox	*Vulpes vulpes*	S5						x								
Red Squirrel	*Tamiasciurus hudsonicus*	S5						x								
Silver-haired Bat	*Lasionycteris noctivagans*	S4						x								
Snowshoe Hare	*Lepus americanus*	S5						x								
Southern Flying Squirrel	*Glaucomys volans*	S4						x								
Star-nosed Mole	*Condylura cristata*	S5						x								
Striped Skunk	*Mephitis mephitis*	S5						x								
Tricolored Bat	*Perimyotis subflavus*	S3?	END	END				x			x					
Virginia Opposum	*Didelphis virginiana*	S4						x								
White-footed Mouse	*Peromyscus leucopus*	S5						x								
White-tailed Deer	*Odocoileus virginianus*	S5						x				x				
Woodchuck	*Marmota monax*	S5						x								
Woodland Jumping Mouse	*Napaeozapus insignis*	S5						x								
Woodland Vole	*Pitymys pinetorum*	S3?	SC	SC				x			x					

Species		Conservation Rank				Source										
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BIRDS																
Alder Flycatcher	*Empidonax alnorum*	S5B							x							
American Crow	*Corvus brachyrhynchos*	S5B							x							X
American Goldfinch	*Carduelis tristis*	S5B							x							
American Kestrel	*Falco sparverius*	S4			Maintain Current[1]				x			x				
American Redstart	*Setophaga ruticilla*	S5B							x							
American Robin	*Turdus migratorius*	S5B							x			x				X
American White Pelican	*Pelecanus erythrorhynchos*	S2N,S4B									x					
American Woodcock	*Scolopax minor*	S4B			Increase[1]				x							
Bald Eagle	*Haliaeetus leucocephalus*	S2N,S4B									x					
Baltimore Oriole	*Icterus galbula*	S4B			Maintain Current[1]				x							
Bank Swallow	*Riparia riparia*	S4B	THR	THR	Increase[1], CBSD[2]				x		x					
Barn Owl	*Tyto alba*	S1	END	END							x					
Barn Swallow	*Hirundo rustica*	S4B	THR	THR	Recovery Objective[1]				x		x					
Belted Kingfisher	*Ceryle alcyon*	S4B			Increase[1]				x							
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S5B			Increase[1], Watch List (Yellow)[2]				x							
Black-capped Chickadee	*Parus atricapillus*	S5							x							X
Black-throated Blue Warbler	Setophaga caerulescens															X
Blue Jay	*Cyanocitta cristata*	S5							x							X
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	Recovery Objective[1], Watch List (Yellow)[2]				x		x					
Brown Creeper	*Certhia americana*	S5B							x							
Brown Thrasher	*Toxostoma rufum*	S4B			Increase[1]				x							
Brown-headed Cowbird	*Molothrus ater*	S4B							x							
Canada Goose	*Branta canadensis*	S5							x			x				
Canada Warbler	*Cardellina canadensis*		THR	SC							x					
Carolina Wren	*Thryothorus ludovicianus*	S4							x							
Cedar Waxwing	*Bombycilla cedrorum*	S5B							x							
Chestnut Sided Warbler	Setophaga pensylvanica															X
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	Reverse Decline[1], Watxh List (Yellow)[2]				x		x					
Chipping Sparrow	*Spizella passerina*	S5B							x							
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B							x							
Common Grackle	*Quiscalus quiscula*	S5B			CBSD[2]				x							
Common Merganser												x				
Common Nighthawk	*Chordeiles minor*	S4B	THR	SC	Reverse Decline[1]				x		x	x				

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Wilson's Snipe	*Gallinago delicata*	S5B							x							
Common Yellowthroat	*Geothlypis trichas*	S5B							x							
Downy Woodpecker	*Picoides pubescens*	S5							x							
Eastern Kingbird	*Tyrannus tyrannus*	S4B			Increase[1]				x							
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	Recovery Objective[1], CBSD[2]				x		x					
Eastern Phoebe	*Sayornis phoebe*	S5B							x							
Eastern Screech-Owl	*Megascops asio*	S4		NAR					x							
Eastern Towhee	*Pipilo erythrophthalmus*	S4B							x							
Eastern Whip-poor-will	*Antrostomus vociferus*	S4B	THR	THR							x					
Eastern Wood-pewee	*Contopus virens*	S4B	SC	SC	Increase[1]				x		x					
European Starling	*Sturnus vulgaris*	SNA							x							
Field Sparrow	*Spizella pusilla*	S4B							x							
Gray Catbird	*Dumetella carolinensis*	S4B							x							
Great Crested Flycatcher	*Myiarchus crinitus*	S4B							x							
Great Horned Owl	*Bubo virginianus*	S4							x							
Green Heron	*Butorides virescens*	S4B			Increase[1]				x							
Golden-winged Warbler	*Vermivora chrysoptera*	S4B	THR	SC							x					
Hairy Woodpecker	*Picoides villosus*	S5							x							
Henslow's Sparrow	*Ammodramus henslowii*	SHB	END	END		x					x					
Horned Grebe	*Podiceps auritus*	S1B,S4N	SC	SC							x					
Horned Lark	*Eremophila alpestris*	S5B			CBSD[2]				x							
House Finch	*Carpodacus mexicanus*	SNA							x							
House Sparrow	*Passer domesticus*	SNA							x							
House Wren	*Troglodytes aedon*	S5B							x							
Indigo Bunting	*Passerina cyanea*	S4B							x							
King Rail	*Rallus elegans*	S2B	END	END							x					
Killdeer	*Charadrius vociferus*	S5B, S5N			Increase[1]				x							
Least Bittern	*Ixobrychus exilis*	S4B	THR	THR							x					
Least Flycatcher	*Empidonax minimus*	S4B			CBSD[2]				x							
Mallard	*Anas platyrhynchos*	S5							x							
Mourning Dove	*Zenaida macroura*	S5							x							X
Mourning Warbler	*Geothlypis philadelphia*	S4B							x							
Northern Bobwhite	*Colinus virginianus*	S1	END	END							x					
Northern Cardinal	*Cardinalis cardinalis*	S5							x							
Northern Flicker	*Colaptes auratus*	S4B							x							
Northern Mockingbird	*Mimus polyglottos*	S4							x							
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4B			Increase[1]				x							
Northern Waterthrush	*Parkesia noveboracensis*	S5B							x							
Olive-sided Flycatcher	*Contopus cooperi*	S4B	THR	SC							x					
Orchard Oriole	*Icterus spurius*	S4B							x							
Ovenbird	*Seiurus aurocapilla*	S4B							x							

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Peregrine Falcon	*Falco peregrinus*	S3B		SC					x		x					
Pileated Woodpecker	*Dryocopus pileatus*	S5							x							
Pine Warbler	*Setophaga pinus*	S5B							x							
Piping Plover	*Charadrius melodus*	S1	END	END							x					
Prothonotary Warbler	*Protonotaria citrea*	S1B	END	END							x					
Purple Martin	*Progne subis*	S4B							x							
Red-eyed Vireo	*Vireo olivaceus*	S5B							x							
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	THR	SC							x					
Red Knot rufa subspecies	*Calidris canutus rufa*	S1N	END	END							x					
Red-tailed Hawk	*Buteo jamaicensis*	S5							x							X
Red-winged Blackbird	*Agelaius phoeniceus*	S4							x			x				X
Ring-necked Pheasant	*Phasianus colchicus*	SNA							x							
Rock Pigeon	*Columba livia*	SNA							x							
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B			Maintain Current[1]				x							
Savannah Sparrow	*Passerculus sandwichensis*	S4B			Increase[1]				x							
Scarlet Tanager	*Piranga olivacea*	S4B							x							
Sharp-Shinned Hawk	*Accipiter striatus*	S5							x							
Shory-eared Owl	*Asio flammeus*	S2N,S4B	SC	SC							x					
Sparrow Species	*Melospiza sp.*	-														X
Song Sparrow	*Melospiza melodia*	S5B							x			x				
Spotted Sandpiper	*Actitis macularia*	S5			Increase[1]				x							
Swamp Sparrow	*Melospiza georgiana*	S5B							x							
Tree Swallow	*Tachycineta bicolor*	S4B							x							
Turkey Vulture	*Cathartes aura*	S5B							x							
Veery	*Catharus fuscescens*	S4B			Management Assessment[3]				x							
Warbling Vireo	*Vireo gilvus*	S5B							x							
White-breasted Nuthatch	*Sitta carolinensis*	S5							x							
Willow Flycatcher	*Empidonax traillii*	S5B							x							
Wood Duck	*Aix sponsa*	S5			Increase[1]				x							
Wood Thrush	*Hylocichla mustelina*	S4B	THR	SC	Maintain Current[1], Watch List (Yellow)[2]				x		x					
Yellow Warbler	*Setophaga petechia*	S5B							x							
Yellow-breasted Chat	*Icteria virens*	S4B	END	END							x					
Yellow-billed Cuckoo	*Coccyzus americanus*	S4B							x							

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INSECTS																
Acadian Hairstreak	*Satyrium acadica*									x						
American Copper	*Lycaena phlaeas*									x						
American Lady	*Vanessa virginiensis*									x						
Appalachian Brown	*Lethe appalachia*									x						
Azure sp.	*Celastrina sp.*									x		x				
Baltimore Checkerspot	*Euphydryas phaeton*									x						
Banded Hairstreak	*Satyrium calanus*									x						
Black Swallowtail	*Papilio polyxenes*									x						
Bronze Copper	*Lycaena hyllus*									x						
Cabbage White	*Pieris rapae*									x						
Clouded Sulphur	*Colias philodice*									x						
Common Buckeye	*Junonia coenia*									x						
Common Ringlet	*Coenonympha tullia*									x						
Common Wood-Nymph	*Cercyonis pegala*									x						
Compton Tortoiseshell	*Nymphalis l-album*									x						
Delaware Skipper	*Anatrytone logan*									x						
Dreamy Duskywing	*Erynnis icelus*									x						
Dun Skipper	*Euphyes vestris*									x						
Eastern Comma	*Polygonia comma*									x						
Eastern Giant Swallowtail	*Papilio cresphontes*									x						
Eastern Pine Elfin	*Callophrys niphon*									x						
Eastern Tailed Blue	*Cupido comyntas*									x						
Eastern Tiger Swallowtail	*Papilio glaucus*									x						
Ebony Jewelwing												x				
Edwards' Hairstreak	*Satyrium edwardsii*									x						
European Skipper	*Thymelicus lineola*									x						
Eyed Brown	*Lethe eurydice*									x						
Fiery Skipper	*Hylephila phyleus*															
Gray Comma	*Polygonia progne*									x						
Great Spangled Fritillary	*Speyeria cybele*									x						
Hickory Hairstreak	*Satyrium caryaevorus*									x						
Hobomok Skipper	*Poanes hobomok*									x						
Juvenal's Duskywing	*Erynnis juvenalis*									x						
Least Skipper	*Ancyloxypha numitor*									x						
Little Glassywing	*Pompeius verna*									x						
Little Wood-Satyr	*Megisto cymela*									x						
Long Dash Skipper	*Polites mystic*									x						
Meadow Fritillary	*Boloria bellona*									x						
Milbert's Tortoiseshell	*Aglais milberti*									x						
Monarch	*Danaus plexippus*	S2N,S4B	SC	SC						x	x					
Mottled Duskywing	*Erynnis martialis*	S2		END							x					
Mourning Cloak	*Nymphalis antiopa*									x						

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Nine-spotted Ladybird Beetle	*Coccinella novemnotata*	SH		END							x					
Northern Azure	*Celastrina lucia*									x						
Northern Broken-Dash	*Wallengrenia egeremet*									x						
Northern Cloudywing	*Thorybes pylades*									x						
Northern Crescent	*Phyciodes cocyta*									x						
Northern Pearly-Eye	*Lethe anthedon*									x						
Orange Sulphur	*Colias eurytheme*									x						
Painted Lady	*Vanessa cardui*									x						
Pearl Crescent	*Phyciodes tharos*									x						
Peck's Skipper	*Polites peckius*									x						
Question Mark	*Polygonia interrogationis*									x						
Rapids Clubtail	*Gomphus quadricolor*	S1		END							x					
Red Admiral	*Vanessa atalanta*									x						
Red-spotted Purple	*Limenitis arthemis astyanax*									x						
Silver-spotted Skipper	*Epargyreus clarus*									x						
Silvery Blue	*Glaucopsyche lygdamus*									x						
Silvery Checkerspot	*Chlosyne nycteis*									x						
Striped Hairstreak	*Satyrium liparops*									x						
Tawny-edged Skipper	*Polites themistocles*									x						
Viceroy	*Limenitis archippus*									x						
White Admiral	*Limenitis arthemis arthemis*									x						
Wild Indigo Duskywing	*Erynnis baptisiae*									x						
Yellow-banded Bumblebee	*Bombus terricola*	S5		SC							x					
Zebra Swallowtail	*Eurytides marcellus*									x						
FLORA																
American Beech	*Fagus grandifolia*															X
American Chesnut	*Castanea dentate*	S3	END	END							x					
American Ginseng	*Panax quinquefolius*	S1S2?		END							x					
Butternut	*Juglans cinerea*	S2	END	END							x					
Ironwood	*Ostrya virginiana*	S5														X
Maple species	*Acer sp.*	-														X
Red Oak	*Quercus rubra*	S5														X
Staghorn Sumac	*Rhus typhina*	S5														X
Sugar Maple	*Acer saccharum*	S5														X
Trout Lily	*Erythronium americanum*	S5														X
White Pine	*Pinus strobus*	S5														X
Wild Parsnip	*Pastinaca sativa*	-										x				
Willow species	*Salix sp.*	-														X

Species		Conservation Rank				Source										
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Provincial or National Conservation Priorities	NHIC Squares - 17PJ0524, 17PJ0424, 17PJ0423, 17PJ0225, 17PJ0226, 17PJ0326, 17PJ0327 &	Ontario Reptile and Amphibian Atlas - 17PJ02	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ02	Ontario Butterfly Atlas - 17PJ02	Ministry of Environment, Conservation and Parks	CVC Data	Aquatic Resource Area (LIO Database)	Credit River Fisheries Management Plan	Derry Rd & Argentia Rd Intersection Improvements Class	Matrix Field Inventory 2019 and 2021
FISH																
American Eel	*Anguilla rostrata*	S1?		END							x		x			
Bluntnose Minnow	*Pimephales notatus*	S5										x	x	x		
Brook Stickleback	*Culaea inconstans*	S5										x	x	x		
Brook Trout	*Salvelinus fontinalis*	S5											x			
Brown Bullhead	*Ameiurus nebulosus*	S5										x	x			
Brown Trout	*Salmo trutta*	SNA										x	x			
Central Mudminnow	*Umbra limi*	S5											x			
Chinook Salmon	*Oncorhynchus tshawytscha*	SNA										x	x			
Coho Salmon	*Oncorhynchus kisutch*	SNA											x			
Common Carp	*Cyprinus carpio*	SNA										x	x			
Common Shiner	*Luxilus cornutus*	S5										x	x			
Creek Chub	*Semotilus atromaculatus*	S5										x	x	x	x	
Eastern Blacknose Dace	*Rhinichthys atratulus*	S5										x	x	x		
Fantail Darter	*Etheostoma flabellare*	S4										x	x			
Fathead Minnow	*Pimephales promelas*	S5										x	x	x		
Golden Shiner	*Notemigonus crysoleucas*	S5											x			
Hornyhead Chub	*Nocomis biguttatus*	S4										x	x			
Johnny Darter	*Etheostoma nigrum*	S5										x	x			
Goldfish	*Carassius auratus*	SNA											x			
Lake Sturgeon (Great Lakes - St Lawrenence population	*Acipenser fulvescens*	S2		THR		x					x					
Largemouth Bass	*Micropterus salmoides*	S5										x	x			
Longnose Dace	*Rhinichthys cataractae*	S5											x		x	
Mottled Sculpin	*Cottus bairdii*	S5											x			
Northern Hog Sucker	*Hypentelium nigricans*	S4										x	x			
Pumpkinseed	*Lepomis gibbosus*	S5										x	x			
Rainbow Darter	*Etheostoma caeruleum*	S4										x	x			
Rainbow Trout	*Oncorhynchus mykiss*	SNA										x	x			
Redside Dace	*Clinostomus elongatus*	S2	END	END		x					x		x			
River Chub	*Nocomis micropogon*	S4										x	x			
Rock Bass	*Ambloplites rupestris*	S5										x	x			
Sea Llamprey	*Petromyzon marinus*	SNA										x	x			
Shortnose Cisco	*Coregonus reighardi*	SH	END	END							x					
Smallmouth Bass	*Micropterus dolomieu*	S5											x			
Stonecat	*Noturus flavus*	S4										x	x			
White Sucker	*Catostomus commersoni*	S5										x	x	x		

Species		Conservation Rank				Source										
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Provincial or National Conservation Priorities	NHIC Squares - 17PJ0524, 17PJ0424, 17PJ0423, 17PJ0225, 17PJ0226, 17PJ0326, 17PJ0327 &	Ontario Reptile and Amphibian Atlas - 17PJ02	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ02	Ontario Butterfly Atlas - 17PJ02	Ministry of Environment, Conservation and Parks	CVC Data	Aquatic Resource Area (LIO Database)	Credit River Fisheries Management Plan	Derry Rd & Argentia Rd Intersection Improvements Class	Matrix Field Inventory 2019 and 2021
Freshwater Mussels																

Definitions, Acronyms and Symbols

Uppercase "X" indicates species was observed, lowercase "x" indicates species was identified during background review, but was not observed and may be considered unlikely to occur

Provincial S-rank

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)
S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)
S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)
S4: Apparently Secure (uncommon, but not rare in the nation and/or province)
S5: Secure (common, widespread and abundant in the nation and/or province)
SNA: Not Applicable (species is not a suitable target for conservation activities)
SHB: Breeding is not confirmed in Ontario
S#S#: Range Rank (range of uncertainty about the status of the species or community)
S#?: Rank is Uncertain
S?: Not Ranked Yet
B: Breeding migrants/vagrants
N: Non-breeding migrants/vagrants

Species at Risk
Species of Conservation Concern

National and Provincial At Risk Status

EXP - Extirpated
END - Endangered
THR - Threatened
SC - Special Concern
NAR - Not at Risk

SARO: Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
SARA: Species at Risk Act

Provincial Conservation Priorities

Recovery[1] - Species that are designated as Endangered or Threatened under federal or provincial Species At Risk legislation.
Assess Status[1] - Species is poorly monitored and status is unknown
Reverse Decline[1] - Species has declined to a less desirable level
Halt Decline[1] - Species has declined but is still at an acceptable level

Maintain Current[1] - Appears to be stable or increasing
Management Assessment[3]
Immediate Management[3]
Medium Priority[4] - definition not provided
Low Priority[4] - definition not provided

Avian conservation Assessment

Watch List (Red) -Highly vulnerable and in urgent need of special attention
Watch List (Yellow) -Range restricted and small populations in need of constant
CBSD - populations have declined continentally by an estimated 50% or more since 1970.

National Conservation Priorities

High Concern[4, 5] - Species population is known or thought to be declining
Moderate Concern[4, 5] - Species population is either a) declining with moderate threats or disturbance; b) stable with known potential threats and moderate to restricted distributions; or c) relatively small with relatively restricted distributions
Low Concern[4,5] - Species population is either a) stable with moderate threats and distributions; b) increasing but with known or potential threats and moderate to restricted distributions; or c) moderate size with nown or potential threats and

Species		Conservation Rank				Source								
Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)	Provincial or National Conservation Priorities	NHIC Squares - 17PJ0524, 17PJ0424, 17PJ0423, 17PJ0225, 17PJ0226, 17PJ0326, 17PJ0327 &	Ontario Reptile and Amphibian Atlas - 17PJ02	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ02	Ontario Butterfly Atlas - 17PJ02	Ministry of Environment, Conservation and Parks	CVC Data	Aquatic Resource Area (LIO Database)	Credit River Fisheries Management Plan	Derry Rd & Argentia Rd Intersection Improvements Class	Matrix Field Inventory 2019 and 2021

APPENDIX D

Stage 1 Archaeological Assessment

Stage 1 Archaeological Assessment Peel West Trunk Sewer (Lot 32, Concession 2 North of Dundas, Lots 1-3, Range 5 North of Dundas, Lot 1, Concession 6 West of Centre, Lots 5-6, Concession 6 West of Centre, Lots 1-7, Concession V West of Centre, Former Toronto Township, County of Peel), City of Mississauga, Regional Municipality of Peel

Revised Report

Prepared for:

Hatch Corporation

2265 Upper Middle Road East, 5th Floor Oakville, Ontario, L6H 0G5

Archaeological Licence: P094 (Merritt) PIF P094-0291-2019

Archaeological Services Inc. File: 18EA-123, 21EA-105

October 28, 2021

ASI Providing Archaeological & Cultural Heritage Services
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Executive Summary

Archaeological Services Inc. was contracted by Hatch Corporation to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Peel West Sewer Trunk Diversions, in the City of Mississauga. This project involves construction of diversion sewers connecting the existing Credit Valley Trunk Sewer to the new West Trunk Sewer on Erin Mills Parkway.

The Stage 1 Study Area comprises the three alternative alignments: 1, 2a, and 2b and the preliminary preferred Alignment 4. Trenchless construction is proposed as the method of construction for all alternatives. The Study Area also includes the preliminary shaft locations and staging areas required for Alignment 4 where surface impacts are planned.

The following recommendations are made:

1 Parts of the Study Area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals (Figures 16-20: Areas highlighted in green). Since the current project proposes trenchless construction methods, Stage 2 will only be required in areas of surface impacts (at depths less than five metres below surface);

1.1 The preliminary shaft locations and staging areas which exhibit archaeological potential will require Stage 2 survey prior to any construction impacts.

1.2 The preferred alignment (at depths greater than five metres below surface) will not require Stage 2 survey.

2 Site AjGw-432 was destroyed during redevelopment. The location of Site AjGw-432 should be noted during any future Stage 2 archaeological assessment on adjacent properties;

3 The Study Area includes the Streetsville Memorial Cemetery at 299 Queen Street South. Because the proposed method of project construction is

trenchless installation, surface impacts in and directly adjacent to the cemetery are not planned within the proposed alignment.

3.1 Any future impacts less than five metres below surface within or directly adjacent to the cemetery will require a Stage 3 Cemetery Investigation to be conducted within the cemetery property, in the sidewalk and Queen Street South right-of-way, to confirm the presence or absence of human remains.

3.2 A Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required for any "invasive" (Stages 2-4) fieldwork.

3.3 If evidence of burials associated with this cemetery are encountered, all work must cease and M.H.S.T.C.I. and the Bereavement Authority of Ontario will need to be contacted for direction on next steps.

4 If the Credit River riverbed will be impacted, the M.H.S.T.C.I.'s Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential.

5 The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and,

6 Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

Project Personnel

- **Senior Project Manager**: Lisa Merritt, MSc. (P094) Partner, Director, Environmental Assessment Division
- **Project Coordinator**: Katrina Thach, Hon. BA (R1225), Archaeologist, Project Coordinator, Environmental Assessment Division; Sarah Jagelewski, Hon. BA (R405), Lead Archaeologist, Manager, Environmental Assessment Division
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- **Project Director**: Lisa Merritt
- **Project Manager**: Eliza Brandy, MA (R1109), Associate Archaeologist, Project Manager, Environmental Assessment Division
- **Field Director**: Eliza Brandy; Kirstyn Allam, Hon. BA (R1258), Cultural Heritage Assistant, Cultural Heritage Division
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- **Report Reviewer**: Lisa Merritt

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1.0 Project Context

Archaeological Services Inc. (ASI) was contracted by Hatch Corporation to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Peel West Sewer Trunk Diversions, in the City of Mississauga. This project involves construction of diversion sewers connecting the existing Credit Valley Trunk Sewer to the new West Trunk Sewer on Erin Mills Parkway.

The Stage 1 Study Area comprises the three alternative alignments: 1, 2a, and 2b and the preliminary preferred Alignment 4. Trenchless construction is proposed as the method of construction for all alternatives. The Study Area also includes the preliminary shaft locations and staging areas required for Alignment 4 where surface impacts are planned (Figure 1).

All activities carried out during this assessment were completed in accordance with the *Ontario Heritage Act* (Ontario Heritage Act, R.S.O. c. O.18, 1990, as amended in 2019) and the 2011 *Standards and Guidelines for Consultant Archaeologists* (S & G), administered by the Ministry of Heritage, Sport, Tourism and Culture Industries (M.H.S.T.C.I. 2011).

1.1. Development Context

All work has been undertaken as required by the *Environmental Assessment Act, RSO* (Environmental Assessment Act, R.S.O., 1990 as amended 2020) and regulations made under the Act, and are therefore subject to all associated legislation. This project is being conducted in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (Municipal Class Environmental Assessment, 2000, as amended 2015).

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment and property inspection was granted by Hatch Corporation on January 21, 2019.

1.1.1. Treaties and Traditional Territories

The Study Area is within Treaty 13a, or the Toronto Purchase, signed on August 2, 1805 by the Mississaugas and the British Crown in Port Credit at the Government Inn. A provisional agreement was reached with the Crown on August 2, 1805, in which the Mississaugas ceded 70,784 acres of land bounded by the Toronto Purchase of 1787 in the east, the Brant Tract in the west, and a northern boundary that ran six miles back from the shoreline of Lake Ontario. The Mississaugas also reserved the sole right of fishing at the Credit River and were to retain a one mile strip of land on each of its banks, which became the Credit Indian Reserve. On September 5, 1806, the signing of Treaty 14 confirmed the Head of the Lake Purchase between the Mississaugas of the Credit and the Crown (Mississauga of the New Credit First Nation, 2001; Mississaugas of the Credit First Nation, 2017).

1.2. Historical Context

1.2.1. Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (B.P.) (Ferris, 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 B.P., the environment had progressively warmed (Edwards & Fritz, 1988) and populations now occupied less extensive territories (Ellis & Deller, 1990).

Between approximately 10,000-5,500 B.P., the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 B.P.; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 B.P. and is indicative of increased

social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Brown, 1995, p. 13; Ellis et al., 1990, 2009).

Between 3,000-2,500 B.P., populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 B.P. and exchange and interaction networks broaden at this time (Spence et al., 1990, pp. 136, 138) and by approximately 2,000 B.P., evidence exists for small community camps, focusing on the seasonal harvesting of resources (Spence et al., 1990, pp. 155, 164). By 1,500 B.P. there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 B.P. - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch & Williamson, 2013, pp. 13–15). As is evident in detailed Anishinaabek ethnographies, winter was a period during which some families would depart from the larger group as it was easier to sustain smaller populations (Rogers, 1962). It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 B.P., lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (C.E.), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson, 1990, p. 317). By 1300-1450 C.E., this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al., 1990, p. 343). From 1450-1649 C.E. this process continued with the coalescence of these small villages into larger communities (Birch & Williamson, 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed.

By 1600 CE, the Huron- Wendat communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and

missionaries. Samuel de Champlain in 1615 reported that a group of Iroquoian-speaking people situated between the Haudenosaunee and the Huron-Wendat were at peace and remained "la nation neutre". Like the Huron-Wendat, Petun, and Haudenosaunee, the Neutral people were settled village agriculturalists. In the 1640s, the Neutral and the Huron-Wendat (and their Algonquian allies such as the Nippissing and Odawa) were decimated by epidemics and ultimately dispersed by the Haudenosaunee. Shortly afterwards, the Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. By the 1690s however, the Anishinaabeg were the only communities with a permanent presence in southern Ontario. From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there was no interruption to Anishinaabeg control and use of southern Ontario.

1.2.2. Post-Contact Settlement

Historically, the Study Area is located in the Township of Toronto, County of Peel in Lot 32, Concession 2 North of Dundas, Lots 1-3, Range 5 North of Dundas, Lot 1, Concession 6 West of Centre, Lots 5-6, Concession 6 West of Centre, Lots 1-7, Concession V West of Centre.

The S & G stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches, and early cemeteries are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the Ontario Heritage Act or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those that are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed

lands within 100 metres of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Indigenous pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls and convenient access, by means of the various waterways and overland trails, into the hinterlands. Early transportation routes followed existing Indigenous trails, both along the lakeshore and adjacent to various creeks and rivers (ASI 2006).

Toronto Township

The Township of Toronto was original surveyed in 1806 by Mr. Wilmot, Deputy Surveyor. The first settler in this Township, and also the County of Peel, was Colonel Thomas Ingersoll. The whole population of the Township in 1808 consisted of seven families, scattered along Dundas Street. The number of inhabitants gradually increased until the war broke out in 1812, which gave considerable check to its progress. When the war was over, the Township's growth revived, and the rear part of the Township was surveyed and called the "New Survey." The greater part of the New Survey was granted to a colony of Irish settlers from New York City, who suffered persecution during the war (Walker and Miles, 1877).

The Hamilton and Toronto Railway was formed in 1852, and in 1855, completed its lake shore route across the south end of Lot 11. In 1871, the railway was amalgamated with the Great Western Railway, which in turn, was amalgamated in 1882, with the Grand Trunk Railway. The Grand Trunk Railway was amalgamated in 1923, with Canadian National Railway (Andreae, 1997, pp. 126–127).

Streetsville

The settlement of Streetsville began in 1819 on the banks of the Credit River, just east of Queen Street South (Mississauga Road) in the City of Mississauga when the Crown acquired all lands north of present-day Eglinton Avenue and

commenced a formal survey from Timothy Street and Richard Bristol. As partial payment for his services, Street was granted over 4500 acres of land throughout Peel and Halton, including land along the Credit River, much of which would become the future village site (Heritage Mississauga 2009c). The first settler to receive a land grant in the area was James Glendinning. On April 21st, 1819 he received land along Mullet Creek (Heritage Mississauga 2009c). Many early settlers were descended from United Empire Loyalists who left the United States during the War of Independence, including the Barnhart, Birdsall, Embleton, Glendinning, Leslie, Lewis, Lightheart, Row(e), Rutledge, and Switzer families, amongst others. In 1821, Timothy Street built a grist mill along the Credit River, followed by a lumber and saw mill in 1822 (Heritage Mississauga 2009c; Heritage Mississauga 2011). During this time, Street lived in the Niagara Peninsula with his family (Manning, 2008).

In 1821 a general store and trading post was opened by John Barnhart at the southwest corner of Queen Street and Pearl Street, called the Montreal House (Heritage Mississauga, 2012; Manning, 2008; Streetsville Women's Institute, 1965). The first general store to serve the community still stands today as the oldest building in the area (Streetsville Women's Institute, 1965). The Montreal House, together with the mills, helped to attract many settlers and early businesses to the village, propelling early growth. As early as 1823, a bridge was built over the Credit River, making the community a key crossing and stopping point. The village officially became known as Streetsville in 1829 when the first post office opened (Heritage Mississauga 2009c). By 1835, grist mills, sawmills, a tannery, and several inns were in operation, making Streetsville the political and economic hub of the surrounding township (Heritage Mississauga 2009c). By 1850 Streetsville had a population of 1000 and was the most prosperous and populated village in Peel County (Heritage Mississauga 2009c).

Early directories list several mills, a tannery, foundry, cooperage, pottery, brickyard, blacksmiths, shoemakers, carriage shops, tinsmith, brewery, telegraph office, physicians, tailors, gunsmith, watchmaker, broom and pail factory, millinery, carpenter, furniture manufacturer, stave factory, bobbin factory, four churches, an Orange Lodge, and two schools (Heritage Mississauga 2009d). Streetsville also had several inns and hotels, including the Telegraph House, Globe

Hotel, Tyrone Inn, Franklin House, Pacific Hotel, and Royal Hotel. The Telegraph House and the Globe Hotel are noted to be the most popular (Manning, 2008).

The first library in Toronto Township is believed to have been organized in Streetsville by 1826, however it was in the 1850s when the Farmer's and Mechanics' Association was established to promote reading and education (K. A. Hicks, 2008). In 1895 the Farmers and Mechanics Institute Library became the Streetsville Public Library, because of the Libraries Act passed by Ontario Legislature in 1882 that gave municipalities power to tax themselves to establish free libraries (K. A. Hicks, 2008). Toronto Township's first high school, the Grammar School opened in Streetsville in 1851 at 321 Queen Street South (Heritage Mississauga, 2012). The building served as a school for a century. John Embleton, the community surveyor, built a store at 213 Queen Street South in the 1840s. From 1854 to 1877 it housed the Library of the Farmer's and Mechanic's Institute, and between 1931 and 1952 it was used as the Post Office (Mississauga Library System 2018). The intersection of Queen Street and Main Street became the commercial hub of the community, blossoming around Barnhart's Montreal House and John Embleton's Store.

By 1858 the population of Streetsville had grown to 1,500. The same year Streetsville incorporated as a village, with John Street, Timothy's son, serving as the first Reeve (Heritage Mississauga 2009c). In the 1880s the village had wooden sidewalks. By 1910, the wooden sidewalks had been replaced with cement sidewalks which lasted into the 1960s. The stretch of road between Streetsville and Erindale was paved with cement and opened on September 16, 1931 (K. A. Hicks, 2008).

By the early twentieth century, Streetsville's mills began to close, and by the 1940s, the last of Streetsville's many hotels had also closed. The community gradually changed from an industrial mill-town into a small businesses and services centre. By 1959, as Streetsville celebrated its centennial anniversary of incorporation, the population had risen to 4,400 (Manning, 2008). In 1962 Streetsville achieved Town status, however this status was short lived as Streetsville was amalgamated into the City of Mississauga in 1974 (Heritage Mississauga 2009c).

Streetsville Memorial Cemetery

Streetsville Memorial Cemetery, also known historically as the Scotch Burying Ground, is located at 299 Queen Street South. The property was designated by the City of Mississauga in 1987. Before the St. Andrew's Presbyterian Church was built next to the cemetery, interments were in the woods. According to the plaque on a commemorative gateway constructed in 1984 at the entrance of the cemetery, Timothy Street deeded one acre in 1824 to the Presbyterian Church of Scotland to serve as the protestant burying ground for the area. It remained active until 1891 when a new cemetery was established on the east side of the Credit River. The one-storey brick church was constructed in 1867, and the cemetery contains many early headstones, including that of Street, who founded Streetsville and died in 1848. Other early burials date to the 1830s (CanadaGenWeb's Cemetery Project, 2021). In 1967, the grounds were restored, and grave markers were repaired. Many grave markers were moved into cairns of cement walls, and a brick and stone gateway was erected to commemorate the twenty-fifth anniversary of the incorporation of Streetsville village and the tenth anniversary of the City of Mississauga (City of Mississauga, 2021). Presently, most of the lands within the current fence along Queen Street are unmarked, suggesting the earliest burials were located fronting onto the historical road and their markers moved into cairns (see Image 43).

Barberton

Barberton was a settlement established along Mississauga Road, historically located to the north of Eglinton Avenue, along the Credit River and on the east side of Mississauga Road. Barberton, also known as Creditvale, had one of the approximately 60 mills along the Credit River established by 1851 (Wilkinson, 2009). Following the purchase of William Comfort's small mill and farm in 1843, brothers William and Robert Barber grew their business and built the Toronto Woolen Mills into one of the largest textile manufacturers in the area (Ontario Heritage Trust, 2018; Wilkinson, 2009). The community that grew around the mill came to be known as Barberton, after William Barber and his brother Robert. Barberton never achieved village status, however 43 buildings were constructed by the Barber brothers for their mill workers (Wilkinson, 2009). Following the decline of the brothers' fortunes, the community of Barberton was deserted.

Most of the original 43 workers' homes are now gone (Ontario Heritage Trust, 2018). Remnants of the original settlement include Barberton Road, which extends east from Mississauga Road and terminates at the Credit River, the mill bridge constructed in 1898, and a small recreational area (Wilkinson, 2009).

Mississauga Road

Mississauga Road is one of Mississauga's oldest northwest-southwest thoroughfares that follows the route of a former Indigenous hunting and fishing trail (Skeoch, 2000). The Indigenous trail that eventually became Mississauga Road was surveyed by John Embleton in the 1820s (K. A. Hicks, 2008). By 1831, Mississauga Road had become a significant route for stagecoach service, connecting Springfield (Erindale) and Streetsville with Port Credit (City of Mississauga, 1983; K. Hicks, 2009). In 1836, Dundas Street became a toll road. A toll stop was established at Dundas Street and Mississauga Road (then called Streetsville Road), with revenue used to improve the roads (K. A. Hicks, 2006). Several communities developed along Mississauga Road throughout the nineteenth century, including Port Credit and Streetsville, and other settlements such as Harris' Corners and Barberton which are no longer extant.

Between 1954 and 1956, the development of the Mississauga Golf and Country Club resulted in the re-routing of Mississauga Road (Fitzgibbon, 2009). When the City of Mississauga was incorporated in 1974, the Region of Peel became responsible for major roadways including Mississauga Road (K. A. Hicks, 2006). With urbanization and significant development on either side, Mississauga Road has become a major arterial road through the heart of Mississauga.

Credit Valley Railway

The Credit Valley Railway (CVR) (now part of the Milton Rail Corridor, CP Galt Subdivision) bisects the Study Area and was constructed between 1877 and 1879 to improve trade opportunities in southern Ontario (Town of Caledon 2009). The project was backed by George Laidlaw and was intended to connect Toronto with Orangeville via Streetsville. Construction began in 1874 and over several subsequent years several branches were added to the proposed line. The first section of track from Parkdale (Toronto) to Milton was opened in 1877. In 1873,

survey work was completed and track was first laid in 1876. Construction on the railway reached the Forks of the Credit by 1879 with a station at the northern end of the longest curved timber trestle of the time, which spanned 1,146 feet through the river valley at a height of 85 feet (Town of Caledon 2009:7.30). The line was completed in 1881 but nearly bankrupted the company. It was established in direct competition with the Toronto, Grey and Bruce Railway in the hopes of stimulating trade and economic opportunities in the outlying areas. In 1883 the line was taken over by the Canadian Pacific (CP) Railway (Heritage Mississauga, 2009a; Town of Caledon, 2009).

1.2.3. Map Review

The 1859 *Tremaine's Map of the County of Peel* and the 1877 *Illustrated Historical Atlas of the County of Peel,* Toronto Township page, were examined to determine the presence of historic features within the Study Area during the nineteenth and twentieth centuries (Figures 2-3).

The 1859 map shows that the community of Streetsville is depicted as a densely populated village core on either side of Queen Street South between Britannia Road West and Church Street. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway were all historically surveyed roads. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, and Britannia Road West are depicted following their present alignments and appear to be well-established roadways. Erin Mills Parkway on the map is depicted as a straight northwest to southeast road to the west of the community of Streetsville. The Study Area travels along the historically surveyed roadways, with Alternative 1 and Preferred Alternative 4 alignments passing through the centre of Streetsville. The branches of the Study Area that follow Britannia Road West and Eglinton Avenue West passes through a rural agricultural context with minimal houses or other structures depicted along the alignments. The eastern end of the northern portions of the alignments are illustrated as intersecting with the Credit River; the river meanders from northwest to southeast and is to the east of Streetsville.

The 1877 map illustrates that the village core has expanded substantially by this period, the southern limits of the core ending at part of Preferred Alternative 4.

Streetsville is surrounded by agricultural land, however development can be seen extending south as properties are already subdivided along the west side of Queen Street South and Mississauga Road. Clusters of structures are illustrated on the lot occupying the north corner of the intersection of present-day Mississauga Road and Eglinton Avenue West. The Credit Valley Railway is depicted on the map following a north-south alignment west of Queen Street South and intersecting with the Study Area along Queen Street South and Britannia Road West. Mullet Creek is depicted on the map as intersecting Study Area along Britannia Road West and Eglinton Avenue West. The creek travels from the northwest to the southeast in the western part of Streetsville to the west of Mississauga Road, Queen Street North, and Queen Street South.

The 1909 topographic map Brampton Sheet, the 1939 Fire Insurance Plan of Streetsville, the 1974 National Topographic System (NTS) Streetsville Sheet, 1954 aerial photography of Mississauga, and the 1994 National Topographic System Brampton Sheet were also examined to determine the extent and nature of development and land uses within the Study Area (Figures 4-10).

The 1909 map depicts that there has been some development along the Study Areas with additional stone or brick and wooden houses being illustrated along the routes of the alignments. The former Credit Valley Railway is now the Canadian Pacific Railway, with Streetsville Junction located near the intersection of Britannia Road West and Queen Street North. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway are all depicted as unmetalled roads. The Britannia Road bridge is located adjacent to the proposed shafts and staging areas at the Credit River. A hotel, a church and cemetery, and school are depicted along the east side of Queen Street South and Mississauga Road.

The 1939 fire insurance plan illustrates that Queen Street included numerous historical structures through the historical centre of Streetsville between Britannia Road and the Canadian Pacific rail line.

The 1954 aerial photograph shows that the settlement area of Streetsville has retained its rural context into the mid-twentieth century. The areas outside of the village core remain largely agricultural, though development of residential

subdivisions have begun southeast of the intersection of Queen Street South and Britannia Road West. The roadways still follow their previous alignments. There has been some development in Streetsville and the area around Streetsville Junction with some outward growth from Mississauga Road, Queen Street North, and Queen Street South. The southern portion of Preferred Alternative 4 remains in an open field agricultural context between Erin Mills Parkway and Mississauga Road.

The 1973 topographic map illustrates that there have been dense areas of development both within and outside the village core. This map labels Eglinton Avenue West as Base Line Road West and Erin Mills Parkway as Fifth Line West. The roadways are all depicted as two-lane hard surface, all weather roads. The area around Eglinton Avenue West remains mostly a rural agricultural context.

The 1994 topographic map demonstrates that there has been growth and development of the Streetsville area which has now encompassed most of the land adjacent to the Study Areas. The areas north of Eglinton Avenue West between Erin Mills Parkway and Mississauga Road; and north of Britannia Road West between Erin Mills Parkway and Mississauga Road are more sparsely developed. Erin Mills Parkway is now illustrated in its present alignment travelling mostly northwest to southeast with a slight curve around the Vista Heights community.

1.2.4. Orthoimagery Review

A review of available Google satellite imagery shows that the Study Area has been located within the urban right-of-ways (ROWs) of Queen Street/Mississauga Road, Britannia Road, Eglinton Avenue, Erin Centre Boulevard and Erin Mills Parkway with industrial development occurring since 2004 northwest of Britannia Road and Queen Street. The imagery also shows that a stormwater management pond was constructed northeast of Erin Mills Parkway and Eglinton Avenue West by 2009, and a residential subdivision was constructed on Summersky Court between 2009 and 2013. In 2017, construction of a residential subdivision on Symphony Court is shown to have begun by demolishing the former properties at 5175, 5201 and 5215 Mississauga Road. The Kingdom Hall of Jehovah's Witnesses and parking lot at 2125 Erin Centre Boulevard is shown to have been constructed

by 2006-2007. The Study Area through Streetsville is shown to have remained relatively unchanged since 2004. Construction activities are shown to have occurred on the northeast corner of Erin Mills Parkway and Eglinton Avenue West, and the ongoing construction works for the new West Trunk Sewer on Erin Mills Parkway can be seen to have begun in 2016.

1.3. Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Study Area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the M.H.S.T.C.I. through "Ontario's Past Portal"; published and unpublished documentary sources; and the files of ASI.

1.3.1. Current Land Use and Field Conditions

The Peel wastewater system comprises the west trunk system that conveys flows along and near the Credit Valley to the Clarkson Wastewater Treatment Plant; and the east trunk system that conveys flows along and near the Etobicoke Creek Valley to the G. E. Booth Wastewater Treatment Plant. The West Trunk system was originally constructed in the late 1960s/early 1970s and has been servicing the west portion of the Region.

The Study Area consists of four alignments for the West Trunk Sewer Diversions. Alignment 1: Single Version Concept, Alignment 2a: Two-Leg Diversion Concept, Alignment 2b: Alternate Two-Leg Diversion Concept, and Preferred Alternative 4.

Alignment 1: Single Diversion Concept is primarily focused on Mississauga Road, Queen Street North, and Queen Street South (a single road, for ease of understanding in this section, Mississauga Road will be used when discussing this roadway); with a branch along Britannia Road West, starting east of the intersection with Queen Street North; and another along Eglinton Avenue West east of Mississauga Road to west of Erin Mills Parkway. The alignment is

approximately 4.14 kilometres in length along Mississauga Road. Mississauga Road is oriented in a northwest-southeast alignment and features two lanes of northwest and southeast-bound vehicular traffic. Mississauga Road also has sidewalks and curbs on both sides. The portion of the Study Area that travels along Britannia Road West is approximately 620 metres in length from its intersection with Mississauga Road. Britannia Road West is oriented in a northeast to southwest alignment and features four lanes of northeast and southwest-bound vehicular traffic with curbs and sidewalks on both sides. The eastern end of the branch travels southeast to the Credit River.

Alignment 2a: Two-Leg Diversion Concept has a northern portion and southern portion. The northern portion is primarily focused on Britannia Avenue West, from the Credit River to Erin Mills Parkway. It has a branch that begins at the intersection of Britannia Avenue West and Queen Street North and travels north. The southern portion is primarily focused on Eglinton Avenue West from just east of Mississauga Road to Erin Mills Parkway. A branch of this portion of the Study Area travels north along Mississauga Road from the intersection of Eglinton Avenue West and Mississauga Road.

Alignment 2b: Alternate Two-Leg Diversion Concept also has a northern portion and southern portion. The southern portion of this alignment is the same as Alignment 2a. The northern portion is mostly the same as 2a with the variation being on its western end. This alignment travels south down Hogan Drive and through Turney Woods Park to Erin Mills Parkway.

Preferred Alternative 4 is primarily focused on Mississauga Road/Queen Street North with branches along Britannia Road West towards the Credit River, and Erin Centre Boulevard to Erin Mills Parkway.

1.3.2. Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful indicator of archaeological potential. Accordingly, a description of the physiography and soils are briefly discussed for the Study Area.

The S & G stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP (Karrow & Warner, 1990, p. Figure 2.16), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include elevated topography (eskers, drumlins, large knolls, and Imageaux), 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 (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S & G, Section 1.3.1).

The Study Area is within the bevelled and drumlinized till plains and till moraines of the South Slope physiographic region of southern Ontario (Figure 8). The South Slope is the southern slope of the Oak Ridges Moraine (Chapman and Putnam 1984: 172-174). The South Slope meets the Moraine at heights of approximately 300 metres above sea level, and descends southward toward Lake Ontario, ending, in some areas, at elevations below 150 metres above sea level. Numerous streams descend the South Slope, having cut deep valleys in the till.

Figure 9 depicts surficial geology for the Study Area. The surficial geology mapping demonstrates that the Study Area is underlain by clay to silt-textured till derived from glaciolacustrine deposits or shale; coarse-textured glaciolacustrine deposits of sand and gravel; fine-textured glaciolacustrine deposits of silt and clay; modern alluvial deposits of clay, silt, sand and gravel; and Paleozoic bedrock (Ontario Geological Survey, 2010). Soils in the Study Area consist of Oneida clay loam, a grey-brown podzolic with good drainage; Chinguacousy clay loam, a grey brown luvisol with imperfect drainage; Bottom Land, an alluvial soil with little profile differentiation and variable drainage; and Jeddo clay, a dark grey gleisolic with poor drainage (Figure 10).

The Study Area crosses the Credit River and its tributary Mullet Creek. The Credit River Watershed drains an area of approximately 860 square kilometres from its headwaters in Orangeville, Erin, and Mono, passing through part of the Niagara Escarpment and the Oak Ridges Moraine, and draining into Lake Ontario at Port Credit (Credit Valley Conservation, 2009). The river was named "*Mis.sin.ni.he*" or "*Mazinigae-zeebi*" by the Mississaugas, and surveyor Augustus Jones believed this signified "the trusting creek" or could also be translated as "to write or give and make credit", while the French name used when the river was first mapped in 1757 was "*Riviere au Credit*". These names refer to the fur trading period, when French, British, and Indigenous traders would meet along this river (Gibson, 2002, p. 177; Jameson, 1838, pp. 73–74; Rayburn, 1997, p. 84; Robb et al., 2003, p. 6; Scott, 1997, p. 182; Smith, 1987, pp. 255–257). The Credit River was historically considered to be one of the best potential power sources for milling in all of southern Ontario, which led to the development of early saw and grist mill industries, and later textile mills, distilleries, bottling plants, and hydro-electric plants spawned communities throughout the river valley, typically close to the Niagara Escarpment (Town of Caledon, 2009, fig. 7.1)

1.3.3. Previously Registered Archaeological Sites

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (O.A.S.D.) maintained by the M.H.S.T.C.I.. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 kilometres east to

west, and approximately 18.5 kilometres north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The Study Area under review is located in Borden block *AjGw.*

According to the O.A.S.D., 25 previously registered archaeological sites are located within one kilometre of the Study Area (M.H.S.T.C.I., 2021). Sites AjGw-39, AjGw-80, and AjGw-618 are within 50 metres (Table 1, sites in italics), and Site AjGw-432 is within the Study Area (Table 1, site in bold). A summary of the sites within one kilometre of the Study Area is provided below in Table 1.

Table 1: Registered Sites within One Kilometre of the Study Area

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
AjGw-6	Monners	Pre-Contact	Campsite	Konrad 1967
AjGw-39	*Farnington*	*Archaic*	*Campsite*	*Unknown 1980*
AjGw-40	Marchesse	Paleo	Campsite	McNeil 1981
AjGw-67	Timothy Street Mill	Post-Contact	Distillery, Tannery, Mill	Mayer, Pihl, Poulton and Associates Inc. 1985
AjGw-76	Not applicable	Pre-Contact Early Archaic	Findspot	Museum of Ontario Archaeology 1987

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
AjGw-77	Not applicable	Other	Findspot	Museum of Ontario Archaeology 1987
AjGw-80	*Not applicable*	*Post-Contact*	*Cabin*	*Museum of Ontario Archaeology 1987*
AjGw-131	Not applicable	Pre-Contact	Findspot	Museum of Ontario Archaeology 1988
AjGw-154	Not applicable	Pre-Contact	Findspot	Museum of Ontario Archaeology 1988
AjGw-155	Not applicable	Pre-Contact	Findspot	Museum of Ontario Archaeology 1988
AjGw-156	Not applicable	Other	Findspot	Museum of Ontario Archaeology 1988

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
AjGw-213	Park Point Estates #1	Post-Contact; Pre-Contact	Homestead; Findspot	Pearce 1990
AjGw-229	Not applicable	Pre-Contact	Findspot	Pearce 1993
AjGw-358	Not applicable	Post-Contact	Homestead	Doroszenko 2003
AjGw-432	**Robert Irwin Pottery Site**	**Post-Contact**	**House**	**ASI 2006, 2007**
AjGw-433	Not applicable	Post-Contact	Unknown	The Archaeologists Inc. 2006
AjGw-434	Not applicable	Post-Contact	Homestead	The Archaeologists Inc. 2004
AjGw-435	Not applicable	Post-Contact	Dump	The Archaeologists Inc. 2004
AjGw-436	Not applicable	Pre-Contact	Findspot	The Archaeologists Inc. 2004

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
AjGw-502	H1	Post-Contact	House, Scatter	ASI 2009
AjGw-503	H2	Post-Contact	House	ASI 2009
AjGw-574	Wyndham H1 Site	Post-Contact	Homestead	Archeoworks Inc. 2017; The Archaeologists Inc. 2018
AjGw-578	Not applicable	Pre-Contact	Unknown	Amec Foster Wheeler 2018; Timmins Martelle Heritage Consultants Inc. 2020
AjGw-618	*Church Location*	*Post-Contact*	*Church*	*Timmins Martelle Heritage Consultants Inc. 2019*
AjGw-638	Not applicable	Post-Contact	Domestic	Timmins Martelle Heritage Consultants

Borden number	Site Name	Temporal/ Cultural Affiliation	Site type	Researcher
				Inc. 2020, 2021

According to the O.A.S.D., AjGw-39, AjGw-80, and AjGw-618 are within approximately 50 metres of the Study Area. Sites AjGw-39 and AjGw-80 do not retain further Cultural Heritage Value or Interest because residential subdivisions have since been constructed in these locations. It is noted by the Ontario Archaeological Sites Database in the Stage 4 site update that site AjGw-618 has no further Cultural Heritage Value or Interest. AjGw-432 was registered within the Study Area however the area has subsequently been subject to demolition and redevelopment and is not considered to retain Cultural Heritage Value or Interest (see ASI 2007 below for a description).

1.3.4. Previous Archaeological Assessments

According to the background research, eight previous reports detail fieldwork within 50 metres of the Study Area.

- Archaeological Assessments Limited (2012: P013-657-2012) conducted a Stage 1-2 Archaeological Assessment for the Streetsville Watermain project including part of the current Study Area at Reid Drive and Queen Street South. This area was identified as disturbed and did not require further work.

- Archeoworks Inc. (2016: P390-0173-2016) conducted a Stage 1-2 archaeological assessment for the proposed development of 5155 Mississauga Road, including parts of the current Study Area. The Stage 2 survey consisted of visual assessment of disturbed areas and test pit survey at 10-metre intervals, which confirmed all areas were disturbed. The property was considered clear of further archaeological concern.

- Archeoworks Inc. (2019: P439-0008-2018) conducted a Stage 1-2 archaeological assessment for the proposed development of 5235 Mississauga Road, including parts of the current Study Area. The Stage 2 survey consisted of visual assessment of disturbed areas and test pit survey at 10-metre intervals, which confirmed all areas were previously disturbed. The property was considered clear of further archaeological concern.

- ASI (2005: CIF P057-040) conducted a Stage 1 archaeological assessment for the Britannia Road Widening from Queen Street to Hurontario Road. The property inspection in 2004 determined that the road had been disturbed, but that undisturbed areas may be located beyond the road near the west end of the corridor as it crosses the Credit River (including parts of the current Study Area) and should be subject to Stage 2 survey prior to any impacts.

- ASI (2007: P047-234-2006) conducted Stage 1-2 archaeological assessment of 98 and 104 Queen Street South approximately 0.15 hectares, including parts of the current Study Area. The Stage 2 survey in 2006 consisted of test pit survey at five metre intervals, which identified the Robert Irwin Pottery site (AjGw-432) within the level grassed yards in front, side and back yards of the former houses on the property. In total, 219 artifacts were identified in a 30 m by 50 m area. The site represents a nineteenth-century earthenware production on a small family scale and was considered significant within the context of Peel County's history, as few commercial manufactories have been documented archaeologically. The site was recommended for Stage 3-4 salvage excavation if it could not be protected from disturbance within the proposed development plan. Based on a review of Google Earth orthoimagery and Google Streetview, the former historical structure was demolished by 2007, and the property was under construction in 2009 for the extant building at 100 Queen Street, south of Caroline Street (Images 15, 37, and 28; see *Supplementary Documentation*). No further information about the site or excavation reports could be located within the O.A.S.D. or the provincial register of reports. It is concluded that this property was redeveloped without the recommended mitigative measures to the site and it is not considered to retain cultural

heritage value or interest and is not recommended for further assessment. Lands immediately to the south are recommended for test pit survey and the location of this site should be noted during any future survey.

- ASI (2011: P347-074-2011) conducted Stage 1-2 archaeological assessment of Streetsville Commons, an approximately 3.8 hectare property east of Mississauga Road, between the railway corridor and Melody Drive, including parts of the current Study Area. The entire area was subject to Stage 2 test pit survey at five metre intervals, however no archaeological materials were identified and the project area was considered clear of further archaeological concern.

- ASI (2012: P047-350-2012, P047-369-2012) conducted Stage 1-2 archaeological assessment of 12 Old Station Road on approximately 0.2 hectares adjacent to the railway corridor. The Stage 2 survey consisted of visual assessment of disturbed areas and test pit survey at 10-metre intervals, which confirmed all areas were disturbed. The property was considered clear of further archaeological concern.

- ASI (2017: P449-0140-2017) conducted Stage 1-2 archaeological assessment of 2475 Eglinton Avenue West. The Stage 2 was completed on approximately 2.1 hectares by test pit survey at five metre intervals, including parts of the current Study Area. No archaeological material was identified and the area was considered clear of further archaeological concern.

- Bluestone Research (2015a: P344-0047-2014) conducted a Stage 1-2 archaeological assessment of 307 Queen Street South in the City of Mississauga south of the Streetsville Memorial Cemetery, within 50 metres of the current Study Area. No archaeological material was identified during the Stage 2. Stage 3 assessment was recommended due to the proximity of the cemetery to ensure no unmarked burials exist within the proposed development on the property.

- Bluestone Research (2015b: P344-0048-2015) conducted a Stage 3 archaeological assessment of 307 Queen Street South in the back yard

adjacent to the Streetsville Memorial Cemetery, within 50 metres of the current Study Area. A smooth bucket backhoe was used to excavate an 11 metre by 25 metre area, extending from the back of the current structure to the end of the study area, and the edge where the current cemetery boundary and study area meet (property boundary marked by a fence line) to 10 meters beyond the edge of the current cemetery boundary. The Stage 3 investigation did not result in the identification of any potential subsurface cultural features, grave shafts, or any indication that the cemetery once extended beyond its current boundaries. No further work was required in this property.

- Stantec (2014: P389-0020-2013) conducted a Stage 1 archaeological assessment for the Eglinton Avenue West – Erin Mills Parkway Corridor Watermain Replacement project, including parts of the current Study Area. The property inspection determined that the project was entirely within the disturbed right-of-way and did not require Stage 2 survey.

- Timmins Martelle Heritage Consultants Inc. (2019: P074-0034-2019) conducted Stage 1 and 2 Archaeological Assessment for the proposed pathway and columbarium at the Streetsville Memorial Cemetery. The survey identified The Church Location site (AjGw-618) in the vicinity of the historic church. The Church Location site (AjGw-618) is a historic site with a small assemblage of temporally non-diagnostic structural remains. Timmins Martelle Heritage Consultants Inc. recommended that the property indicated potential for building remains to be present and as such, mechanical topsoil removal is recommended for the columbarium footings, to both confirm that no unmarked burials are present and establish if church foundations or building remnants are present. Two former ground penetrating radar surveys indicate that there is high potential for burials to extend into the sidewalk and Queen Street South right-of-way.

- TMHC P074-0042-2019 City of Mississauga-Streetsville Cemetery St4 2019-033 AjGw-618 Church/Chapel site No Further Cultural Heritage Value or Interest. In Database - Awaiting Ministry Review.

2.0 Field Methods

A Stage 1 property inspection must adhere to the S & G, Section 1.2, Standards 1-6, which are discussed below. The entire property and its periphery must be inspected. The inspection may be either systematic or random. Coverage must be sufficient to identify the presence or absence of any features of archaeological potential. The inspection must be conducted when weather conditions permit good visibility of land features. Natural landforms and watercourses are to be confirmed if previously identified. Additional features such as elevated topography, relic water channels, glacial shorelines, well-drained soils within heavy soils and slightly elevated areas within low and wet areas should be identified and documented, if present. Features affecting assessment strategies should be identified and documented such as woodlots, bogs or other permanently wet areas, areas of steeper grade than indicated on topographic mapping, areas of overgrown vegetation, areas of heavy soil, and recent land disturbance such as grading, fill deposits and vegetation clearing. The inspection should also identify and document structures and built features that will affect assessment strategies, such as heritage structures or landscapes, cairns, monuments or plaques, and cemeteries.

The Stage 1 archaeological assessment property inspection was conducted under the field direction of Eliza Brandy (R1109) of ASI, on May 15, 2019, and Kirstyn Allam (R1258) on June 17, 2021, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Study Area. It was a systematic visual inspection from publicly accessible lands/public right-of-ways (R.O.W.) only and did not include excavation or collection of archaeological resources. Fieldwork was conducted when weather conditions were deemed clear with good visibility (partly cloudy and sunny with seasonal temperatures), per S & G Section 1.2., Standard 2. Field observations are compiled onto the existing conditions of the Study Area in Section 7.0 (Figures 9-12) and associated photographic Images are presented in Section 8.0 (1-36).

3.0 Analysis and Conclusions

The historical and archaeological contexts have been analyzed to help determine the archaeological potential of the Study Area. Results of the analysis of the Study Area property inspection and background research are presented in Section 3.1.

3.1. Analysis of Archaeological Potential

The S & G, Section 1.3.1, lists criteria that are indicative of archaeological potential. The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites (Table 1);
- Water sources: primary, secondary, or past water source (Credit River, Mullet Creek);
- Early historic transportation routes (Eglinton Avenue, Mississauga Road, Queen Street, Britannia Road, Erin Mills Parkway, Canadian Valley Railway);
- Proximity to early settlements (Streetsville, Barberton); and
- Well-drained soils (Oneida clay loam)

According to the S & G, Section 1.4 Standard 1e, no areas within a property containing locations listed or designated by a municipality can be recommended for exemption from further assessment unless the area can be documented as disturbed. The Municipal Heritage Register was consulted and 241 properties are Listed and 23 are Designated under Part IV and V of the *Ontario Heritage Act* adjacent to the Study Area under the *Ontario Heritage Act*. The Study Area is also within the Streetsville Village Core Cultural Heritage Landscape (C.H.L.) and the Mississauga Road Scenic Route C.H.L. from the 2005 Cultural Landscape Inventory, further detailed in ASI's Cultural Heritage Resource Assessment report for the West Trunk Sewer Diversions project (ASI, 2020).

Streetsville Memorial Cemetery

Streetsville Memorial Cemetery, also known historically as the Scotch Burying Ground, is located at 299 Queen Street South. Early burials date to the 1830s. Presently, much of the lands within the current fenced property along Queen

Street are unmarked, suggesting the earliest burials were located fronting onto the historical road and their markers moved into cairns (see Image 43). A property survey of the cemetery should be obtained prior to any proposed project impacts in the vicinity of the cemetery to confirm the legal limits of the property.

As described in the Stage 1-2 assessment by Timmins Martelle (P074-0034-2019) two previous geophysical surveys have been carried out within this cemetery. Copies of these reports should be obtained for review prior to any future survey within the vicinity of the Study Area:

- *Geophysical Assessment of the Historic Cemetery Properties within the City of Mississauga, Regional Municipality of Peel, Ontario* (The Archaeologists Inc. 2006)

  In 2006 The Archaeologists Inc. conducted ground penetrating radar survey along the northeastern, northwestern, southwestern edges of the cemetery and in its central portion which identified a potential structure in the centre of the cemetery (likely the first church circa 1824) as well as 41 anomalies representing potential graves along the southwestern boundary of the cemetery, running into the sidewalk along Queen Street South.

- *City of Mississauga Streetsville Memorial Cemetery GPR Subsurface Investigation and Resistivity Cemetery Mapping* (Global GPR 2016).

  In 2016 Global GPR Services conducted ground penetrating radar survey and identified 475 anomalies, most of which represent possible burials.

3.2. Conclusions

The property inspection determined that parts of the Study Area exhibit archaeological potential. The project proposes trenchless construction methods, and there are surface impacts associated with this construction method, including preliminary shaft locations and staging areas; these areas are required to have Stage 2 survey completed in advance of any construction activities. Additionally, any locations of proposed impacts to areas of archaeological potential in which the trenchless construction depth is less than five metres below surface, Stage 2

will be required. The construction of the alignment itself (at depths greater than five metres below surface) will not trigger Stage 2 in areas of surface archaeological potential.

According to the S & G Section 2.1.2, test pit survey is required on terrain where ploughing is not viable, such as wooded areas, properties where existing landscaping or infrastructure would be damaged, overgrown farmland with heavy brush or rocky pasture, and narrow linear corridors up to 10 metres wide (Images 8, 11, 21-24; Figures 16-20: areas highlighted in green).

The Study Area includes the Streetsville Memorial Cemetery at 299 Queen Street South (Figure 19: Areas outlined in dark grey). Because the proposed method of construction is trenchless installation, surface impacts are not planned within the proposed alignment in the cemetery or immediately adjacent lands.

Two previous geophysical surveys carried out within this cemetery and described in the Stage 1-2 assessment by Timmins Martelle (P074-0034-2019) indicate that there is high potential for burials to extend into the sidewalk and Queen Street South right-of-way. Therefore, any future impacts less than five metres below surface within or directly adjacent to the cemetery will require a Stage 3 Cemetery Investigation to be conducted in the sidewalk and Queen Street South right-of-way, to confirm the presence or absence of human remains associated with the Streetsville Memorial Cemetery (Figure 19: areas hatched in black and highlighted in white). A Stage 2 test-pit survey at five metre intervals should be conducted within the grass strip between Streetsville Memorial Cemetery and Andrew's Presbyterian Church to locate any near-surface finds, or as yet undocumented sites prior to the Stage 3 assessment (Figure 19: areas cross-hatched in black and highlighted in green).

If field conditions permit, the cemetery investigation would entail complete mechanical topsoil removal in the sidewalk and the right-of-way lands adjacent to the cemetery fence, under the supervision of a licensed archaeologist. While mechanical topsoil removal typically occurs for a minimum of 10-metres adjacent to a cemetery to confirm it's boundaries, much of the land within this 10-metre area has already been impacted by construction related to the road. As such, the mechanical topsoil removal should start in the area of the right-of-way with low

potential, working inward towards the cemetery's fence. Depending on the results of the assessment, additional fieldwork may be required (e.g. construction monitoring) within and beyond this margin. If field conditions, such as deeply buried utility locates and/or road infrastructure in the right-of-way, do not permit mechanical topsoil removal, then ASI recommends a program of archaeological construction monitoring to monitor for the recovery of unmarked burials in this area.

A Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required for any "invasive" (Stages 2-4) fieldwork. The Authorization will relieve the archaeologist of the prohibition and liability related to the intentional disturbance of a human burial within a cemetery extending beyond the currently mapped boundaries.

If evidence of burials associated with this cemetery are encountered, all work must cease and M.H.S.T.C.I. and the Bereavement Authority of Ontario will need to be contacted for direction on next steps.

Part of the Study Area has been previously assessed and does not require further archaeological assessments (Figures 16-21: areas highlighted in red).

A combination of property inspection and assessment of topographic mapping (ESRI 2021) determined that some of lands within the Study Area are sloped in excess of 20 degrees (Image 7; Figures 16, 19-20: areas highlighted in pink) and according to the S & G Section 2.1 do not retain potential. These areas do not require further survey.

The Study Area crosses the main branch of the Credit River (Image 8; Figure 16: areas highlighted in dark blue). If the riverbed will be impacted, the M.H.S.T.C.I.'s Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential.

The remainder of the Study Area has been subjected to deep soil disturbance events associated with the construction of road right-of-ways, deeply buried utility installation, and infrastructure around Mullet Creek. According to the S & G

Section 1.3.2 these areas do not retain archaeological potential (Images 1-7, 9, 10, 12-37; Figures 16-21 areas highlighted in yellow) and do not require further survey.

4.0 Recommendations

The following recommendations are made:

1 Parts of the Study Area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals (Figures 16-20: Areas highlighted in green). Since the current project proposes trenchless construction methods, Stage 2 will only be required in areas of surface impacts (at depths less than five metres below surface);

1.1 The preliminary shaft locations and staging areas which exhibit archaeological potential will require Stage 2 survey prior to any construction impacts.

1.2 The preferred alignment (at depths greater than five metres below surface) will not require Stage 2 survey.

2 Site AjGw-432 was destroyed during redevelopment. The location of Site AjGw-432 should be noted during any future Stage 2 archaeological assessment on adjacent properties;

3 The Study Area includes the Streetsville Memorial Cemetery at 299 Queen Street South. Because the proposed method of project construction is trenchless installation, surface impacts in and directly adjacent to the cemetery are not planned within the proposed alignment.

3.1 Any future impacts less than five metres below surface within or directly adjacent to the cemetery will require a Stage 3 Cemetery Investigation to be conducted within the cemetery property, in the sidewalk and Queen Street South right-of-way, to confirm the presence or absence of human remains.

3.2 A Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required for any "invasive" (Stages 2-4) fieldwork.

3.3 If evidence of burials associated with this cemetery are encountered, all work must cease and M.H.S.T.C.I. and the Bereavement Authority of Ontario will need to be contacted for direction on next steps.

4 If the Credit River riverbed will be impacted, the M.H.S.T.C.I.'s Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential.

5 The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and,

6 Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

NOTWITHSTANDING the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Heritage, Sport, Tourism and Culture Industries should be immediately notified.

The above recommendations are subject to Ministry approval and it is an offence to alter any archaeological site without Ministry of Heritage, Sport, Tourism and Culture Industries concurrence. No grading or other activities that may result in the destruction or disturbance of any archaeological sites are permitted until notice of M.H.S.T.C.I. approval has been received.

5.0 Legislation Compliance Advice

ASI advises compliance with the following legislation:

- This report is submitted to the Ministry of Heritage, Sport, Tourism and Culture Industries as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, RSO 2005, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation, and protection 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 Heritage, Sport, Tourism and Culture Industries, a letter will be issued by the Ministry stating that there are no further concerns with regards 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 field work 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 Archaeology 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 sec. 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 or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the

Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified.

- Archaeological sites recommended for further archaeological field work or protection remain subject to Section 48(1) of the Ontario Heritage Act and may not be altered, nor may artifacts be removed from them, except by a person holding an archaeological license.

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7.0 Images

7.1. Field Photography

Image 1 Mississauga Road; Area is disturbed, no potential

Image 3 Arch Road; Area is disturbed, no potential

Image 2 Mississauga Road; Area is disturbed, no potential

Image 4 Joseph Street and Britannia Road West; Area was disturbed in 2007 (see also Images 2-4 below).

Image 5 Joseph Street; Area is disturbed, no potential.

Image 6 Britannia Road West; Area beyond disturbed right-of-way is sloped, no potential.

Image 7 Britannia Road West; Area beyond disturbed right-of-way is sloped, no potential.

Image 8 Credit River; Areas adjacent to the river require Stage 2 survey.

Image 9 Britannia Road West; Area beyond disturbed right-of-way is sloped, no potential.

Image 10 Queen Street South; Area is disturbed, no potential.

Image 11 Turney Woods Park; Area requires Stage 2 survey.

Image 12 Queen Street South; Area is disturbed, no potential.

Image 13 Queen Street South; Area is disturbed, no potential.

Image 14 Queen Street South; Area is disturbed, no potential.

Image 15 Queen Street South; Area is disturbed, no potential (see also Image 39 below).

Image 16 Queen Street South; Area is disturbed, no potential.

Image 17 Queen Street South; Area is disturbed, no potential.

Image 18 Queen Street South; Area is disturbed, no potential.

Image 19 Queen Street South; Area is disturbed, no potential.

Image 20 Queen Street South; Area is disturbed, no potential.

Image 21 Streetsville Memorial Cemetery must be avoided. Stage 3 cemetery investigation required for any surface impacts in the R.O.W.

Image 22 Queen Street South; Area beyond disturbed road and right-of-way requires Stage 2 survey.

Image 23 Queen Street South; Area beyond disturbed road and right-of-way requires Stage 2 survey.

Image 24 Queen Street South; Area beyond disturbed road and right-of-way requires Stage 2 survey.

Image 25 Queen Street South railway crossing; Area is disturbed, no potential.

Image 26 Mississauga Road; Area is disturbed, no potential.

Image 27 Mississauga Road; Area is disturbed, no potential.

Image 28 Mississauga Road; Area is disturbed, no potential.

Image 29 Mississauga Road; Area is disturbed, no potential.

Image 30 Eglinton Avenue West; Area is disturbed, no potential.

Image 31 Eglinton Avenue West; Area is disturbed, no potential.

Image 32 Eglinton Avenue West; Area is disturbed, no potential.

Image 33 Erin Mills Parkway; Area is disturbed, no potential.

Image 34 Erin Mills Parkway; Area is disturbed, no potential.

Image 35 Erin Centre Boulevard; Area is disturbed, no potential.

Image 36 Erin Centre Boulevard; Area is disturbed, no potential.

Image 37 Erin Centre Boulevard at Mimico Creek; Area requires Stage 2 survey adjacent to the creek slopes.

7.2. Historical Imagery

Image 38 2009 Google Streetview of 100 Queen Street South, showing property under construction with topsoil stripping and regrading activities.

Image 39 2021 Google Streetview of 100 Queen Street South showing redevelopment of the property.

Image 40 2007 Google Streetview of Britannia Road West and Joseph Street showing former Twentieth Century residential houses.

Image 41 2007 Google Streetview of Britannia Road West and Earl Street showing demolition of former Twentieth Century residential houses.

Image 42 2007 Google Earth Imagery of former Twentieth Century residential houses fronting Britannia Road West between Earl and Joseph Street prior to their demolition and the construction of the extant trail (see also Image 4; Figure 16).

Image 43 2021 Google Streetview of grave markers gathered into cairns within Streetsville Memorial Cemetery.

8.0 Maps

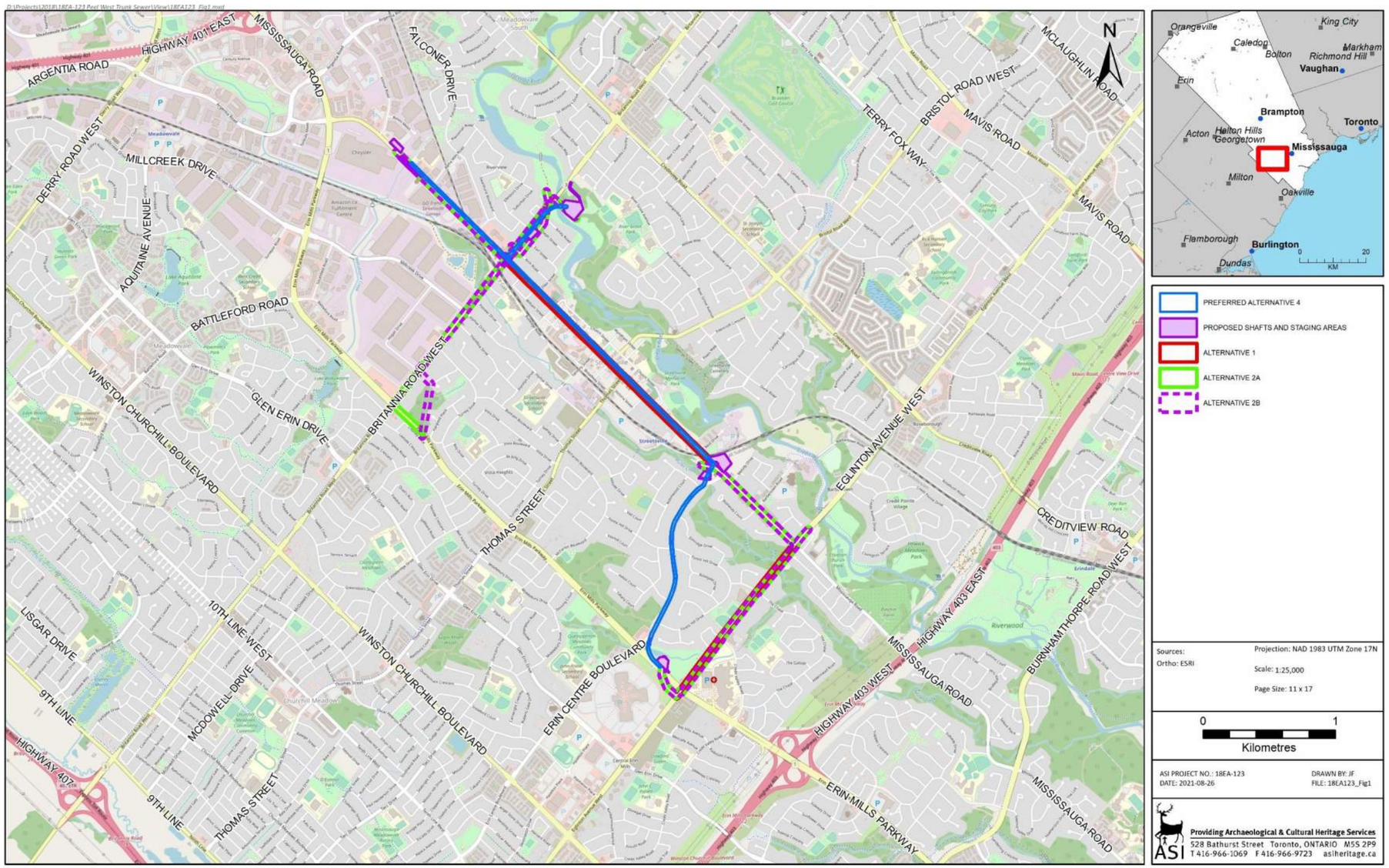

Figure 1: Peel West Trunk Sewer Study Area

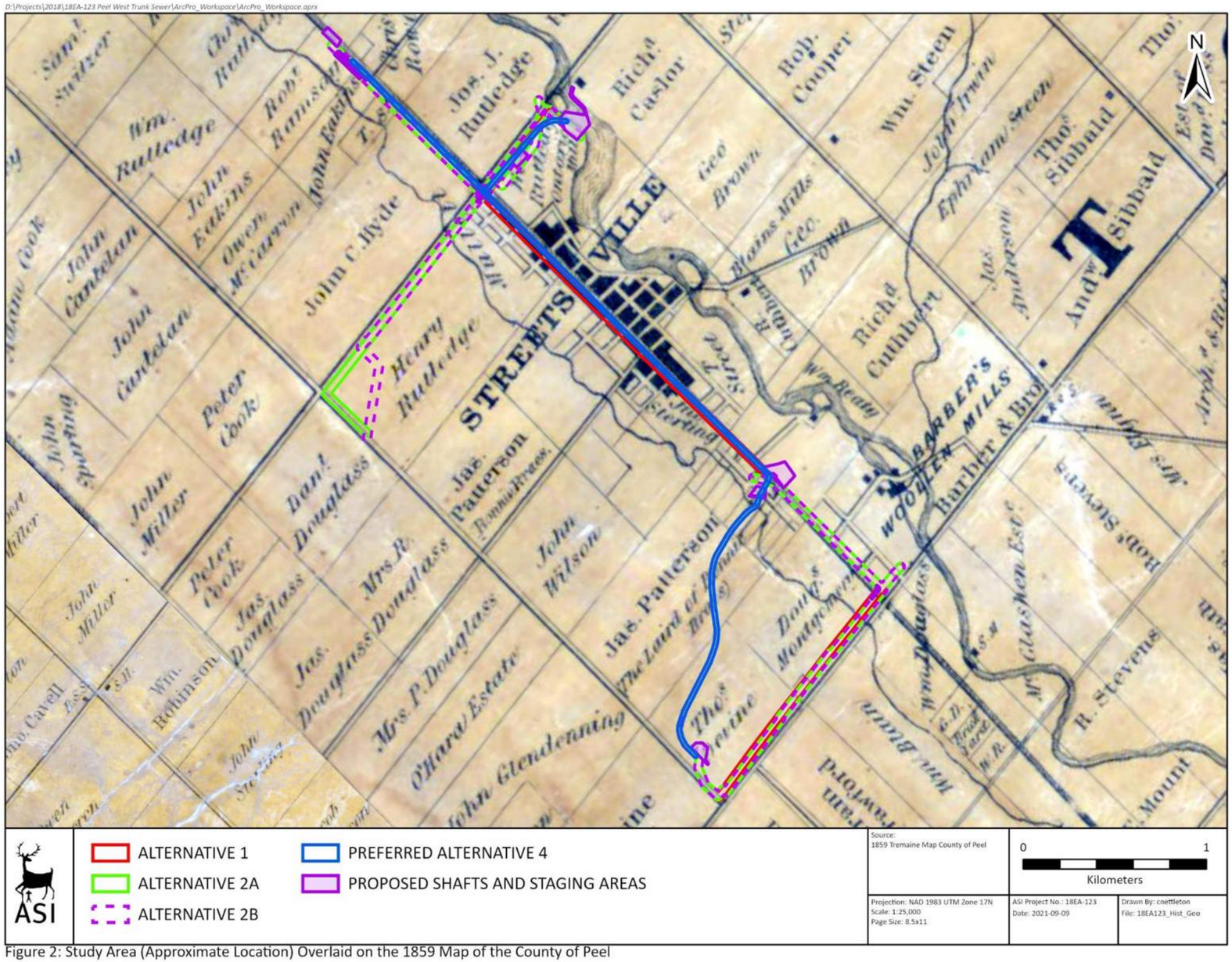

Figure 2: Study Area (Approximate Location) Overlaid on the 1859 Map of the County of Peel

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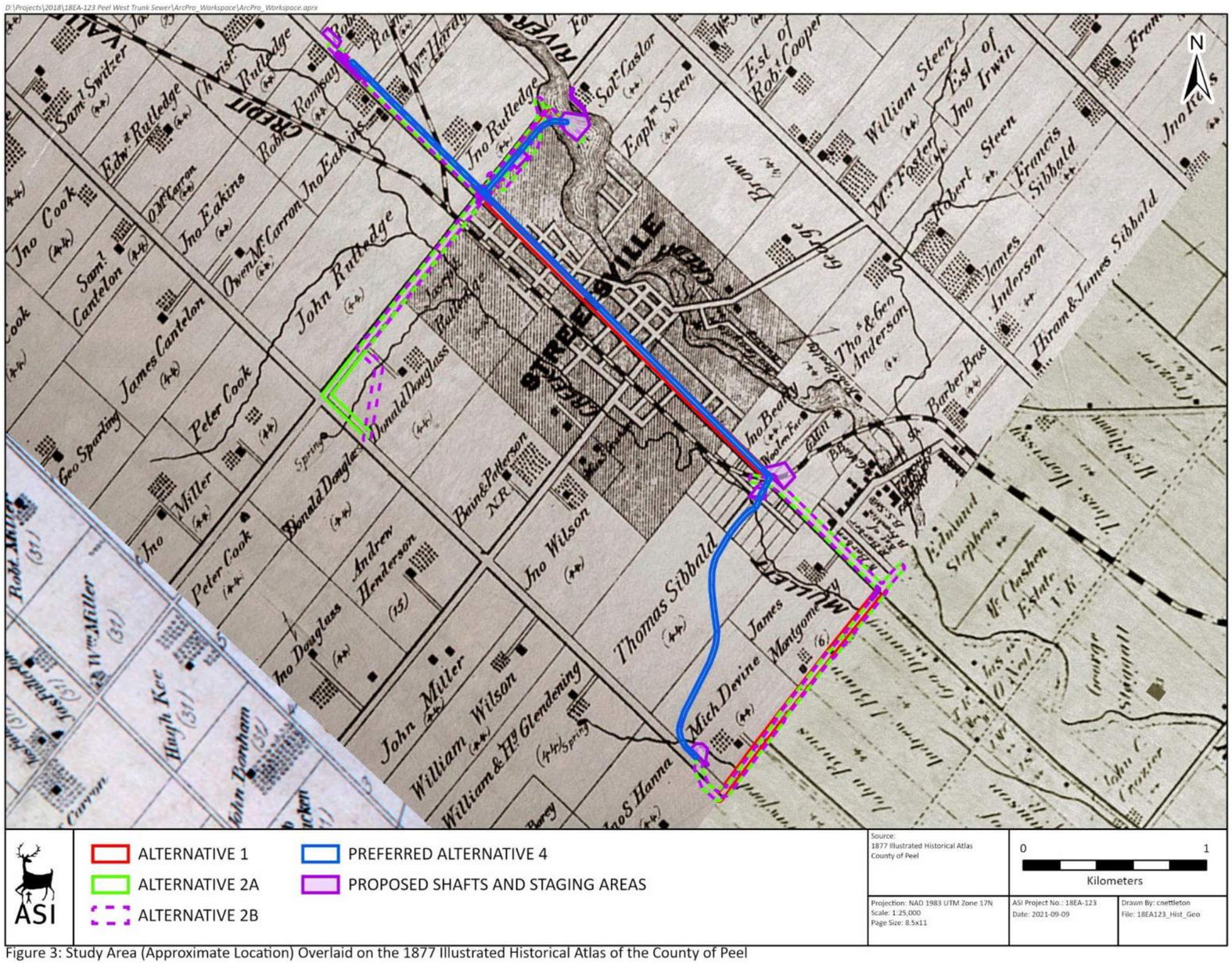

Figure 3: Study Area (Approximate Location) Overlaid on the 1877 Illustrated Historical Atlas of the County of Peel

Figure 3: Study Area (Approximate Location) Overlaid on the 1877 Illustrated Historical Atlas of the County of Peel

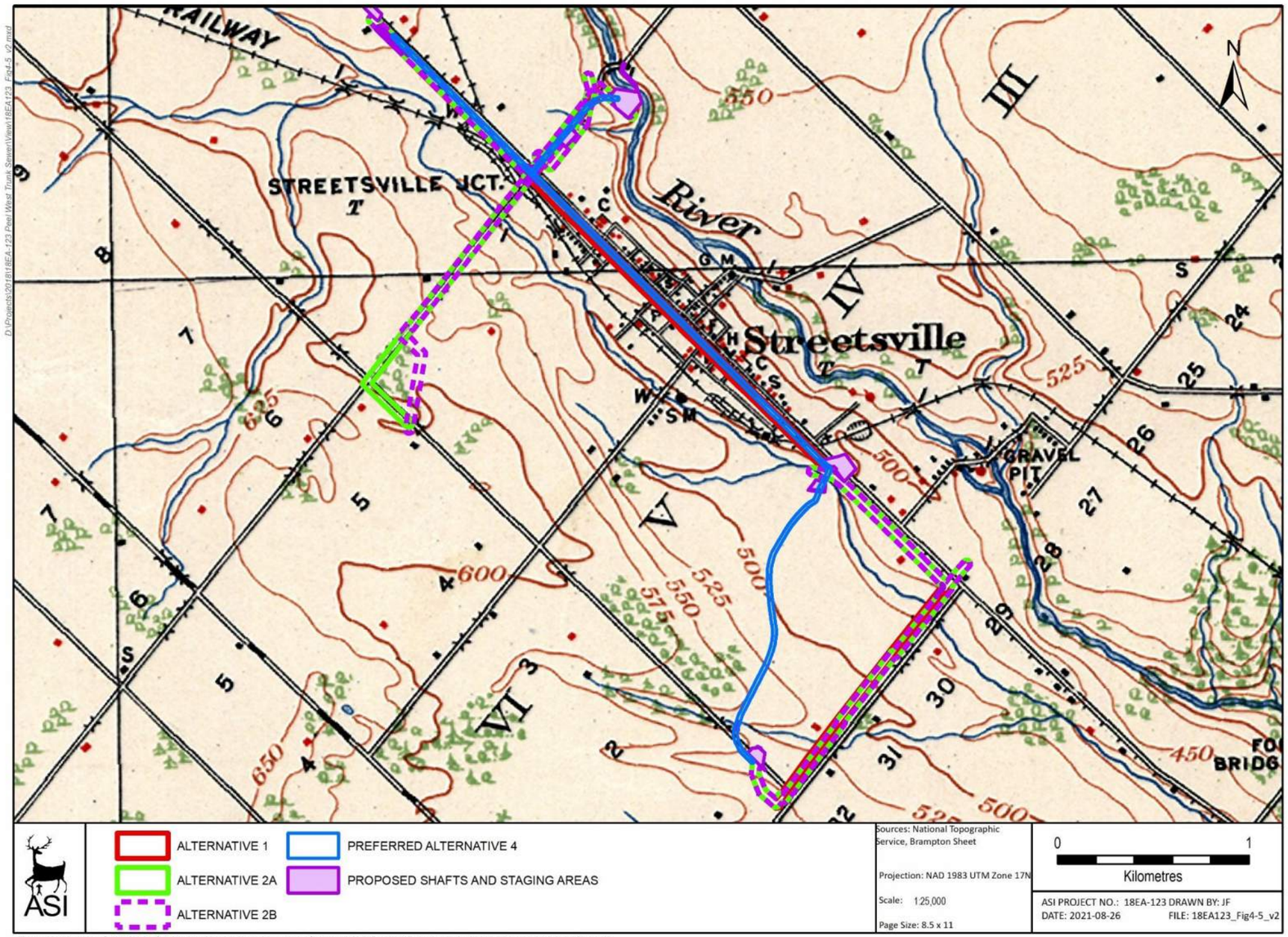

Figure 4: Study Area (Approximate Location) Overlaid on the 1909 NTS Brampton Sheet

Figure 4: Study Area (Approximate Location) Overlaid on the 1909 National Topographic System (NTS) Brampton Sheet

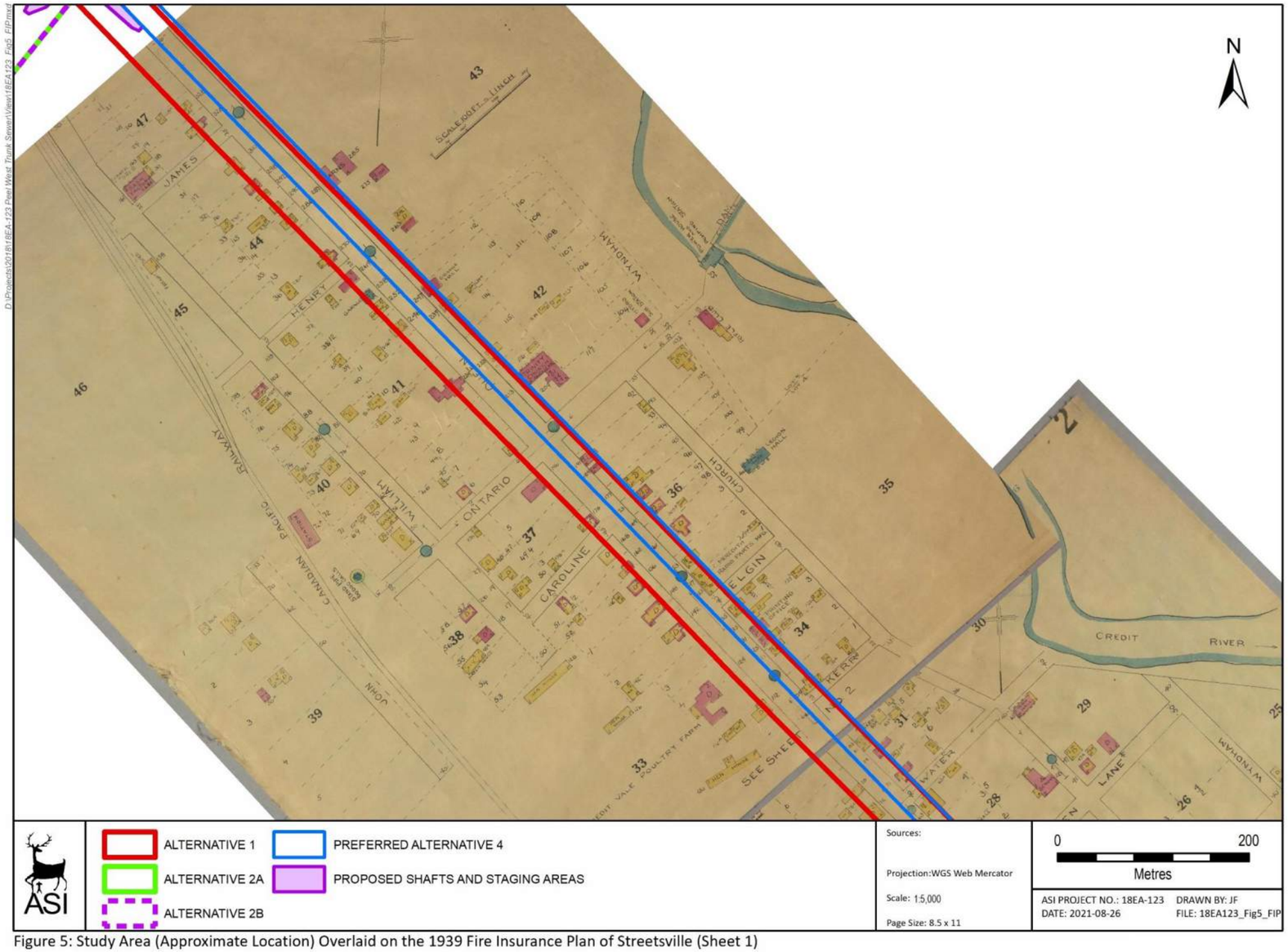

Figure 5: Study Area (Approximate Location) Overlaid on the 1939 Fire Insurance Plan of Streetsville (Sheet 1)

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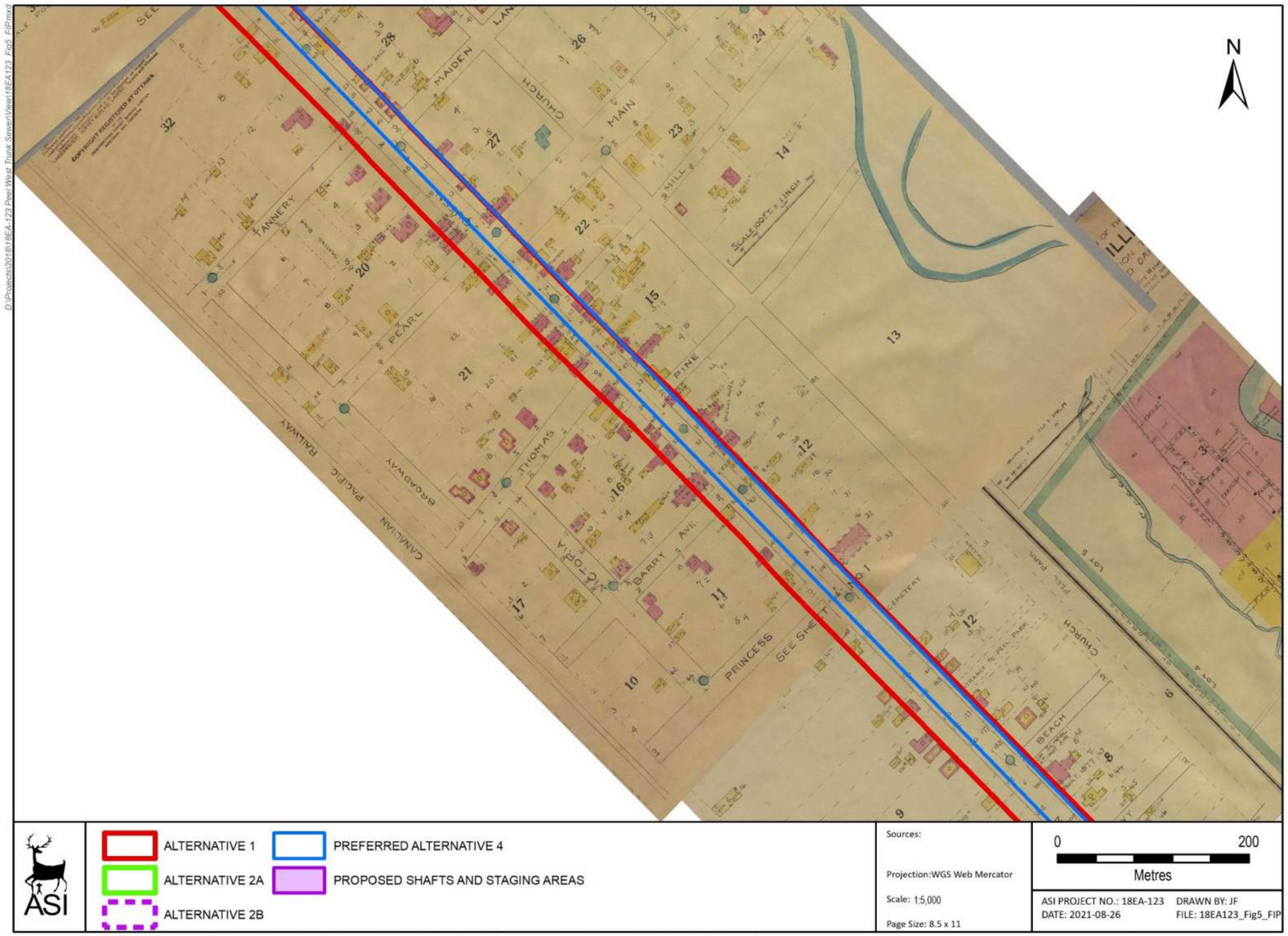

Figure 6: Study Area (Approximate Location) Overlaid on the 1939 Fire Insurance Plan of Streetsville (Sheet 2)

Figure 6: Study Area (Approximate Location) Overlaid on the 1939 Fire Insurance Plan of Streetsville (Sheet 2)

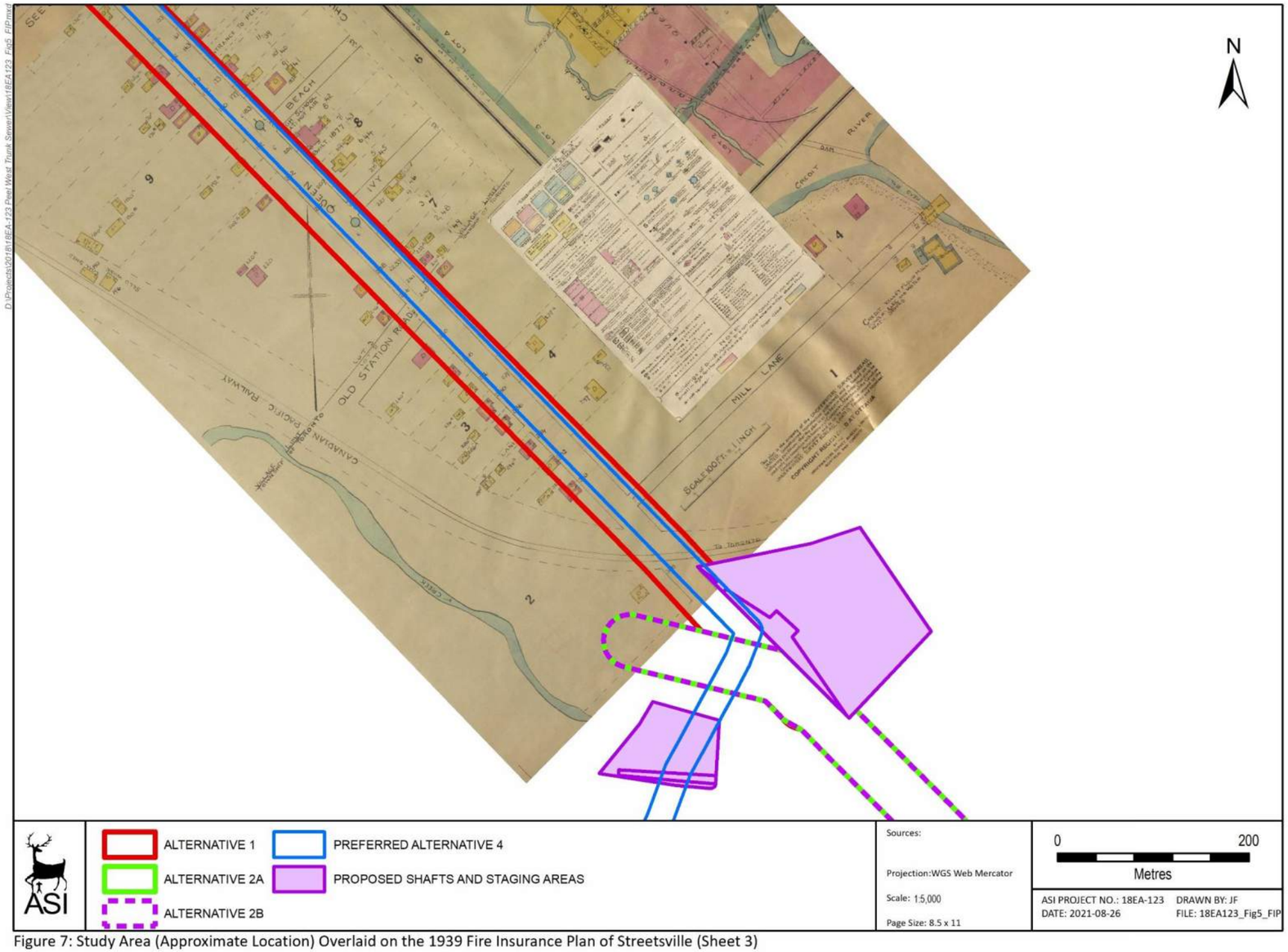

Figure 7: Study Area (Approximate Location) Overlaid on the 1939 Fire Insurance Plan of Streetsville (Sheet 3)

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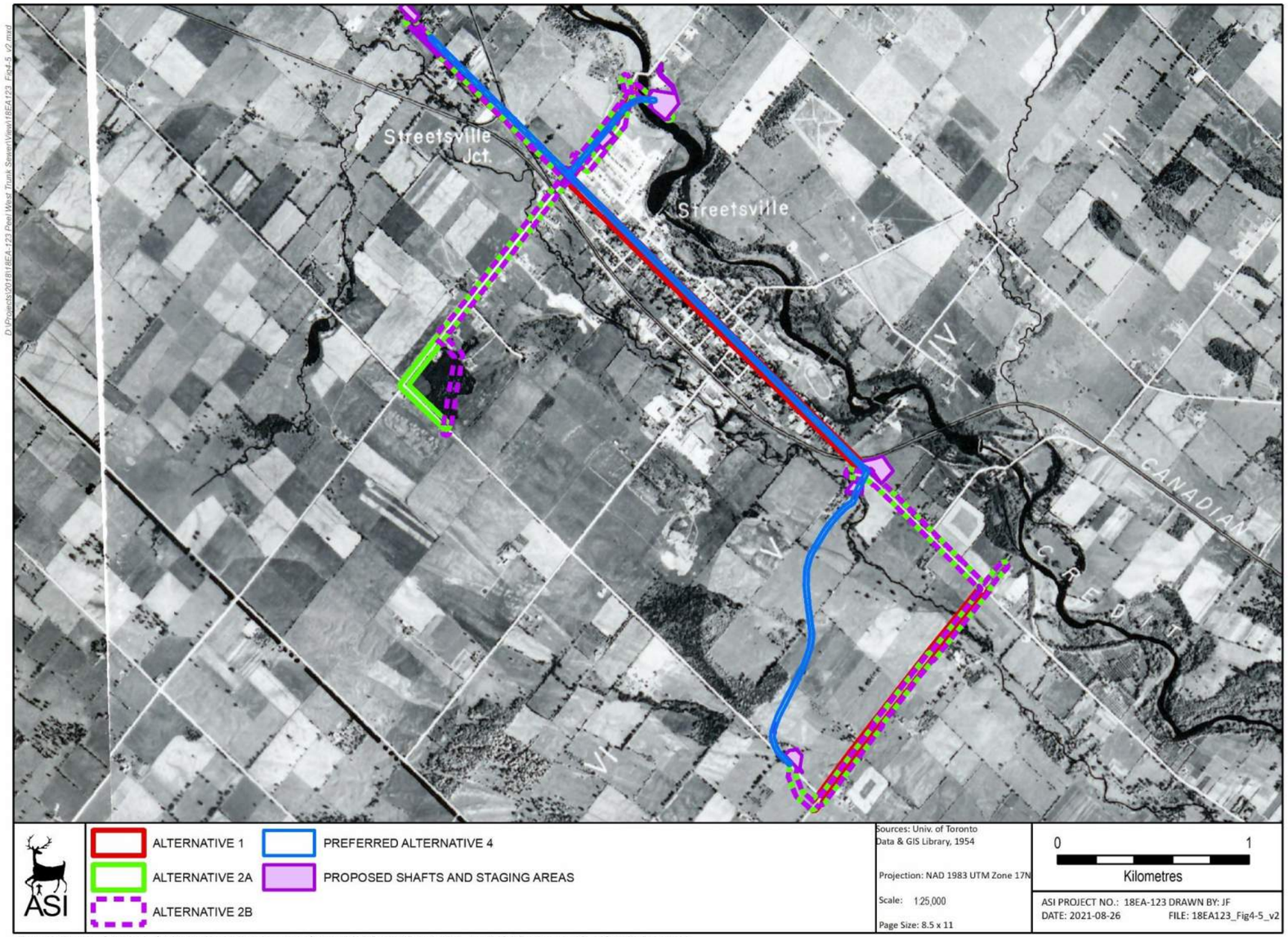

Figure 8: Study Area (Approximate Location) Overlaid on the 1954 Aerial Photograph of Mississauga

Figure 8: Study Area (Approximate Location) Overlaid on the 1954 Aerial Photograph of Mississauga

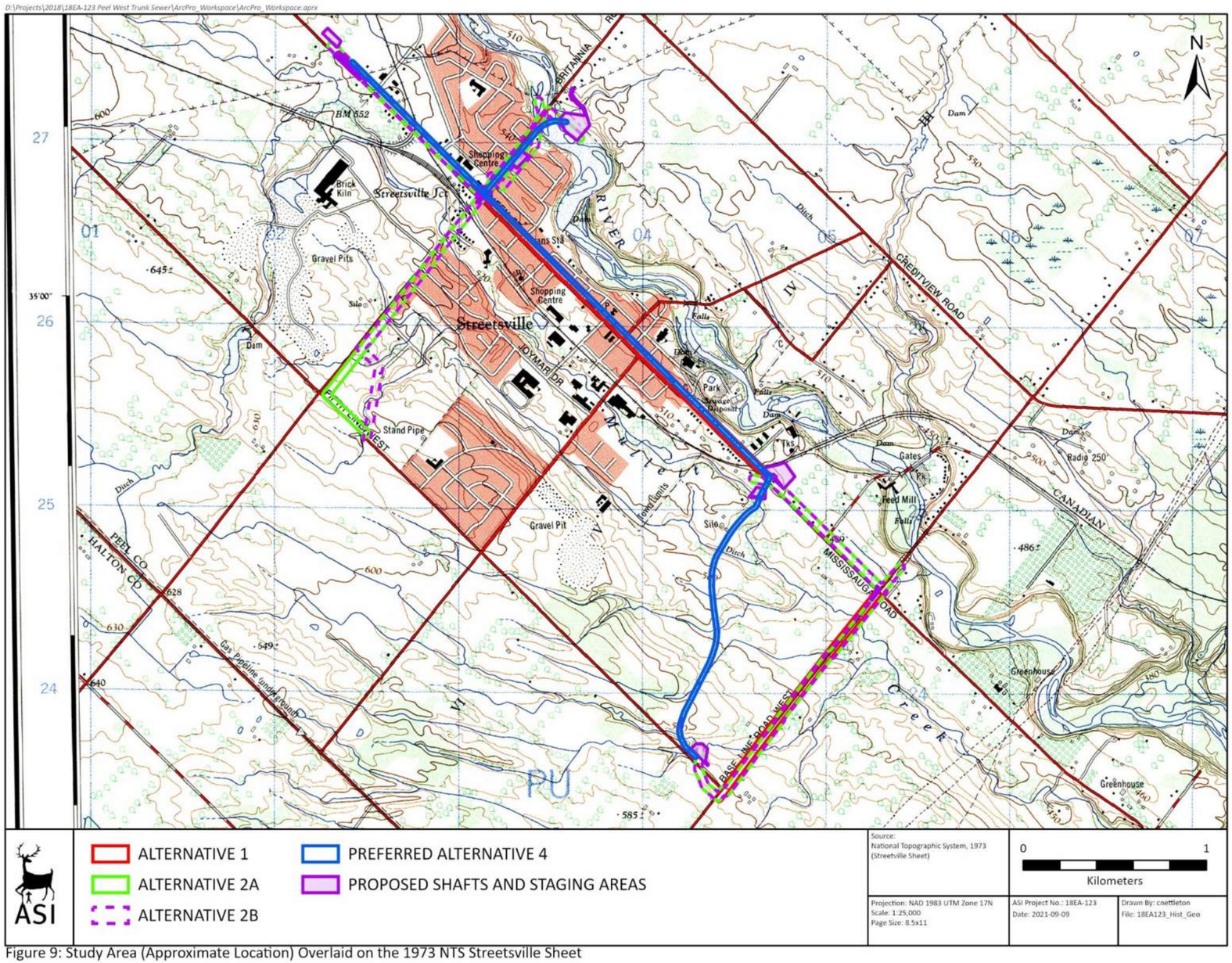

Figure 9: Study Area (Approximate Location) Overlaid on the 1973 NTS Streetsville Sheet

Figure 9: Study Area (Approximate Location) Overlaid on the 1973 National Topographic System (NTS) Streetsville Sheet

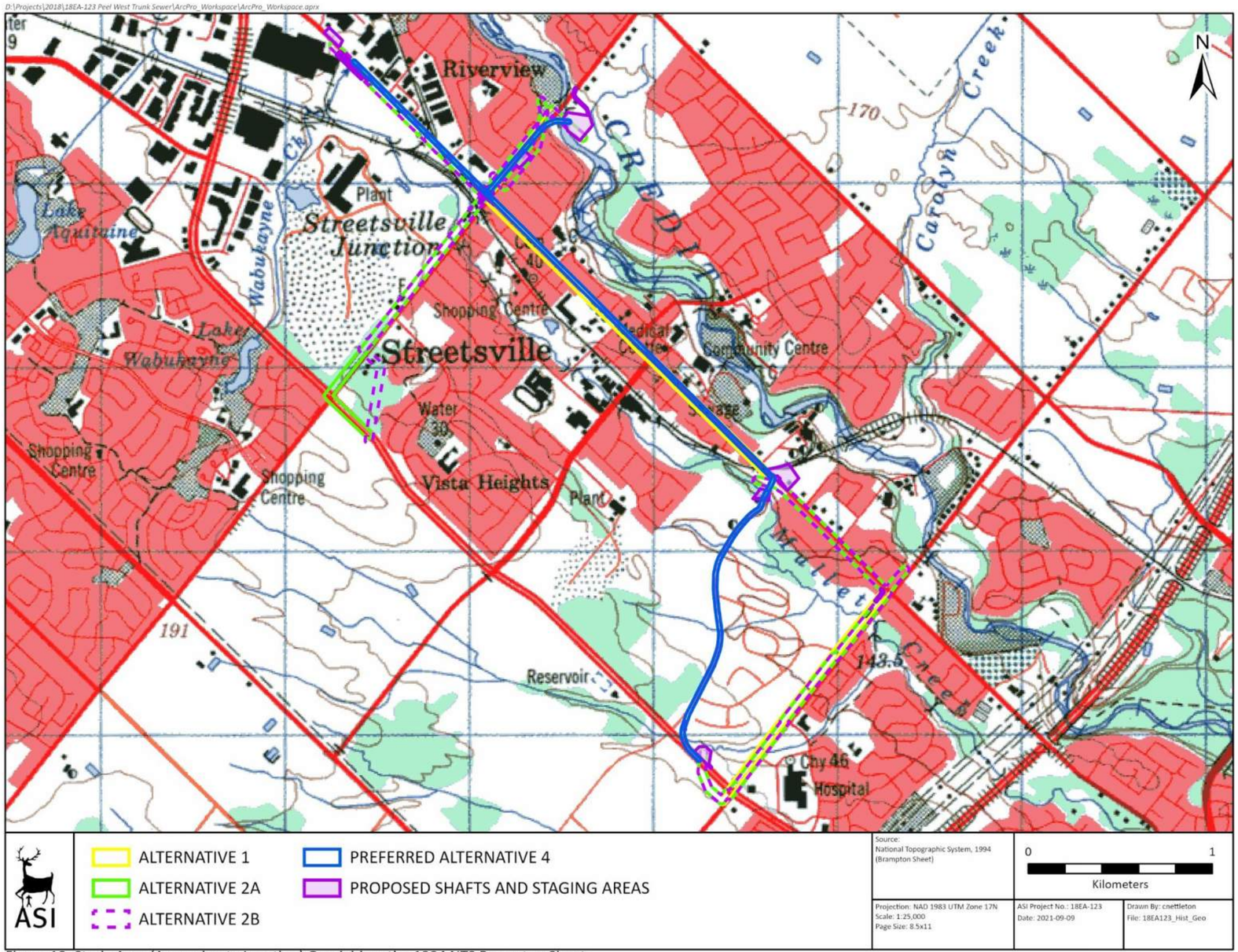

Figure 10: Study Area (Approximate Location) Overlaid on the 1994 NTS Brampton Sheet

Figure 10: Study Area (Approximate Location) Overlaid on the 1994 National Topographic System (NTS) Streetsville Sheet

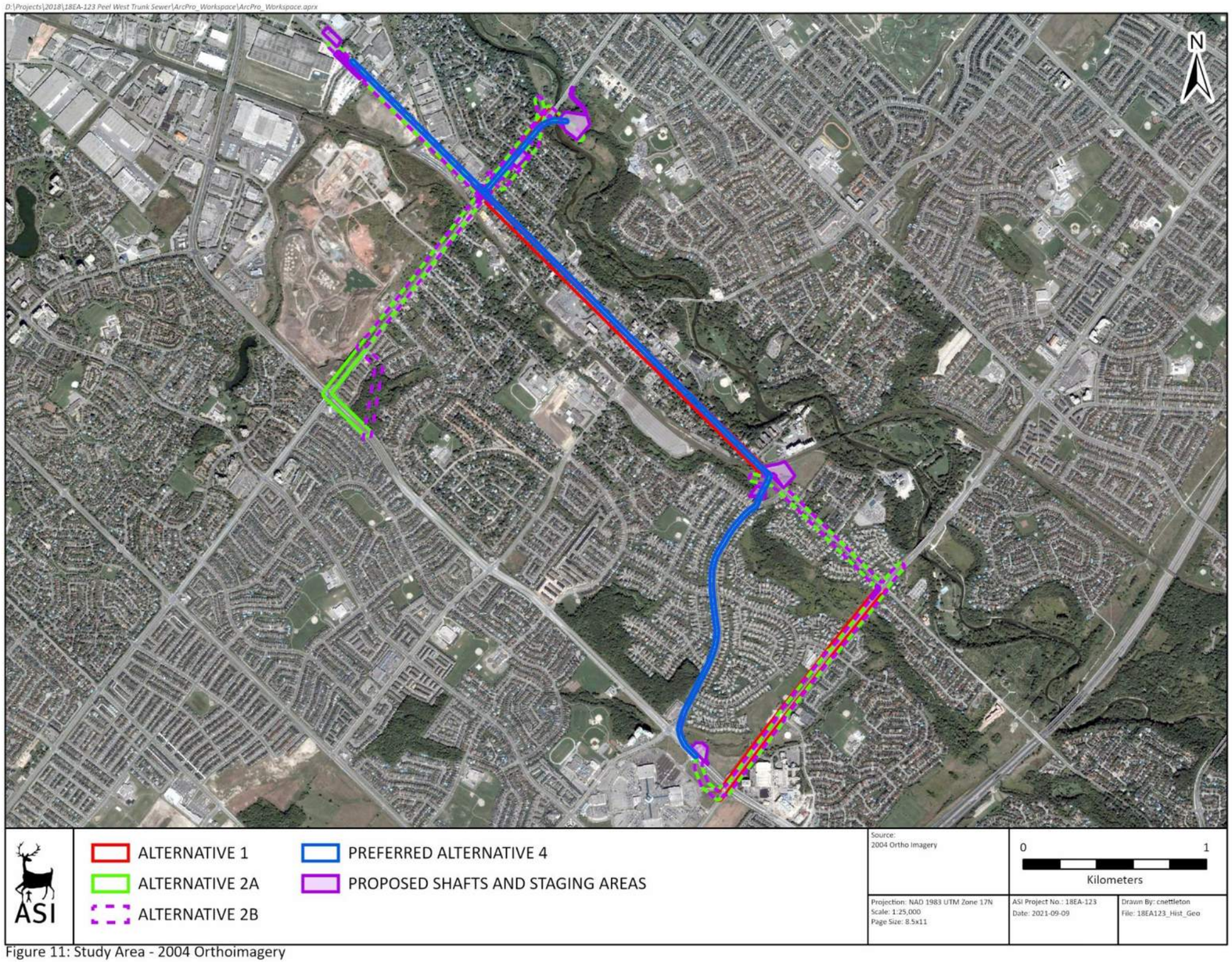

Figure 11: Study Area - 2004 Orthoimagery

Figure 11:Study Area – 2004 Orthoimagery

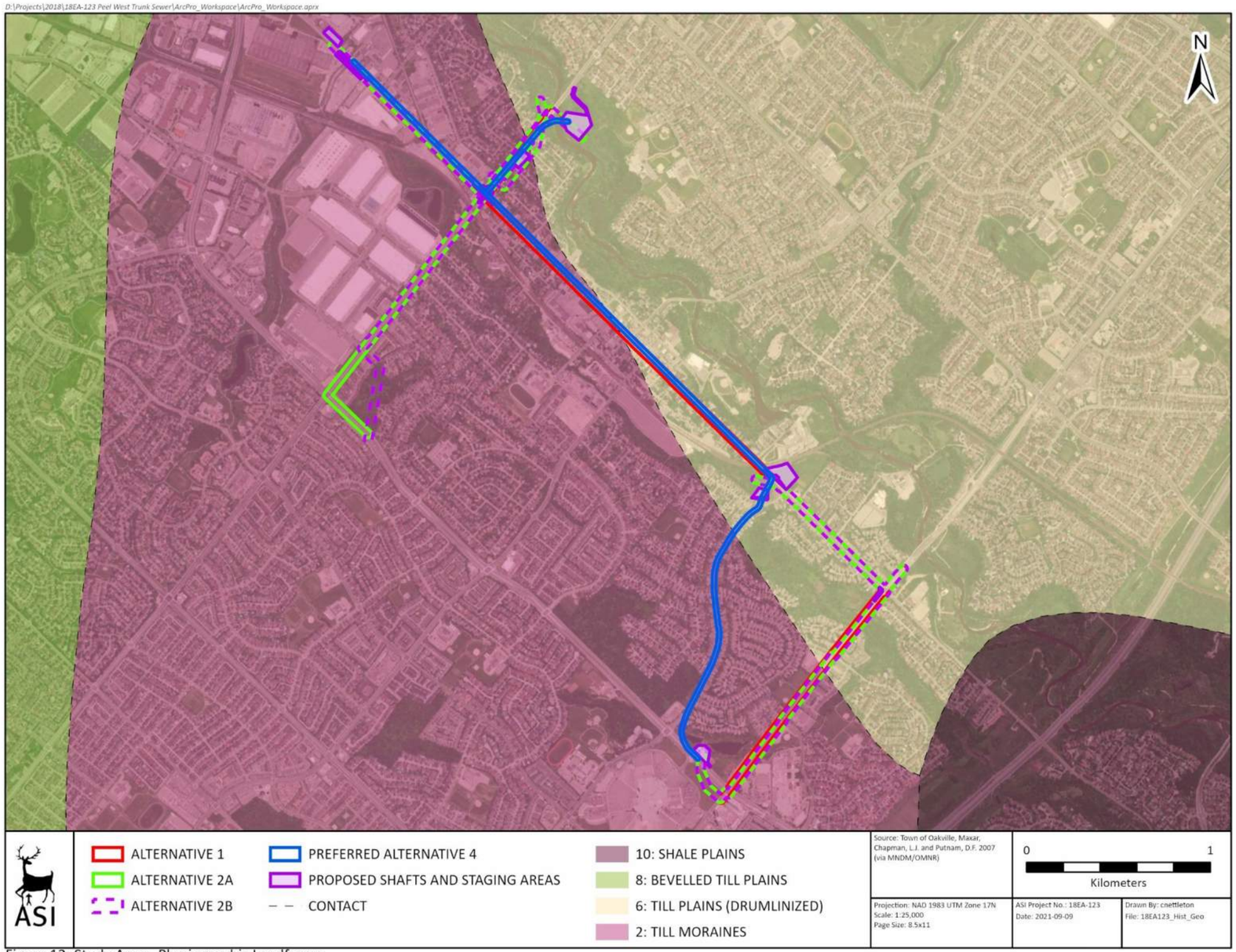

Figure 12: Study Area – Physiographic Landforms

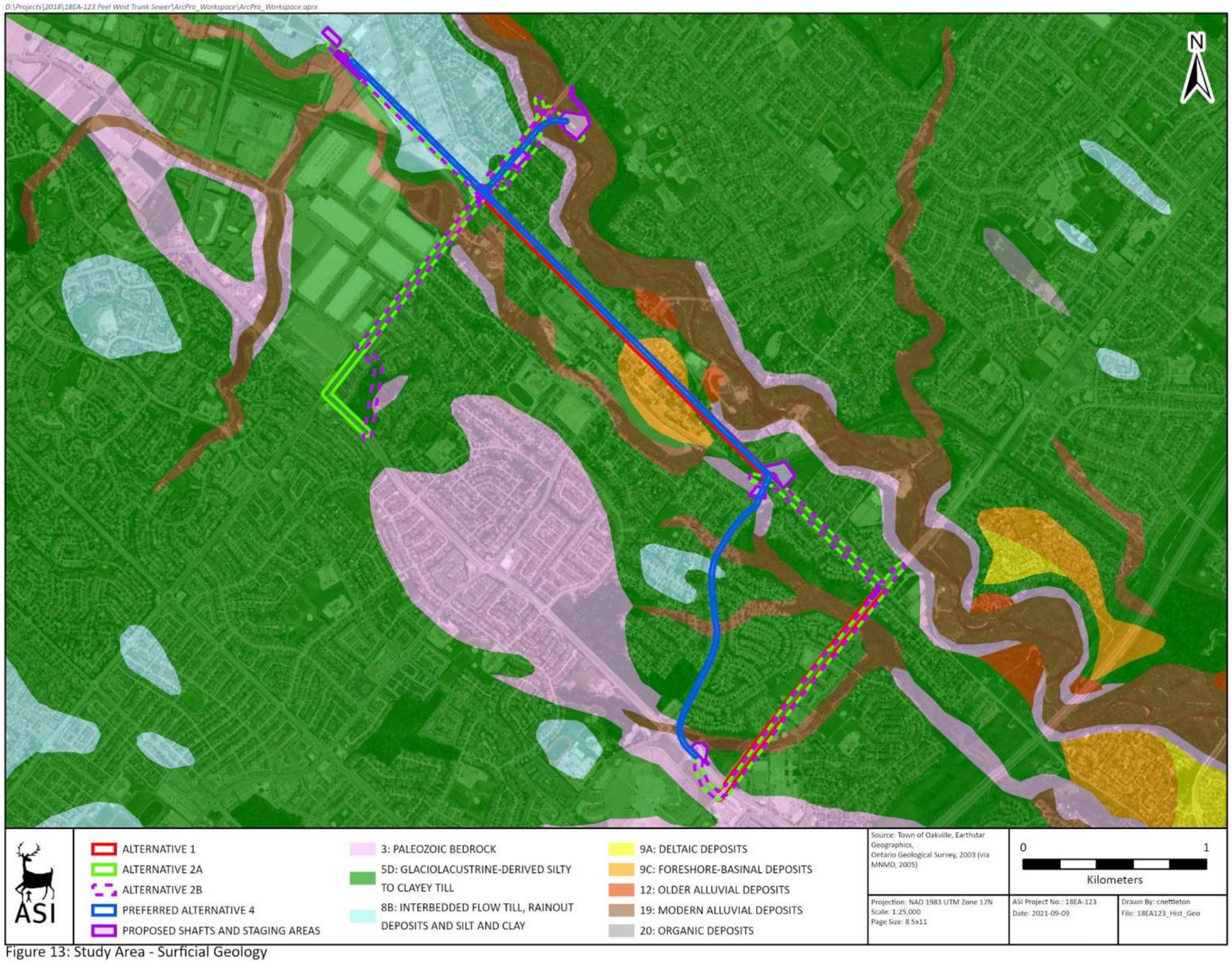

Figure 13: Study Area – Surficial Geology

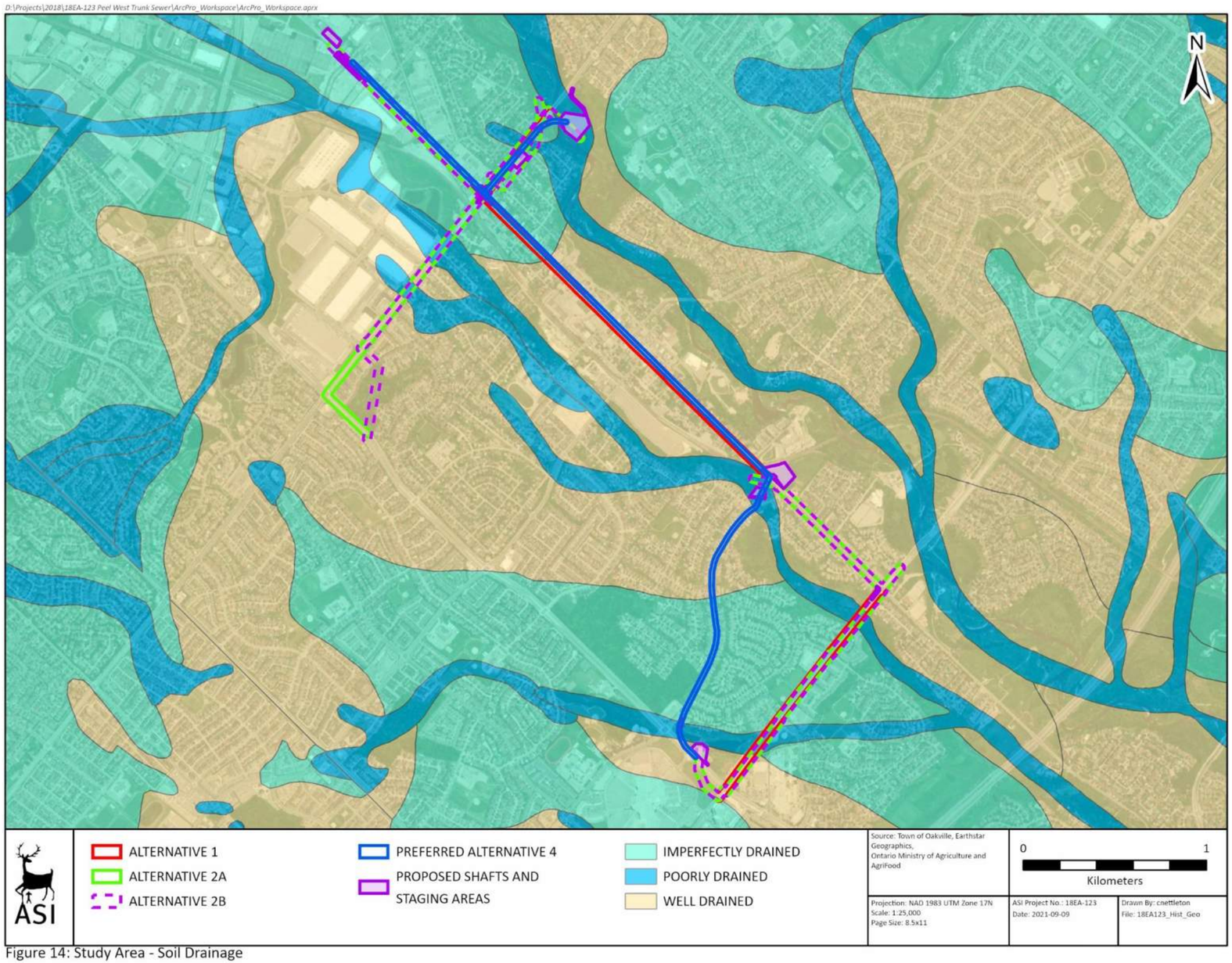

Figure 14: Study Area – Soil Drainage

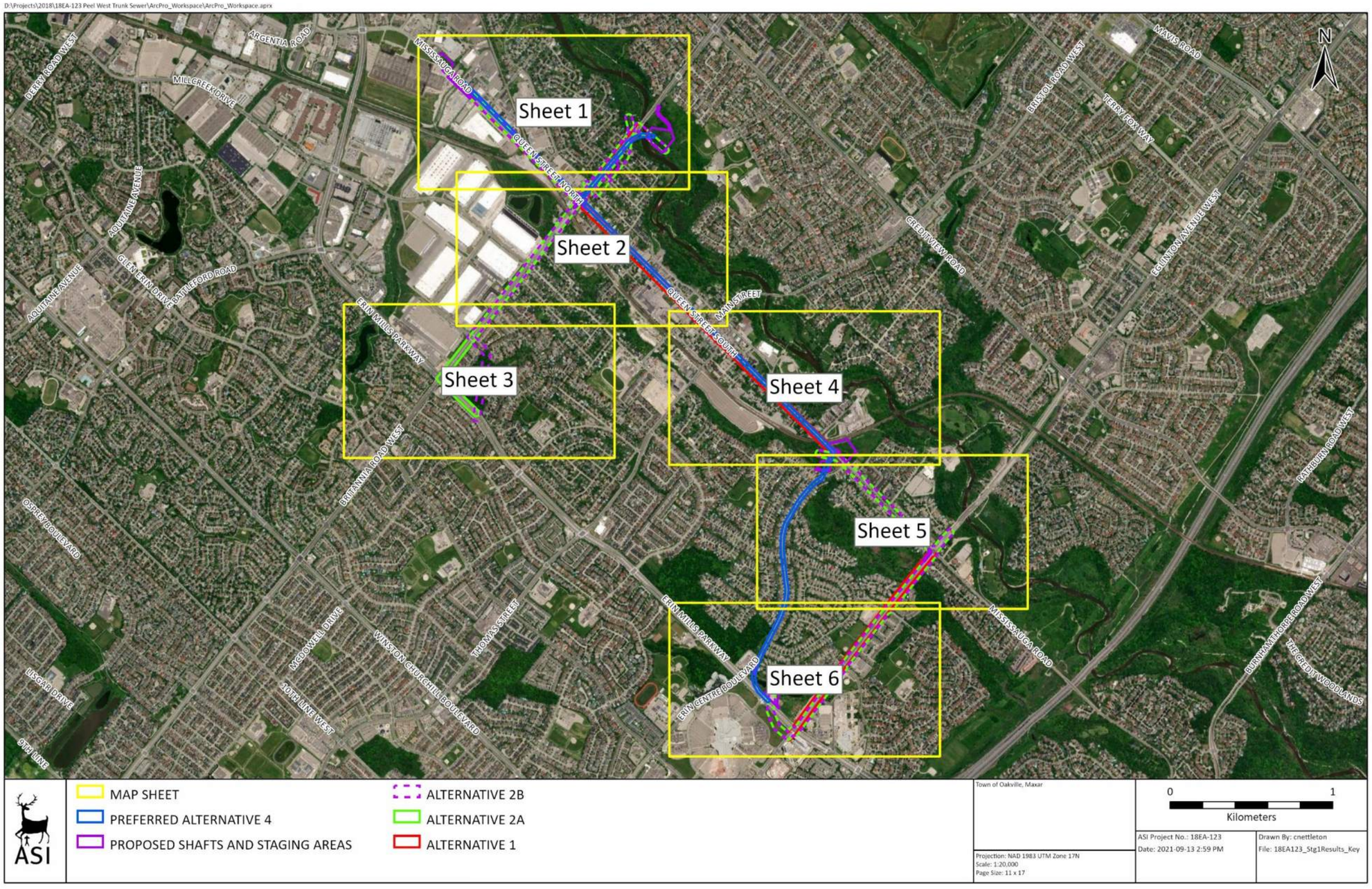

Figure 15: Peel West Trunk Sewer – Results of Stage 1 (Key Map)

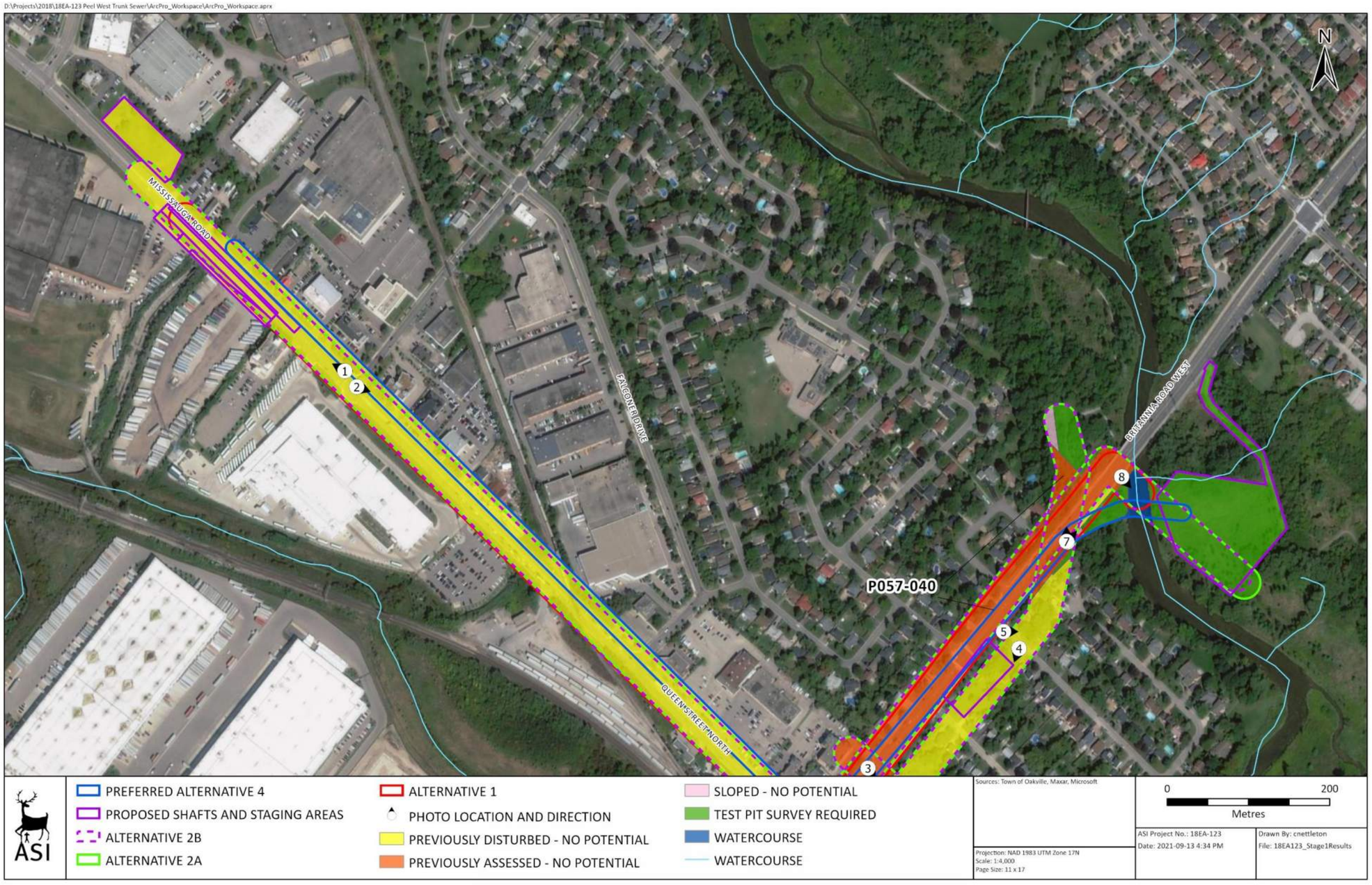

Figure 16: Peel West Trunk Sewer – Results of Stage 1 (Sheet 1)

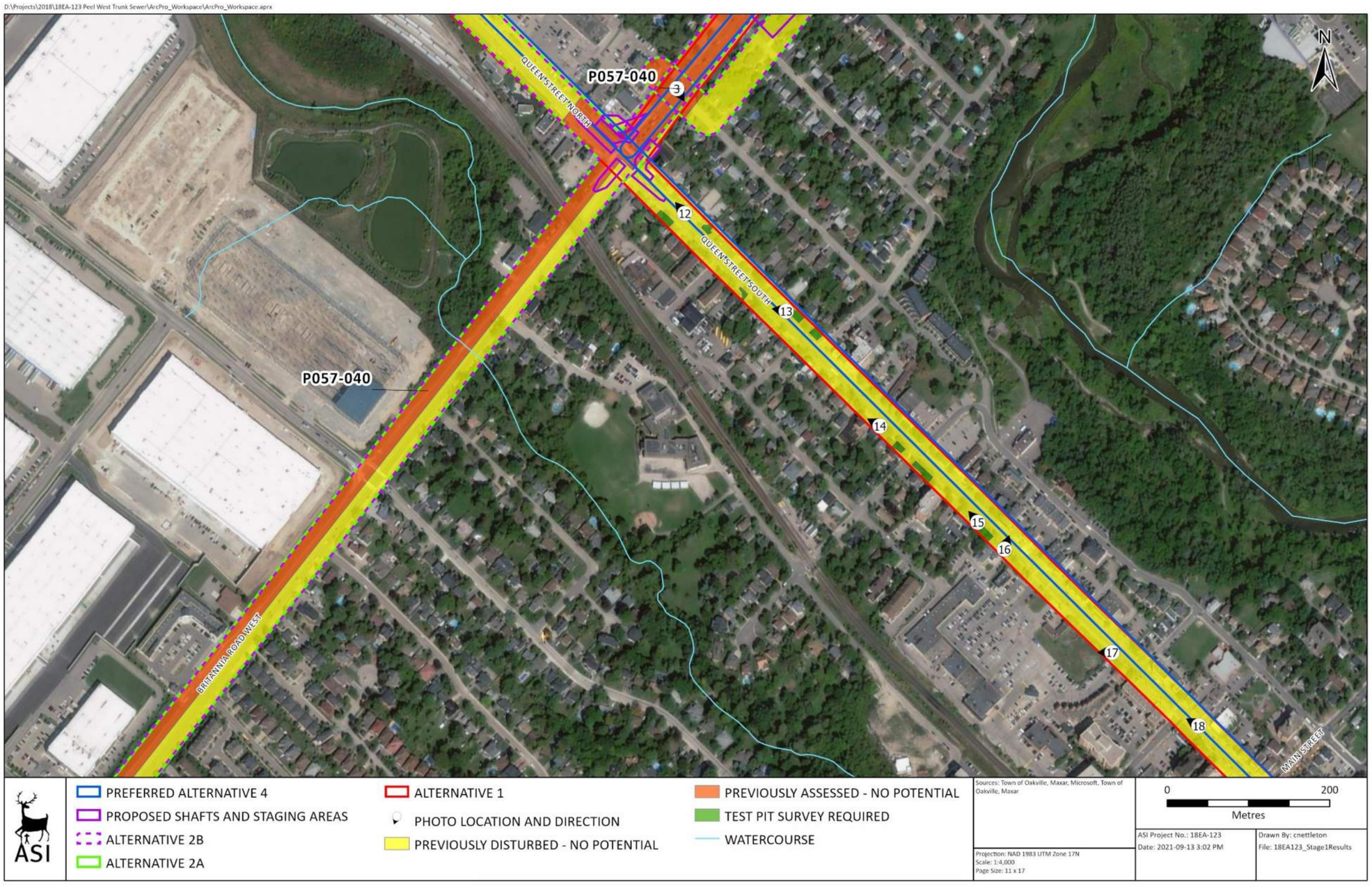

Figure 17: Peel West Trunk Sewer – Results of Stage 1 (Sheet 2)

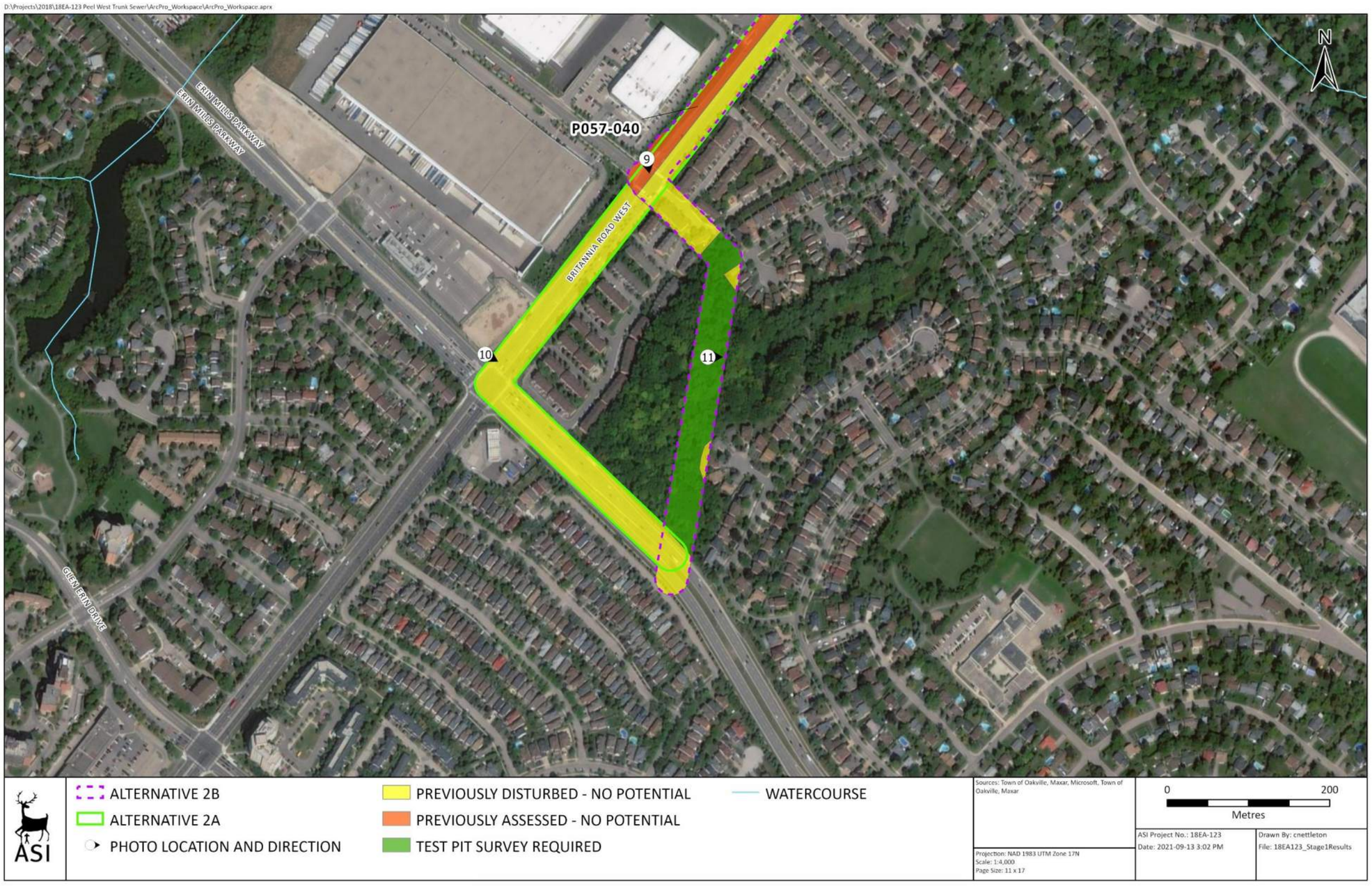

Figure 18: Peel West Trunk Sewer – Results of Stage 1 (Sheet 3)

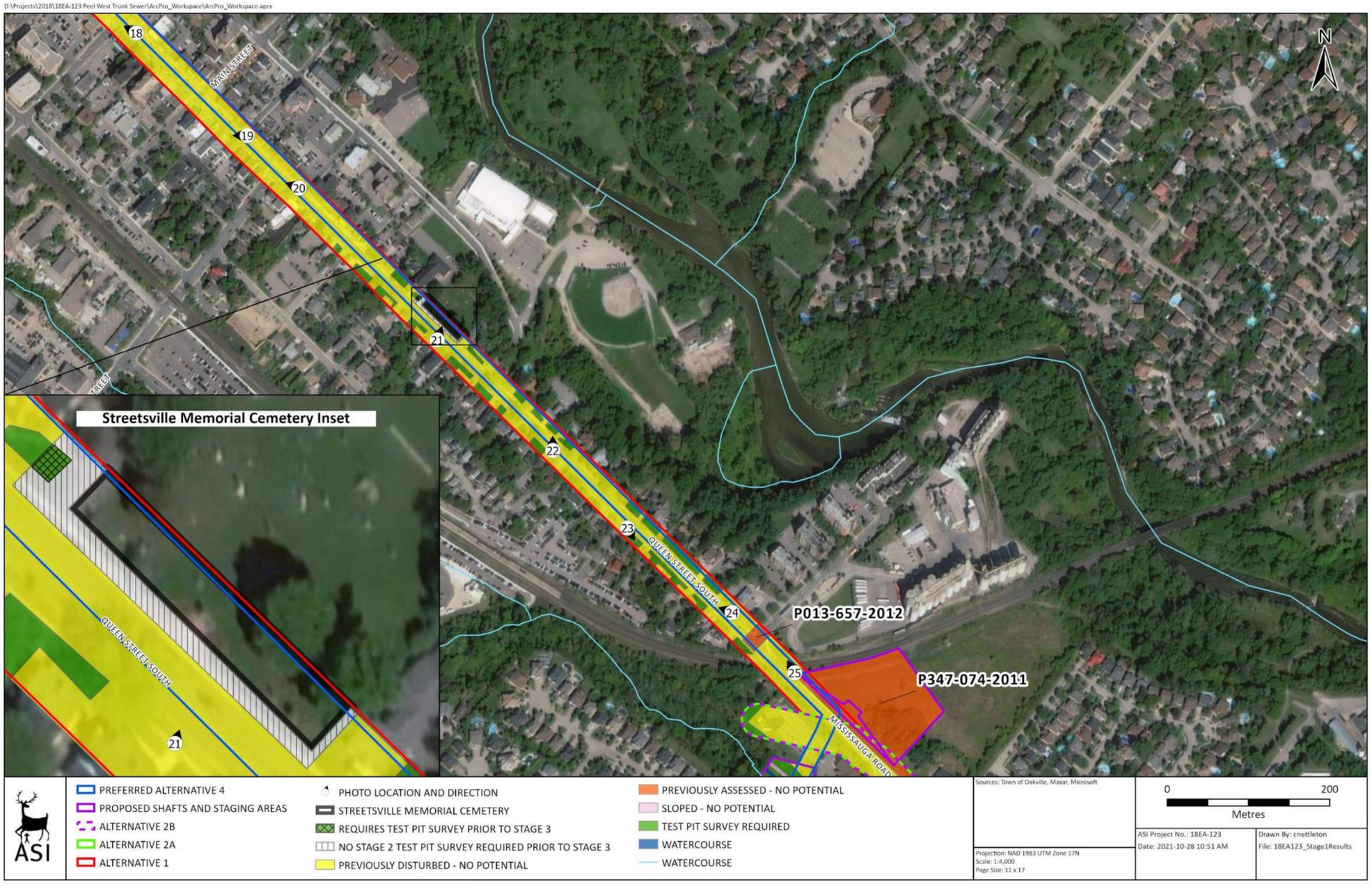

Figure 19: Peel West Trunk Sewer – Results of Stage 1 (Sheet 4)

Figure 20: Peel West Trunk Sewer – Results of Stage 1 (Sheet 5)

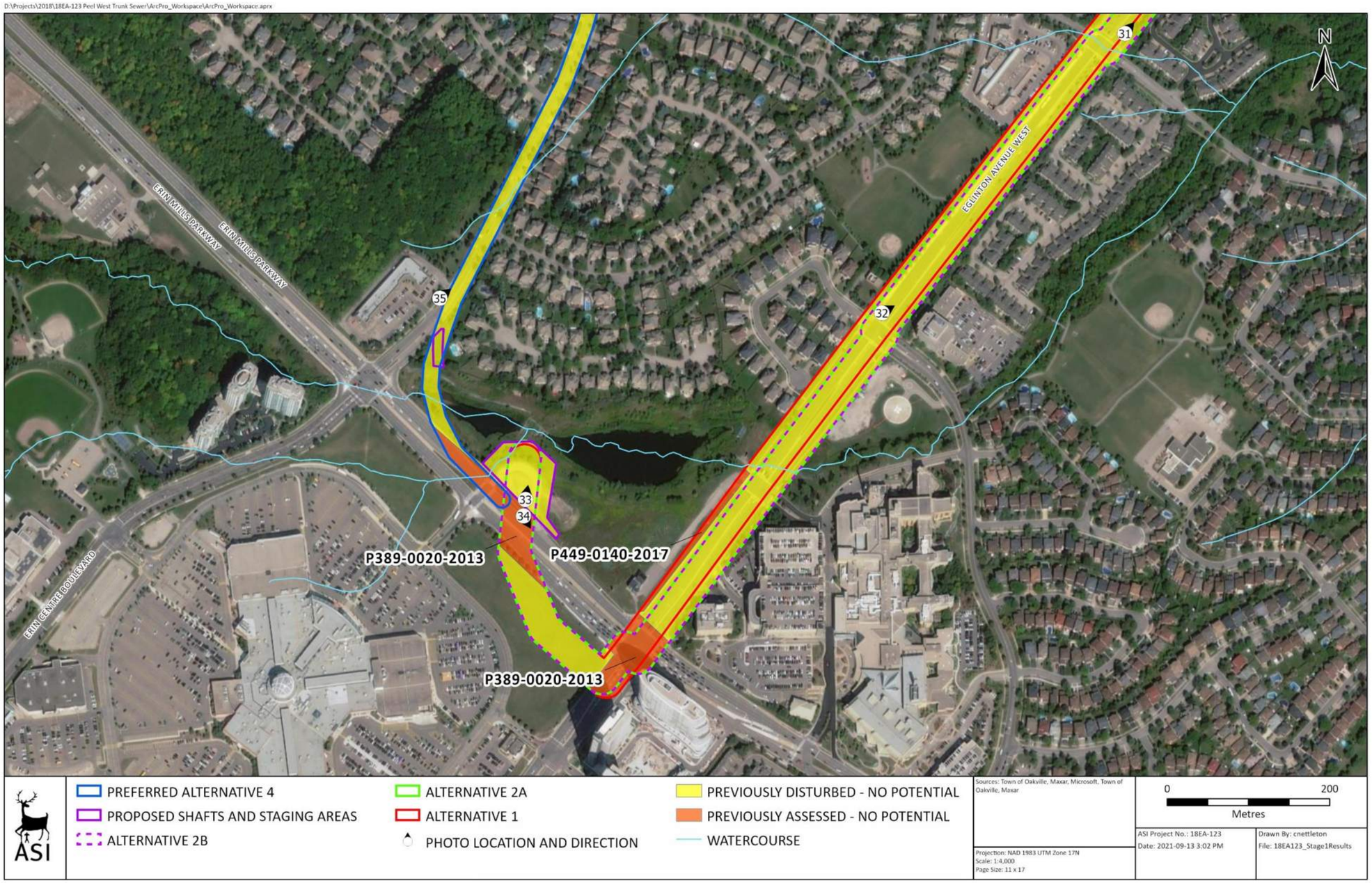

Figure 21: Peel West Trunk Sewer – Results of Stage 1 (Sheet 6)

APPENDIX E

Cultural Heritage Assessment Report

CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT

WEST TRUNK SEWER DIVERSIONS

CITY OF MISSISSAUGA
REGION OF PEEL, ONTARIO

FINAL REPORT

Prepared for:

Hatch Corporation
2265 Upper Middle Road East, 5th Floor
Oakville, ON L6M 2W2

ASI File: 18CH-112

May 2019 (Revised June 2019 and April, May, and July 2020)

ASI Providing Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
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CULTURAL HERITAGE RESOURCE ASSESSMENT:
BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT

WEST TRUNK SEWER DIVERSIONS

CITY OF MISSISSAUGA
REGION OF PEEL, ONTARIO

EXECUTIVE SUMMARY

ASI was contracted by Hatch Corporation to conduct a Cultural Heritage Resource Assessment (CHRA) for the Peel West Trunk Sewer Diversions Schedule 'B' Municipal Class Environmental Assessment (EA), in the City of Mississauga, for the Region of Peel, Ontario. This project involves construction of diversion sewers connecting the existing Credit Valley Trunk Sewer to the new West Trunk Sewer at Erin Mills Parkway. The study area comprises three proposed alignment alternatives: 1, 2a, and 2b. The study area is located in an urban context in the community of Streetsville within the City of Mississauga.

The results of background historical research and a review of secondary source material revealed a study area with an urban land use history dating back to the early nineteenth century. A field review was conducted for the proposed alignment alternatives to confirm the location of and to document previously identified cultural heritage resources, and to identify and document any potential additional ones.

Background research, data collection, and field review conducted for the study area determined that thirteen potential cultural heritage resources (including seven built heritage resources and six cultural heritage landscapes) are located within and/or adjacent to the study area. Following the selection of the preliminary preferred Alternative 1 on Mississauga Road (including Queen Street North and Queen Street South), Britannia Road, and Eglington Avenue in February 2020, the existing conditions report (revised June 2019) was updated with a preliminary impact assessment to identify potential impacts of Alternative 1 to the identified cultural heritage resources in March 2020. A total of 13 potential cultural heritage resources were identified within or adjacent to Alternative 1 and associated Staging Areas (SA), with direct impacts anticipated for three CHRs (CHR 2, 3, and 10) and indirect impacts anticipated for 3 CHRs (CHR 1-3).

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.

3. No direct impacts to any properties with identified cultural heritage value are anticipated as a result of tunnelling activities for the preferred alternative. However, indirect impacts related to vibrations should be monitored by a structural engineer to ensure that there are no indirect impacts.

4. Direct impacts to CHRs 2,3 and 10 are anticipated as a result of the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties with potential cultural heritage value within these CHRs that are anticipated to be directly impacted include:
   CHR 2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
   CHR 10: 1700 Britannia Road West (SA1)

5. As the property at 3 Queen Street North (part of CHR 2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

6. As the properties at 5267 Mississauga Road (part of CHR 2), and 1700 Britannia Road West (CHR 10) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHR 2) and 1700 Britannia Road (CHR 10), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these case. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

7. Direct impacts to CHR 3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHR 3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHR 3.

8. Indirect impacts to CHRs 1, 2 and 3 are anticipated as a result of their location adjacent to the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHRs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
   CHR 1: 3 Queen Street South (listed, adjacent to SA4.1)
   CHR 2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
   CHR 3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

9. Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West, 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

10. Should future work require an expansion of the study area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on potential heritage resources.

11. This report should be submitted to heritage planning staff at the City of Mississauga, the Ministry of Heritage, Sport, Tourism and Culture Industry, and any other relevant heritage stakeholders that have an interest in this project.

PROJECT PERSONNEL

Senior Project Manager:	Lindsay Graves, MA, CAHP *Senior Cultural Heritage Specialist | Senior Project Manager, Cultural Heritage Division*
Project Manager:	John Sleath, MA *Cultural Heritage Specialist | Project Manager Cultural Heritage Division*
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Report Preparation:	Kirstyn Allam, Hon. BA, Dip. Advanced Museum Studies *Cultural Heritage Assistant, Cultural Heritage Division* John Sleath
Graphics Preparation:	Robin Latour, MPhil, PDip *Associate Archaeologist | Geomatics Specialist Operations Division*
Field Review:	Peter Carruthers *Senior Archaeologist*
Report Reviewers:	Lindsay Graves John Sleath

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1.0 INTRODUCTION

ASI was contracted by Hatch Corporation to conduct a Cultural Heritage Resource Assessment (CHRA) for the Peel West Trunk Sewer Diversions Schedule 'B' Municipal Class Environmental Assessment (EA), in the City of Mississauga, for the Region of Peel, Ontario. This project involves construction of diversion sewers connecting the existing Credit Valley Sewer to the new West Trunk Sewer at Erin Mills Parkway. The study area comprises three proposed alignment alternatives: 1, 2a, and 2b (Figure 1). Following the selection of the preliminary preferred Alternative 1 (Single Diversion Concept focused on Mississauga Road/Queen Street North and South) (Figure 2) in February 2020, the existing conditions report (dated June 2019) was updated with a preliminary impact assessment to identify potential impacts of Alternative 1 and associated Staging Areas (SA) to the identified cultural heritage resources in March 2020. The study area is located in an urban context in the community of Streetsville within the City of Mississauga.

The purpose of this report is to identify existing conditions of the study area, present an inventory of cultural heritage resources located within or adjacent to the study area, identify impacts to cultural heritage resources, and propose appropriate mitigation measures. This report was conducted by John Sleath, Project Manager, under the senior project management of Lindsay Graves, Senior Cultural Heritage Specialist, both of ASI.

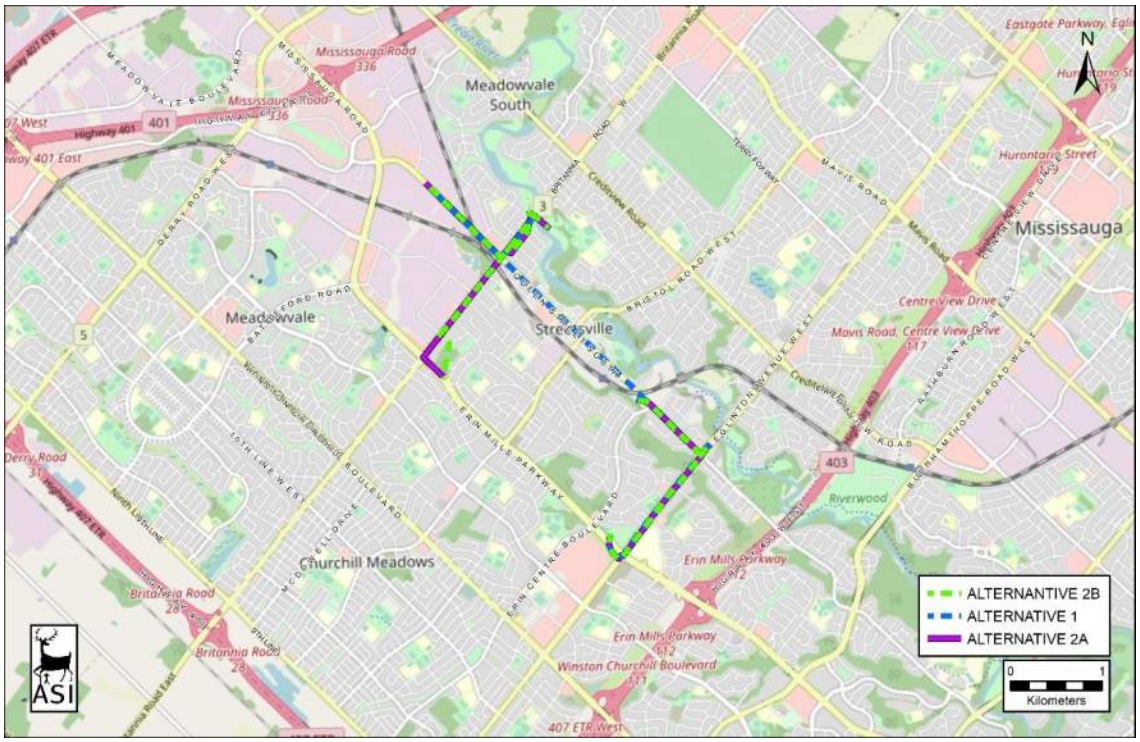

Figure 1: Location of the study area
Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

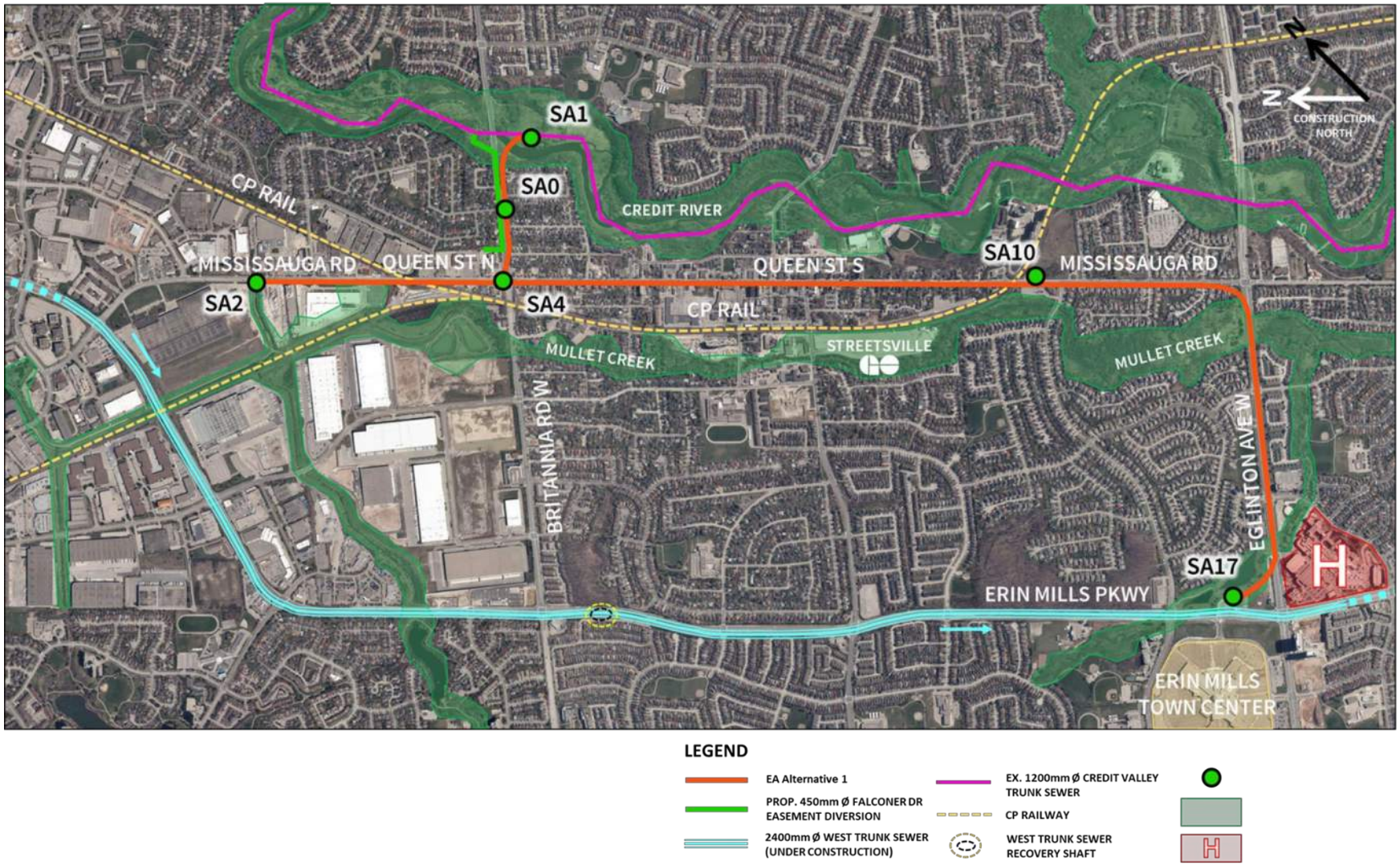

Figure 2: Location of the Alternative 1 in red and associated Staging Areas noted by green and black dots

(Hatch Corporation 2020)

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT

2.1 Legislation and Policy Context

This cultural heritage resource assessment considers cultural heritage resources in the context of improvements to specified areas, pursuant to the *Environmental Assessment Act*. This assessment addresses above ground cultural heritage resources over 40 years old. Use of a 40-year-old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Tourism, Culture and Sport 2016). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

For the purposes of this assessment, the term cultural heritage resources is used to describe both cultural heritage landscapes (CHLs) and built heritage resources (BHRs). A cultural landscape is perceived as a collection of individual built heritage resources and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage resources are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

The analysis throughout the study process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines. Under the *Environmental Assessment Act* (1990) environment is defined in Subsection 1(c) to include:

- cultural conditions that influence the life of man or a community, and;
- any building, structure, machine, or other device or thing made by man.

The Ministry of Tourism, Culture and Sport is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario and has published two guidelines to assist in assessing cultural heritage resources as part of an environmental assessment: *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992), and *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1980). Accordingly, both guidelines have been utilized in this assessment process.

The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (Section 1.0) states the following:

> When speaking of man-made heritage we are concerned with the works of man and the effects of his activities in the environment rather than with movable human artifacts or those environments that are natural and completely undisturbed by man.

In addition, environment may be interpreted to include the combination and interrelationships of human artifacts with all other aspects of the physical environment, as well as with the social, economic and cultural conditions that influence the life of the people and communities in Ontario. The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* distinguish between two basic

ways of visually experiencing this heritage in the environment, namely as cultural heritage landscapes and as cultural features.

Within this document, cultural heritage landscapes are defined as the following (Section 1.0):

> The use and physical appearance of the land as we see it now is a result of man's activities over time in modifying pristine landscapes for his own purposes. A cultural landscape is perceived as a collection of individual man-made features into a whole. Urban cultural landscapes are sometimes given special names such as townscapes or streetscapes that describe various scales of perception from the general scene to the particular view. Cultural landscapes in the countryside are viewed in or adjacent to natural undisturbed landscapes, or waterscapes, and include such land uses as agriculture, mining, forestry, recreation, and transportation. Like urban cultural landscapes, they too may be perceived at various scales: as a large area of homogeneous character; or as an intermediate sized area of homogeneous character or a collection of settings such as a group of farms; or as a discrete example of specific landscape character such as a single farm, or an individual village or hamlet.

A cultural feature is defined as the following (Section 1.0):

> …an individual part of a cultural landscape that may be focused upon as part of a broader scene, or viewed independently. The term refers to any man-made or modified object in or on the land or underwater, such as buildings of various types, street furniture, engineering works, plantings and landscaping, archaeological sites, or a collection of such objects seen as a group because of close physical or social relationships.

The Minister of Tourism, Culture, and Sport has also published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (2014; *Standards and Guidelines* hereafter). These *Standards and Guidelines* apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest. They are mandatory for Ministries and prescribed public bodies and have the authority of a Management Board or Cabinet directive. Prescribed public bodies include:

- Agricultural Research Institute of Ontario
- Hydro One Inc.
- Liquor Control Board of Ontario
- McMichael Canadian Art Collection
- Metrolinx
- The Niagara Parks Commission
- Ontario Heritage Trust
- Ontario Infrastructure and Lands Corporation
- Ontario Lottery and Gaming Corporation
- Ontario Power Generation Inc.
- Royal Botanical Gardens
- Toronto Area Transit Operating Authority
- St. Lawrence Parks Commission

The *Standards and Guidelines* provide a series of definitions considered during the course of the assessment:

A provincial heritage property is defined as the following (14):

> Provincial heritage property means real property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.

A provincial heritage property of provincial significance is defined as the following (14):

> Provincial heritage property that has been evaluated using the criteria found in *Ontario Heritage Act* O. Reg. 10/06 and has been found to have cultural heritage value or interest of provincial significance.

A built heritage resource is defined as the following (13):

> …one or more significant buildings (including fixtures or equipment located in or forming part of a building), structures, earthworks, monuments, installations, or remains associated with architectural, cultural, social, political, economic, or military history and identified as being important to a community. For the purposes of these Standards and Guidelines, "structures" does not include roadways in the provincial highway network and in-use electrical or telecommunications transmission towers.

A cultural heritage landscape is defined as the following (13):

> …a defined geographical area that human activity has modified and that has cultural heritage value. Such an area involves one or more groupings of individual heritage features, such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form distinct from that of its constituent elements or parts. Heritage conservation districts designated under the *Ontario Heritage Act*, villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trails, and industrial complexes of cultural heritage value are some examples.

Additionally, the *Planning Act* (1990) and related *Provincial Policy Statement* (*PPS*), which was updated in 2014, make a number of provisions relating to heritage conservation. One of the general purposes of the *Planning Act* is to integrate matters of provincial interest in provincial and municipal planning decisions. In order to inform all those involved in planning activities of the scope of these matters of provincial interest, Section 2 of the *Planning Act* provides an extensive listing. These matters of provincial interest shall be regarded when certain authorities, including the council of a municipality, carry out their responsibilities under the *Act*. One of these provincial interests is directly concerned with:

> 2.(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest

Part 4.7 of the *PPS* states that:

> The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.
>
> Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.
>
> Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.
>
> In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.

Those policies of relevance for the conservation of heritage features are contained in Section 2- Wise Use and Management of Resources, wherein Subsection 2.6 - Cultural Heritage and Archaeological Resources, makes the following provisions:

> 2.6.1 Significant built heritage resources and significant cultural heritage landscapes shall be conserved.

A number of definitions that have specific meanings for use in a policy context accompany the policy statement. These definitions include built heritage resources and cultural heritage landscapes.

A *built heritage resource* is defined as: “a building, structure, monument, installation or any manufactured remnant that contributes to a property’s cultural heritage value or interest as identified by a community, including an Aboriginal community” (Ministry of Municipal Affairs and Housing 2014).

A *cultural heritage landscape* is defined as “a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association” (Ministry of Municipal Affairs and Housing 2014). Examples may include, but are not limited to farmscapes, historical settlements, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.

In addition, significance is also more generally defined. It is assigned a specific meaning according to the subject matter or policy context, such as wetlands or ecologically important areas. With regard to

cultural heritage and archaeology resources, resources of significance are those that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people (Ministry of Municipal Affairs and Housing 2014).

Criteria for determining significance for the resources are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation (Ministry of Municipal Affairs and Housing 2014).

Accordingly, the foregoing guidelines and relevant policy statement were used to guide the scope and methodology of the cultural heritage assessment.

2.1.1 Region of Peel

The Region of Peel provides cultural heritage policies in its Official Plan (2016). Cultural heritage policies within the Region of Peel's Official Plan relevant to this assessment include:

3.6.2.1 Direct the area municipalities to include in their official plans policies for the definition, identification, conservation and protection of cultural heritage resources in Peel, in cooperation with the Region, the conservation authorities, other agencies and aboriginal groups, and to provide direction for their conservation and preservation, as required.

3.6.2.2 Support the designation of Heritage Conservation Districts in area municipal official plans.

3.6.2.3 Ensure that there is adequate assessment, preservation, interpretation and/or rescue excavation of cultural heritage resources in Peel, as prescribed by the Ministry of Citizenship, Culture and Recreation's archaeological assessment and mitigation guidelines, in cooperation with the area municipalities.

3.6.2.4 Require and support cultural heritage resource impact assessments, where appropriate, for infrastructure projects, including Region of Peel projects.

3.6.2.5 Direct the area municipalities to require, in their official plans, that the proponents of development proposals affecting heritage resources provide for sufficient documentation to meet Provincial requirements and address the Region's objectives with respect to cultural heritage resources.

3.6.2.6 Encourage and support the area municipalities in preparing, as part of any area municipal official plan, an inventory of cultural heritage resources and provision of guidelines for identification, evaluation and impact mitigation activities.

3.6.2.7 Direct the area municipalities to only permit development and site alteration on

lands containing archaeological resources or areas of archaeological potential if the significant archaeological resources have been conserved by removal and documentation, or by preservation on site. Where significant archaeological resources must be preserved on site, only development and site alteration which maintain the heritage integrity of the site may be permitted.

3.6.2.8 Direct the area municipalities to only permit development and site alteration on adjacent lands to protected heritage property where the proposed property has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.

2.1.2 City of Mississauga

The City of Mississauga's *Official Plan* (2018b) sets out several policies with regard to cultural heritage resources. Policies that are relevant to this assessment are provided below:

7.4 Heritage Planning

7.4.1.1 The heritage policies are based on two principles:

a. heritage planning will be an integral part of the planning process; and
b. cultural heritage resources of significant value will be identified, protected, and preserved.

7.4.1.2 Mississauga will discourage the demolition, destruction or inappropriate alteration or reuse of cultural heritage resources.

7.4.1.3 Mississauga will require development to maintain locations and settings for cultural heritage resources that are compatible with and enhance the character of the cultural heritage resource.

7.4.1.4 Mississauga will encourage other levels of government to enact legislation and develop programs that promote the preservation and rehabilitation of cultural heritage resources.

7.4.1.5 Mississauga will encourage private and public support and the allocation of financial resources for the preservation and rehabilitation of cultural heritage resources.

7.4.1.6 Mississauga will foster public awareness of and commitment to, the protection and enhancement of cultural heritage resources.

7.4.1.7 Mississauga will maintain a Heritage Register of property, including structures and cultural landscapes that should be preserved as cultural heritage resources. The cultural heritage resources in the Heritage Register will be assessed based on

their design or physical value, historical or associative value, contextual value and archaeological significance including the aggregation of both natural and cultural heritage resources.

7.4.1.8 The Heritage Register will contain a legal description of the property, the name and address of the owner, a statement explaining the cultural heritage value or interest of the property and a description of the heritage attributes of the property.

7.4.1.9 Character Area policies may identify means of protecting cultural heritage resources of major significance by prohibiting uses or development that would have a deleterious effect on the cultural heritage resource, and encouraging uses and development that preserve, maintain and enhance the cultural heritage resource.

7.4.1.10 Applications for development involving cultural heritage resources will be required to include a Heritage Impact Assessment prepared to the satisfaction of the City and other appropriate authorities having jurisdiction.

7.4.1.11 Cultural heritage resources designated under the Ontario Heritage Act, will be required to preserve the heritage attributes and not detract or destroy any of the heritage attributes in keeping with the Ontario Heritage Tool Kit, the Ontario Ministry of Culture, and the Standards and Guidelines for the Conservation of Historic Places in Canada, Parks Canada.

7.4.1.12 The proponent of any construction, development, or property alteration that might adversely affect a listed or designated cultural heritage resource or which is proposed adjacent to a cultural heritage resource will be required to submit a Heritage Impact Assessment, prepared to the satisfaction of the City and other appropriate authorities having jurisdiction.

7.4.1.13 Cultural heritage resources must be maintained in situ and in a manner that prevents deterioration and protects the heritage qualities of the resource.

7.4.1.14 Cultural heritage resources will be integrated with development proposals.

7.4.1.15 Mississauga will regulate use and other matters, as appropriate, for heritage preservation through zoning by-laws.

7.4.1.16 Mississauga will acquire heritage easements, apply restrictive covenants, and enter into development agreements, as appropriate, for the preservation of cultural heritage resources.

7.4.1.17 Public works will be undertaken in a way that minimizes detrimental impacts on cultural heritage resources.

7.4.1.18 Mississauga recognizes the Credit River and Etobicoke Creek valleys as heritage corridors with both prehistoric and historical significance.

7.4.1.19 Mississauga will consider and promote archaeological management plans and cultural plans in conserving cultural heritage and archaeological resources.

7.4.1.20 Mississauga will consider the interests of Aboriginal communities in conserving cultural heritage and archaeological resources.

7.4.2.2 Prior to the demolition or alteration of a cultural heritage resource, documentation will be required of the property to the satisfaction of the City, and any appropriate advisory committee. This documentation may be in the form of a Heritage Impact Assessment.

7.4.2.3 Development adjacent to a cultural heritage property will be encouraged to be compatible with the cultural heritage property.

7.4.3.1 Heritage Conservation Districts will be designated by the City in accordance with the Ontario Heritage Act and the following criteria:

a. most of the structures or heritage elements, in a grouping, that have a unique character and reflect some aspect of the heritage of the community or are of historic, architectural, natural, or cultural significance; or
b. an environment that should be preserved because of its cultural heritage, cultural landscape, or scenic significance.

7.4.3.3 Applications for development within a Heritage Conservation District will be required to include a Heritage Impact Assessment and Heritage Permit, prepared to the satisfaction of the City and the appropriate authorities having jurisdiction.

14.10 Streetsville

14.10.3.1 Heritage resources will include those properties listed on the City's Heritage Register, but will not be restricted to the list.

2.2 Data Collection and Methodology

In the course of the cultural heritage assessment, all potentially affected cultural heritage resources are subject to inventory. Short form names are usually applied to each resource type, (e.g. barn, residence). Generally, when conducting a preliminary identification of cultural heritage resources, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of cultural heritage resources in a particular geographic area.

Background historical research, which includes consultation of primary and secondary source research and historical mapping, is undertaken to identify early settlement patterns and broad agents or themes

of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as retaining cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified cultural heritage resources. The field review is also used to identify cultural heritage resources that have not been previously identified on federal, provincial, or municipal databases.

Several investigative criteria are utilised during the field review to appropriately identify new cultural heritage resources. These investigative criteria are derived from provincial guidelines, definitions, and past experience. During the course of the environmental assessment, a built structure or landscape is identified as a cultural heritage resource if it is considered to be 40 years or older, and if the resource satisfies at least one of the following criteria:

Design/Physical Value:

- It is a rare, unique, representative or early example of a style, type, expression, material or construction method.
- It displays a high degree of craftsmanship or artistic merit.
- It demonstrates a high degree of technical or scientific achievement.
- The site and/or structure retains original stylistic features and has not been irreversibly altered so as to destroy its integrity.
- It demonstrates a high degree of excellence or creative, technical or scientific achievement at a provincial level in a given period.

Historical/Associative Value:

- It has a direct association with a theme, event, belief, person, activity, organization, or institution that is significant to: The City of Mississauga; the Province of Ontario; or Canada.
- It yields, or has the potential to yield, information that contributes to an understanding of the history of: The City of Mississauga; the Province of Ontario; or Canada.
- It demonstrates or reflects the work or ideas of an architect, artist builder, designer, or theorist who is significant to: The City of Mississauga; the Province of Ontario; or Canada.
- It represents or demonstrates a theme or pattern in Ontario's history.
- It demonstrates an uncommon, rare or unique aspect of Ontario's cultural heritage.
- It has a strong or special association with the entire province or with a community that is found in more than one part of the province. The association exists for historical, social, or cultural reasons or because of traditional use.
- It has a strong or special association with the life or work of a person, group or organization of importance to the province or with an event of importance to the province.

Contextual Value:

- It is important in defining, maintaining, or supporting the character of an area.

- It is physically, functionally, visually, or historically linked to its surroundings.
- It is a landmark.
- It illustrates a significant phase in the development of the community or a major change or turning point in the community's history.
- The landscape contains a structure other than a building (fencing, culvert, public art, statue, etc.) that is associated with the history or daily life of that area or region.
- There is evidence of previous historical and/or existing agricultural practices (e.g. terracing, deforestation, complex water canalization, apple orchards, vineyards, etc.).
- It is of aesthetic, visual or contextual important to the province.

If a property within or adjacent to the study area meets one of these criteria it will be identified as a potential cultural heritage resource in this report and is subject to further research where appropriate and when feasible. Typically, detailed archival research, permission to enter lands containing potential heritage resources, and further consultation is required to determine the specific heritage significance of the identified potential cultural heritage resource. The detailed research and analysis required to conduct a heritage evaluation under O. Reg 9/06 is considered beyond the scope of this CHRA. Instead, a preliminary evaluation and justification for inclusion as potential cultural heritage resources based on the criteria above is employed and is presented in this report.

Additional properties within the project study area were encountered and observed during field review, however, they were screened out as potential cultural heritage resources because they were not considered to be 40 years or older, and were not determined to satisfy at least one of the criteria identified above.

When identifying cultural heritage landscapes, the following categories are typically utilized for the purposes of the classification during the field review:

Farm complexes:	comprise two or more buildings, one of which must be a farmhouse or barn, and may include a tree-lined drive, tree windbreaks, fences, domestic gardens and small orchards.
Roadscapes:	generally two-lanes in width with absence of shoulders or narrow shoulders only, ditches, tree lines, bridges, culverts and other associated features.
Waterscapes:	waterway features that contribute to the overall character of the cultural heritage landscape, usually in relation to their influence on historical development and settlement patterns.
Railscapes:	active or inactive railway lines or railway rights of way and associated features.
Historical settlements:	groupings of two or more structures with a commonly applied name.

Streetscapes:	generally consists of a paved road found in a more urban setting, and may include a series of houses that would have been built in the same time period.
Historical agricultural landscapes:	generally comprises a historically rooted settlement and farming pattern that reflects a recognizable arrangement of fields within a lot and may have associated agricultural outbuildings, structures, and vegetative elements such as tree rows.
Cemeteries:	land used for the burial of human remains.

Results of the desktop data collection and field review are contained in Section 3.0, while Sections 4.0 contains conclusions and recommendations with respect to potential impacts of the undertaking on the identified cultural heritage resource. A cultural heritage resource inventory is provided in Section 7.0, while location mapping is in Section 8.0.

3.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT

This section provides a summary of historical research and a description of identified above ground cultural heritage resources that may be affected by the proposed undertaking.

3.1 Background Historical Summary

A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of physiography, as well as Indigenous and Euro-Canadian land use and settlement.

Historically, the study area is located in the former Township of Toronto, County of Peel on part of Lot 32, Concession II North of Dundas Street (NDS); Lots 1-3, Range V NDS; Lot 1, Concession VI West of Centre Road (WCR); Lots 5-6, Concession VI WCR; Lots 1-7, Concession V WCR; and Lots 1-7, Concession IV WCR.

3.1.1 Physiography

The study area is situated within the Iroquois Plain physiographic region of southern Ontario (Chapman and Putnam 1984).

The Iroquois Plain physiographic region of Southern Ontario is a lowland region bordering Lake Ontario. This region is characteristically flat and formed by lacustrine deposits laid down by the inundation of Lake Iroquois, a body of water that existed during the late Pleistocene. This region extends from the Trent River in the east, around the western part of Lake Ontario to the Niagara River, spanning a distance of 300 km (Chapman and Putnam 1984:190). The old shorelines of Lake Iroquois include cliffs, bars, beaches and boulder pavements. The old sandbars in this region are good aquifers that supply

water to farms and villages. The gravel bars are quarried for road and building material, while the clays of the old lake bed have been used for the manufacture of bricks (Chapman and Putnam 1984:196).

3.1.2 Indigenous Land Use and Settlement

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (BP) (Ferris 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards and Fritz 1988) and populations now occupied less extensive territories (Ellis and Deller 1990).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 BP; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 BP and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Ellis et al. 1990; Ellis et al. 2009; Brown 1995:13).

Between 3,000-2,500 BP, populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 BP and exchange and interaction networks broaden at this time (Spence et al. 1990:136, 138) and by approximately 2,000 BP, evidence exists for macro-band camps, focusing on the seasonal harvesting of resources (Spence et al. 1990:155, 164). By 1,500 BP there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 BP - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch and Williamson 2013:13–15). Bands likely retreated to interior camps during the winter. It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 BP, lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (CE), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson 1990:317). By 1300-1450 CE, this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al. 1990:343). From 1450-1649 CE this process continued with the coalescence of these small villages into larger communities (Birch and Williamson 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed. By 1600 CE, the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s,

the traditional enmity between the Haudenosaunee[1] and the Huron-Wendat (and their Algonquian allies such as the Nippissing and Odawa) led to the dispersal of the Huron-Wendat.

Shortly after dispersal of the Wendat and their Algonquian allies, Ojibwa began to expand into southern Ontario and Michigan from a "homeland" along the east shore of Georgian Bay, west along the north shore of Lake Huron, and along the northeast shore of Lake Superior and onto the Upper Peninsula of Michigan (Rogers 1978:760–762). This history was constructed by Rogers using both Anishinaabek oral tradition and the European documentary record, and notes that it included Chippewa, Ojibwa, Mississauga, and Saulteaux or "Southeastern Ojibwa" groups. Ojibwa, likely Odawa, were first encountered by Samuel de Champlain in 1615 along the eastern shores of Georgian Bay. Etienne Brule later encountered other groups and by 1641, Jesuits had journeyed to Sault Sainte Marie (Thwaites 1896:11:279) and opened the Mission of Saint Peter in 1648 for the occupants of Manitoulin Island and the northeast shore of Lake Huron. The Jesuits reported that these Algonquian peoples lived "solely by hunting and fishing and roam as far as the "Northern sea" to trade for " Furs and Beavers, which are found there in abundance" (Thwaites 1896-1901, 33:67), and "all of these Tribes are nomads, and have no fixed residence, except at certain seasons of the year, when fish are plentiful, and this compels them to remain on the spot" (Thwaites 1896-1901, 33:153). Algonquian-speaking groups were historically documented wintering with the Huron-Wendat, some who abandoned their country on the shores of the St. Lawrence because of attacks from the Haudenosaunee (Thwaites 1896-1901, 27:37).
Other Algonquian groups were recorded along the northern and eastern shores and islands of Lake Huron and Georgian Bay - the "Ouasouarini" [Chippewa], the "Outchougai" [Outchougai], the "Atchiligouan" [Achiligouan] near the mouth of the French River and north of Manitoulin Island the "Amikouai, or the nation of the Beaver" [Amikwa; Algonquian] and the "Oumisagai" [Missisauga; Chippewa] (Thwaites 1896-1901, 18:229, 231). At the end of the summer 1670, Father Louys André began his mission work among the Mississagué, who were located on the banks of a river that empties into Lake Huron approximately 30 leagues from the Sault (Thwaites 1896-1901, 55:133-155).

After the Huron had been dispersed, the Haudenosaunee began to exert pressure on Ojibwa within their homeland to the north. While their numbers had been reduced through warfare, starvation, and European diseases, the coalescence of various Anishinaabek groups led to enhanced social and political strength (Thwaites 1896-1901, 52:133) and Sault Sainte Marie was a focal point for people who inhabited adjacent areas both to the east and to the northwest as well as for the Saulteaux, who considered it their home (Thwaites 1896-1901, 54:129-131). The Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. From east to west, these villages consisted of Ganneious, on Napanee Bay, an arm of the Bay of Quinte; Quinte, near the isthmus of the Quinte Peninsula; Ganaraske, at the mouth of the Ganaraska River; Quintio, at the mouth of the Trent River on the north shore of Rice Lake; Ganatsekwyagon (or Ganestiquiagon), near the mouth of the Rouge River; Teyaiagon, near the mouth of the Humber River; and Quinaouatoua, on the portage between the western end of Lake Ontario and the Grand River (Konrad 1981:135). Their locations near the mouths of the Humber and Rouge Rivers, two branches of the Toronto Carrying Place, strategically linked these settlements with the upper Great Lakes through Lake Simcoe. The inhabitants of these villages were agriculturalists, growing maize, pumpkins and

[1] The Haudenosaunee are also known as the New York Iroquois or Five Nations Iroquois and after 1722 Six Nations Iroquois. They were a confederation of five distinct but related Iroquoian–speaking groups – the Seneca, Onondaga, Cayuga, Oneida, and Mohawk. Each lived in individual territories in what is now known as the Finger Lakes district of Upper New York. In 1722 the Tuscarora joined the confederacy.

squash, but their central roles were that of portage starting points and trading centres for Iroquois travel to the upper Great Lakes for the annual beaver hunt (Konrad 1974; Williamson et al. 2008:50–52). Ganatsekwyagon, Teyaiagon, and Quinaouatoua were primarily Seneca; Ganaraske, Quinte and Quintio were likely Cayuga, and Ganneious was Oneida, but judging from accounts of Teyaiagon, all of the villages might have contained peoples from a number of the Iroquois constituencies (ASI 2013).

During the 1690s, some Ojibwa began moving south into extreme southern Ontario and soon replaced, the Haudenosaunee by force. By the first decade of the eighteenth century, the Michi Saagiig Nishnaabeg (Mississauga Nishnaabeg) had settled at the mouth of the Humber, near Fort Frontenac at the east end of Lake Ontario and the Niagara Region and within decades were well established throughout southern Ontario. In 1736, the French estimated there were 60 men at Lake Saint Clair and 150 among small settlements at Quinte, the head of Lake Ontario, the Humber River, and Matchedash (Rogers 1978:761). This history is based almost entirely on oral tradition provided by Anishinaabek elders such as George Copway (Kahgegagahbowh), a Mississauga born in 1818 near Rice Lake who followed a traditional lifestyle until his family converted to Christianity (MacLeod 1992:197; Smith 2000). According to Copway, the objectives of campaigns against the Haudenosaunee were to create a safe trade route between the French and the Ojibwa, to regain the land abandoned by the Huron-Wendat. While various editions of Copway's book have these battles occurring in the mid-seventeenth century, common to all is a statement that the battles occurred around 40 years after the dispersal of the Huron-Wendat (Copway 1850:88; Copway 1851:91; Copway 1858:91). Various scholars agree with this timeline ranging from 1687, in conjunction with Denonville's attack on Seneca villages (Johnson 1986:48; Schmalz 1991:21–22) to around the mid- to late-1690s leading up to the Great Peace of 1701 (Schmalz 1977:7; Bowman 1975:20; Smith 1975:215; Tanner 1987:33; Von Gernet 2002:7–8).

Robert Paudash's 1904 account of Mississauga origins also relies on oral history, in this case from his father, who died at the age of 75 in 1893 and was the last hereditary chief of the Mississauga at Rice Lake. His account in turn came from his father Cheneebeesh, who died in 1869 at the age of 104 and was the last sachem or Head Chief of all the Mississaugas. He also relates a story of origin on the north shore of Lake Huron (Paudash 1905:7–8) and later, after the dispersal of the Huron-Wendat, carrying out coordinated attacks against the Haudenosaunee. Francis Assikinack, an Ojibwa of Manitoulin Island born in 1824, provides similar details on battles with the Haudenosaunee (Assikinack 1858:308–309).

Peace was achieved between the Haudenosaunee and the Anishinaabek Nations in August of 1701 when representatives of more than twenty Anishinaabek Nations assembled in Montreal to participate in peace negotiations (Johnston 2004:10). During these negotiations captives were exchanged and the Iroquois and Anishinaabek agreed to live together in peace. Peace between these nations was confirmed again at council held at Lake Superior when the Iroquois delivered a wampum belt to the Anishinaabek Nations.

From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there is no interruption to Anishinaabek control and use of southern Ontario. While hunting in the territory was shared, and subject to the permission of the various nations for access to their lands, its occupation was by Anishinaabek until the assertion of British sovereignty, the British thereafter negotiating treaties with them. Eventually, with British sovereignty, tribal designations changed (Smith 1975:221–222; Surtees 1985:20–21). According to Rogers (1978), by the twentieth century, the Department of Indian Affairs had divided the "Anishinaubag" into three different tribes, despite the fact that by the early eighteenth

century, this large Algonquian-speaking group, who shared the same cultural background, "stretched over a thousand miles from the St. Lawrence River to the Lake of the Woods." With British land purchases and treaties, the bands at Beausoleil Island, Cape Croker, Christian Island, Georgina and Snake Islands, Rama, Sarnia, Saugeen, the Thames, and Walpole, became known as "Chippewa" while the bands at Alderville, New Credit, Mud Lake, Rice Lake, and Scugog, became known as "Mississauga." The northern groups on Lakes Huron and Superior, who signed the Robinson Treaty in 1850, appeared and remained as "Ojibbewas" in historical documents.

In 1763, following the fall of Quebec, New France was transferred to British control at the Treaty of Paris. The British government began to pursue major land purchases throughout Ontario in the early nineteenth century and entered into negotiations with various Nations for additional tracts of land as the need arose to facilitate European settlement.

In 1805, the Mississaugas were granted one mile (approximately 1.6 km) on either side of the Credit River, Twelve Mile Creek and Sixteen Mile Creek. In 1818, the majority of the Mississauga Tract was acquired by the Crown excluding the lands tracts flanking the Credit River, Twelve Mile Creek and Sixteen Mile Creek. In 1820, the remainder of Mississauga land was surrendered except approximately 81 hectares (ha) along the Credit River (Heritage Mississauga 2012:18). In 1825-26 the Credit Indian Village was established as an agricultural community and Methodist mission near present day Port Credit (Heritage Mississauga 2009a; Mississaugas of the New Credit First Nation 2017a). By 1840 the village was under significant pressure from Euro-Canadian settlement that plans begun to relocate the settlement. In 1847 the Credit Mississaugas were made a land offer by the Six Nations Council to relocate at the Grand River. In 1847, 266 Mississaugas settled at New Credit, approximately 23 km southwest of Brantford. In 1848 a mission of the Methodist Church was established there by Rev. William Ryerson (Woodland Indian Cultural Education Centre 1985). Although the majority of the former Mississague Tract had been surrendered from the Mississauga by 1856 (Gould 1981), this does not exclude the likelihood that the Mississauga continued to utilise the landscape at large during travel (Ambrose 1982) and for resource extraction.

The eighteenth century saw the ethnogenesis in Ontario of the Métis, when Métis people began to identify as a separate group, rather than as extensions of their typically maternal First Nations and paternal European ancestry (Métis National Council n.d.). Métis populations were predominantly located north and west of Lake Superior, however, communities were located throughout Ontario (MNC n.d.; Stone and Chaput 1978:607,608). During the early nineteenth century, many Métis families moved towards locales around southern Lake Huron and Georgian Bay, including Kincardine, Owen Sound, Penetanguishene, and Parry Sound (MNC n.d.). Recent decisions by the Supreme Court of Canada (Supreme Court of Canada 2003; Supreme Court of Canada 2016) have reaffirmed that Métis people have full rights as one of the Indigenous people of Canada under subsection 91(24) of the Constitution Act, 1867.

The study area is within Treaty 13a, or the Toronto Purchase, signed on August 2, 1805 by the Mississaugas and the British Crown in Port Credit at the Government Inn. A provisional agreement was reached with the Crown on August 2, 1805, in which the Mississaugas ceded 70,784 acres of land bounded by the Toronto Purchase of 1787 in the east, the Brant Tract in the west, and a northern boundary that ran six miles back from the shoreline of Lake Ontario. The Mississaugas also reserved the sole right of fishing at the Credit River and were to retain a one mile strip of land on each of its banks,

which became the Credit Indian Reserve. On September 5, 1806, the signing of Treaty 14 confirmed the Head of the Lake Purchase between the Mississaugas of the Credit and the Crown (Mississaugas of the New Credit First Nation 2017b; Mississaugas of the New Credit First Nation 2001).

3.1.3 Historical Euro-Canadian Land Use: Township Survey and Settlement

Historically, the study area is located in the former Township of Toronto, County of Peel on part of Lot 32, Concession II North of Dundas Street (NDS); Lots 1-3, Range V NDS; Lot 1, Concession VI West of Centre Road (WCR); Lots 5-6, Concession VI WCR; Lots 1-7, Concession V WCR; and Lots 1-7, Concession IV WCR.

3.1.4 Toronto Township

The Township of Toronto was original surveyed in 1806 by Mr. Wilmot, Deputy Surveyor. The first settler in this Township, and also the County of Peel, was Colonel Thomas Ingersoll. The whole population of the Township in 1808 consisted of seven families, scattered along Dundas Street. The number of inhabitants gradually increased until the war broke out in 1812, which gave considerable check to its progress. When the war was over, the Township's growth revived and the rear part of the Township was surveyed and called the "New Survey." The greater part of the New Survey was granted to a colony of Irish settlers from New York City, who suffered persecution during the war (Walker and Miles 1877).

The Hamilton and Toronto Railway was formed in 1852, and in 1855, completed its lake shore route across the south end of Lot 11. In 1871, the railway was amalgamated with the Great Western Railway, which in turn, was amalgamated in 1882, with the Grand Trunk Railway. The Grand Trunk Railway was amalgamated in 1923, with Canadian National Railway (Andreae 1997:126–127).

Streetsville

The settlement of Streetsville began in 1819 on the banks of the Credit River, just east of Queen Street South (Mississauga Road) in the City of Mississauga when the Crown acquired all lands north of present-day Eglinton Avenue and commenced a formal survey from Timothy Street and Richard Bristol. As partial payment for his services, Street was granted over 4500 acres of land throughout Peel and Halton, including land along the Credit River, much of which would become the future village site (Heritage Mississauga 2009c). The first settler to receive a land grant in the area was James Glendinning. On April 21st, 1819 he received land along Mullet Creek (Heritage Mississauga 2009c). Many early settlers were descended from United Empire Loyalists who left the United States during the War of Independence, including the Barnhart, Birdsall, Embleton, Glendinning, Leslie, Lewis, Lightheart, Row(e), Rutledge, and Switzer families, amongst others. In 1821, Timothy Street built a grist mill along the Credit River, followed by a lumber and saw mill in 1822 (Heritage Mississauga 2009c; Heritage Mississauga 2011). During this time, Street lived in the Niagara Peninsula with his family (Manning 2008).

In 1821 a general store and trading post was opened by John Barnhart at the southwest corner of Queen Street and Pearl Street, called the Montreal House (Heritage Mississauga 2012; Manning 2008; Streetsville Women's Institute 1965). The first general store to serve the community still stands today as the oldest building in the area (Streetsville Women's Institute 1965). The Montreal House, together with

the mills, helped to attract many settlers and early businesses to the village, propelling early growth. As early as 1823, a bridge was built over the Credit River, making the community a key crossing and stopping point. The village officially became known as Streetsville in 1829 when the first post office opened (Heritage Mississauga 2009c). By 1835, grist mills, sawmills, a tannery, and several inns were in operation, making Streetsville the political and economic hub of the surrounding township (Heritage Mississauga 2009c). By 1850 Streetsville had a population of 1000 and was the most prosperous and populated village in Peel County (Heritage Mississauga 2009c).

Early directories list several mills, a tannery, foundry, cooperage, pottery, brickyard, blacksmiths, shoemakers, carriage shops, tinsmith, brewery, telegraph office, physicians, tailors, gunsmith, watchmaker, broom and pail factory, millinery, carpenter, furniture manufacturer, stave factory, bobbin factory, four churches, an Orange Lodge, and two schools (Heritage Mississauga 2009d). Streetsville also had several inns and hotels, including the Telegraph House, Globe Hotel, Tyrone Inn, Franklin House, Pacific Hotel, and Royal Hotel. The Telegraph House and the Globe Hotel are noted to be the most popular (Manning 2008).

The first library in Toronto Township is believed to have been organized in Streetsville by 1826, however it was in the 1850s when the Farmer's and Mechanics' Association was established to promote reading and education (Hicks 2008). In 1895 the Farmers and Mechanics Institute Library became the Streetsville Public Library, because of the Libraries Act passed by Ontario Legislature in 1882 that gave municipalities power to tax themselves to establish free libraries (Hicks 2008). Toronto Township's first high school, the Grammar School opened in Streetsville in 1851 at 321 Queen Street South (Heritage Mississauga 2012). The building served as a school for a century. John Embleton, the community surveyor, built a store at 213 Queen Street South in the 1840s. From 1854 to 1877 it housed the Library of the Farmer's and Mechanic's Institute, and between 1931 and 1952 it was used as the Post Office (Mississauga Library System 2018). The intersection of Queen Street and Main Street became the commercial hub of the community, blossoming around Barnhart's Montreal House and John Embleton's Store.

By 1858 the population of Streetsville had grown to 1,500. The same year Streetsville incorporated as a village, with John Street, Timothy's son, serving as the first Reeve (Heritage Mississauga 2009c). In the 1880s the village had wooden sidewalks. By 1910, the wooden sidewalks had been replaced with cement sidewalks which lasted into the 1960s. The stretch of road between Streetsville and Erindale was paved with cement and opened on September 16, 1931 (Hicks 2008).

By the early twentieth century, Streetsville's mills began to close, and by the 1940s, the last of Streetsville's many hotels had also closed. The community gradually changed from an industrial mill-town into a small businesses and services centre. By 1959, as Streetsville celebrated its centennial anniversary of incorporation, the population had risen to 4,400 (Manning 2008). In 1962 Streetsville achieved Town status, however this status was short lived as Streetsville was amalgamated into the City of Mississauga in 1974 (Heritage Mississauga 2009c).

Barberton

Barberton was a settlement established along Mississauga Road, historically located to the north of Eglinton Avenue, along the Credit River and on the east side of Mississauga Road. Barberton, also known

as Creditvale, had one of the approximately 60 mills along the Credit River established by 1851 (Wilkinson 2009). Following the purchase of William Comfort's small mill and farm in 1843, brothers William and Robert Barber grew their business and built the Toronto Woolen Mills into one of the largest textile manufacturers in the area (Wilkinson 2009; Ontario Heritage Trust 2018). The community that grew around the mill came to be known as Barberton, after William Barber and his brother Robert. Barberton never achieved village status, however 43 buildings were constructed by the Barber brothers for their mill workers (Wilkinson 2009). Following the decline of the brothers' fortunes, the community of Barberton was deserted. Most of the original 43 workers' homes are now gone (Ontario Heritage Trust 2018). Remnants of the original settlement include Barberton Road, which extends east from Mississauga Road and terminates at the Credit River, the mill bridge constructed in 1898, and a small recreational area (Wilkinson 2009).

Mississauga Road

Mississauga Road is one of Mississauga's oldest northwest-southwest thoroughfares that follows the route of a former Indigenous hunting and fishing trail (Skeoch 2000). The Indigenous trail that eventually became Mississauga Road was surveyed by John Embleton in the 1820s (Hicks 2008). By 1831, Mississauga Road had become a significant route for stagecoach service, connecting Springfield (Erindale) and Streetsville with Port Credit (Hicks 2009; City of Mississauga 1983). In 1836, Dundas Street became a toll road. A toll stop was established at Dundas Street and Mississauga Road (then called Streetsville Road), with revenue used to improve the roads (Hicks 2006). Several communities developed along Mississauga Road throughout the nineteenth century, including Port Credit and Streetsville, and other settlements such as Harris' Corners and Barberton which are no longer extant.

Between 1954 and 1956, the development of the Mississauga Golf and Country Club resulted in the re-routing of Mississauga Road (Fitzgibbon 2009). When the City of Mississauga was incorporated in 1974, the Region of Peel became responsible for major roadways including Mississauga Road (Hicks 2006). With urbanization and significant development on either side, Mississauga Road has become a major arterial road through the heart of Mississauga.

Credit River

The study area is within the Credit River Watershed, which drains an area of approximately 860 square kilometres from its headwaters in Orangeville, Erin, and Mono, passing through part of the Niagara Escarpment and the Oak Ridges Moraine, and draining into Lake Ontario at the town of Port Credit (Credit Valley Conservation 2009). The river was named "*Mis.sin.ni.he*" or "*Mazinigae-zeebi*" by the Mississaugas, and surveyor Augustus Jones believed this signified "the trusting creek," or could also be translated as "to write or give and make credit," while the French name used when the river was first mapped in 1757 was "*Riviere au Credit.*" These names refer to the fur trading period, when French, British, and Indigenous traders would meet along this river (Smith 1987:255–257; Rayburn 1997:84; Scott 1997:182; Gibson 2002:177; Robb et al. 2003:6). The Credit River was historically considered to be one of the best potential power sources for milling in all of southern Ontario, which led to the development of early saw and grist mill industries, and later textile mills, distilleries, bottling plants, and hydro-electric plants spawned communities throughout the river valley, typically close to the Niagara Escarpment (Town of Caledon 2009:7.1).

Credit Valley Railway

The Credit Valley Railway (CVR) (now part of the Milton GO Rail Corridor, CP Galt Subdivision) bisects the study area and was constructed between 1877 and 1879 to improve trade opportunities in southern Ontario (Town of Caledon 2009). The project was backed by George Laidlaw and was intended to connect Toronto with Orangeville via Streetsville. Construction began in 1874 and over several subsequent years several branches were added to the proposed line. The first section of track from Parkdale (Toronto) to Milton was opened in 1877. In 1873, survey work was completed, and track was first laid in 1876. Construction on the railway reached the Forks of the Credit by 1879 with a station at the northern end of the longest curved timber trestle of the time, which spanned 1,146 feet through the river valley at a height of 85 feet (Town of Caledon 2009:7.30). The line was completed in 1881 but nearly bankrupted the company. It was established in direct competition with the Toronto, Grey and Bruce Railway in the hopes of stimulating trade and economic opportunities in the outlying areas. In 1883 the line was taken over by the Canadian Pacific (CP) Railway (Heritage Mississauga 2009b; Town of Caledon 2009).

3.1.5 Review of Historical Mapping

The 1859 *Tremaine's Map of the County of Peel* and the 1877 *Illustrated Historical Atlas of the County of Peel* were reviewed to examine the study area from the nineteenth century.

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historic mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

Historically, the study area is located in the former Township of Toronto, County of Peel on part of Lot 32, Concession II North of Dundas Street (NDS); Lots 1-3, Range V NDS; Lot 1, Concession VI West of Centre Road (WCR); Lots 5-6, Concession VI WCR; Lots 1-7, Concession V WCR; and Lots 1-7, Concession IV WCR.

Details of historical property owners and historical features in the study area are listed in Table 1.

Table 1: Nineteenth-century property owner(s) and historical features(s) within the study area

		1859 Tremaine's Map		*1877 Illustrated Historical Atlas*	
Lot #	**Con #**	**Property Owner(s)**	**Historical Feature(s)**	**Property Owner(s)**	**Historical Feature(s)**
32	II NDS	Chas. Crawford	Eglinton Avenue West	Mary F. Crawford	Structure Orchard Eglinton Avenue West
1	Range V NDS	Hiram Crawford	Eglinton Avenue West	John Burns	Structure Orchard Eglinton Avenue West
2		Wm. Blair	Eglinton Avenue West	Andrew A. Blair	Structure Orchard Eglinton Avenue West
3		Wm. Douglas	Eglinton Avenue West Mississauga Road	Geo. Dunning	Eglinton Avenue West Mississauga Road
1	VI WCR	Wm. Devine	Eglinton Avenue West Erin Mill Parkway	Jno. S. Hanna	Eglinton Avenue West Erin Mills Parkway
5		Danl. Douglas	Erin Mills Parkway	Donald Douglas	Erin Mills Parkway Britannia Road West
6		Peter Cook	Erin Mills Parkway Britannia Road West	Peter Cook	Erin Mills Parkway Britannia Road West
1	V WCR	Thos. Devine Dougs. Montgomery	Eglinton Avenue West Erin Mills Parkway Eglinton Avenue West Mississauga Road	Mich Devine James Montgomery	Eglinton Avenue West Mississauga Road Mullett Creek
2		None	Mississauga Road	None	Mississauga Road Credit Valley Railway Mullett Creek
3		Jno. Sterling	Streetsville	None	Streetsville
4		None	Streetsville	None	Streetsville
5		Henry Rutledge	Erin Mills Parkway Britannia Road West Mullett Creek	Donald Douglas Joseph Rutledge	Britannia Road West Britannia Road West Credit Valley Railway
6		John C. Hyde	Erin Mills Parkway Britannia Road West Mullett Creek	John Rutledge	Britannia Road West Credit Valley Railway
7		T.S. John Eakins Robt. Ramsay	Residence Mississauga Road Mississauga Road Mississauga Road	Jno Eakins Robt. Ramsay	Residence Orchard Mississauga Road Orchard Mississauga Road

1	IV WCR	None	Eglinton Avenue West Mississauga Road	W. Barber	Residence Mississauga Road
2		None	Mississauga Road	None	Mississauga Road Credit Valley Railway
3		None	Streetsville	None	Streetsville
4		None	Streetsville	None	Streetsville
5		Henry Rutledge Richard Caslor	Streetsville Britannia Road West Credit River Residence Britannia Road West Credit River	None Solomon Caslor	Streetsville Britannia Road West Mississauga Road Residence Orchard Britannia Road West Credit River
6		Jos. J. Rutledge	Mississauga Road Britannia Road West Credit River	Jno. Rutledge	Mississauga Road Britannia Road West Credit Valley Railway
7		Chris Rowe Robt. Ramsay	Mississauga Road Mississauga Road	Wm. Hardy Robert Ramsay	Orchard Mississauga Road Mississauga Road

The 1859 *Tremaine's Map* (Figure 3) shows that the community of Streetsville is depicted as a densely populated village on either side of Queen Street South between Britannia Road West and Church Street. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway were all historically surveyed roads. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, and Britannia Road West are depicted following their present alignments and appear to be well-established roadways. Erin Mills Parkway on the map is depicted as a straight northwest to southeast road to the west of the community of Streetsville. The study area travels along the historically surveyed roadways, with the one alignment passing through the centre of Streetsville. The branches of the study area that follow Britannia Road West and Eglinton Avenue West passes through a rural agricultural context with minimal houses or other structures depicted along the alignments. The eastern end of the northern portions of the alignments are illustrated as intersecting with the Credit River, which meanders from northwest to southeast and is to the east of Streetsville.

The 1877 *Illustrated Historical Atlas* (Figure 4) illustrates that the Streetsville village core has expanded substantially by this period. The Credit Valley Railway is depicted on the map following a north-south alignment west of Queen Street South and intersecting with the study area along Queen Street South and Britannia Road West. Streetsville is surrounded by agricultural land, however development can be seen extending south as properties are already subdivided along the west side of Queen Street South and Mississauga Road. Clusters of structures are illustrated on the lot occupying the north corner of the intersection of present-day Mississauga Road and Eglinton Avenue West. Mullett Creek is depicted on the map as intersecting the study area along Britannia Road West and Eglinton Avenue West. The creek travels from the northwest to the southeast in the western part of Streetsville to the west of Mississauga Road, Queen Street North, and Queen Street South.

In addition to nineteenth-century mapping, historical topographic mapping and aerial photographs from the twentieth century were examined. This report presents maps and aerials photographs from 1909, 1954, 1973, and 1994. These do not represent the full range of maps consulted for the purpose of this study but were judged to cover the full range of land uses that occurred in the area during this period.

The 1909 topographic map (Figure 5) depicts that there had been some development along the study areas by this time with additional stone or brick and wooden houses being illustrated along the routes of the alignments. The former Credit Valley Railway is now the Canadian Pacific Railway (CPR), with Streetsville Junction located near the intersection of Britannia Road West and Queen Street North. The eastern end of the portion of the study area along Britannia Road West is no longer depicted as intersecting with the Credit River. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway are all depicted as unmetalled roads.

The 1954 aerial photograph (Figure 6) shows that the settlement area of Streetsville has retained its rural context into the mid-twentieth century. The areas outside of the village core remain largely agricultural, though development of residential subdivisions have begun southeast of the intersection of Queen Street South and Britannia Road West. The roadways follow the alignments previously described. Some additional development in Streetsville and the area around Streetsville Junction is depicted with some outward growth from Mississauga Road, Queen Street North, and Queen Street South.

The 1973 topographic map (Figure 7) illustrates that there was significant development both within and outside the Streetsville village core. This map labels Eglinton Avenue West as Base Line Road West and Erin Mills Parkway as Fifth Line West. The roadways are all depicted as two-lane hard surface, all weather roads. The area around Eglinton Avenue West remains mostly a rural agricultural context.

The 1994 topographic map (Figure 8) demonstrates that there had been growth and development of the Streetsville area in the late twentieth century which has now encompassed most of the land adjacent to the study areas. The areas north of Eglinton Avenue West between Erin Mills Parkway and Mississauga Road; and north of Britannia Road West between Erin Mills Parkway and Mississauga Road are more sparsely developed. Erin Mills Parkway is now illustrated in its present alignment travelling mostly northwest to southeast with a slight curve around the Vista Heights community.

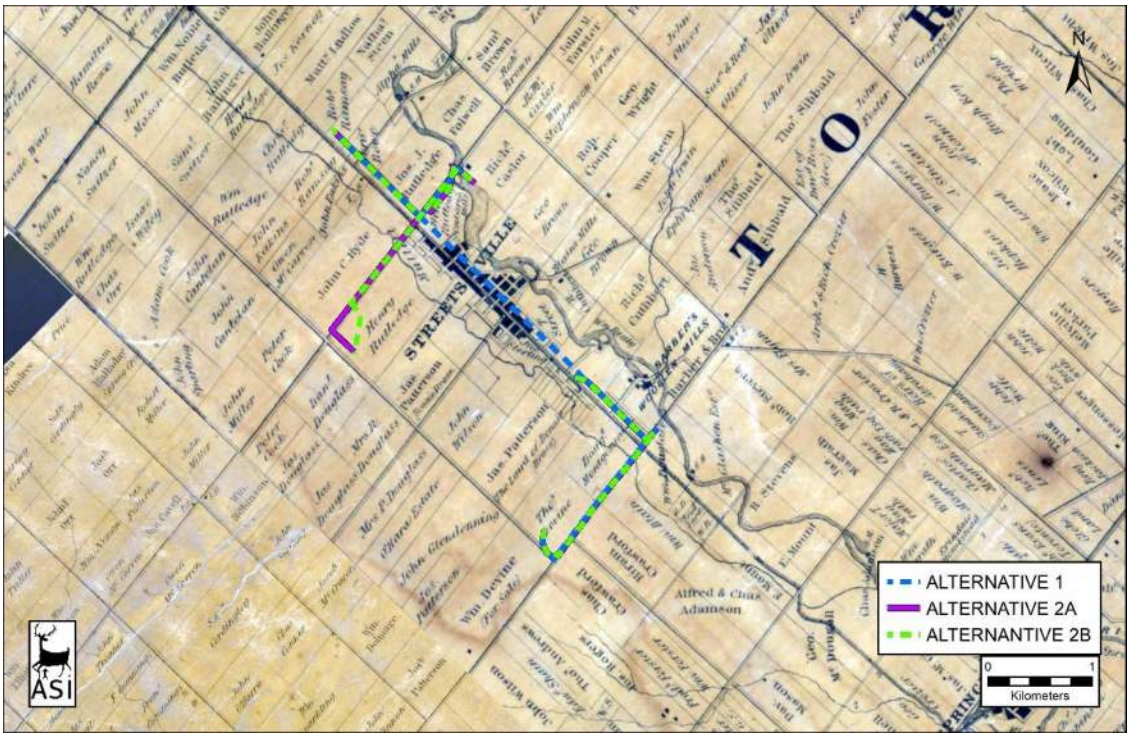

Figure 3: The study area overlaid on the 1859 *Tremaine's Map of the County of Peel*

Base Map: Tremaine 1859

Figure 4: The study area overlaid on the 1877 Illustrated Historical Atlas of the County of Peel

Base Map: Walker and Miles 1877

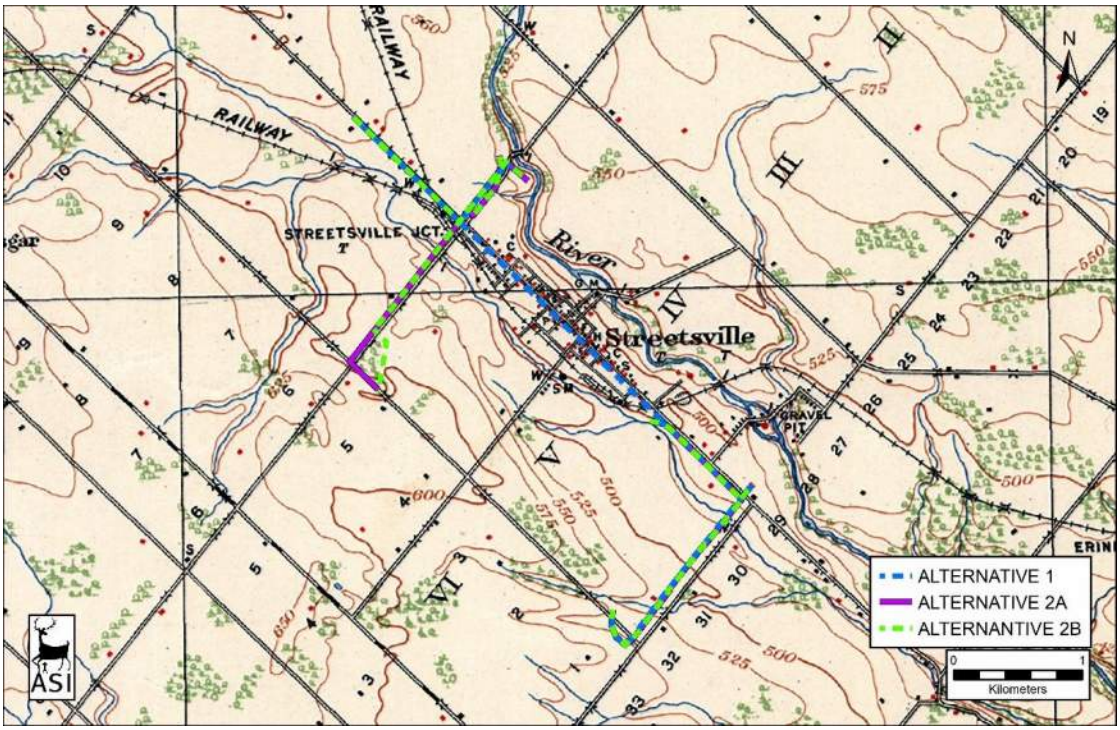

Figure 5: The study area overlaid on the 1909 Brampton NTS map

Base Map: NTS Sheet 35 (Department of Militia and Defence 1909)

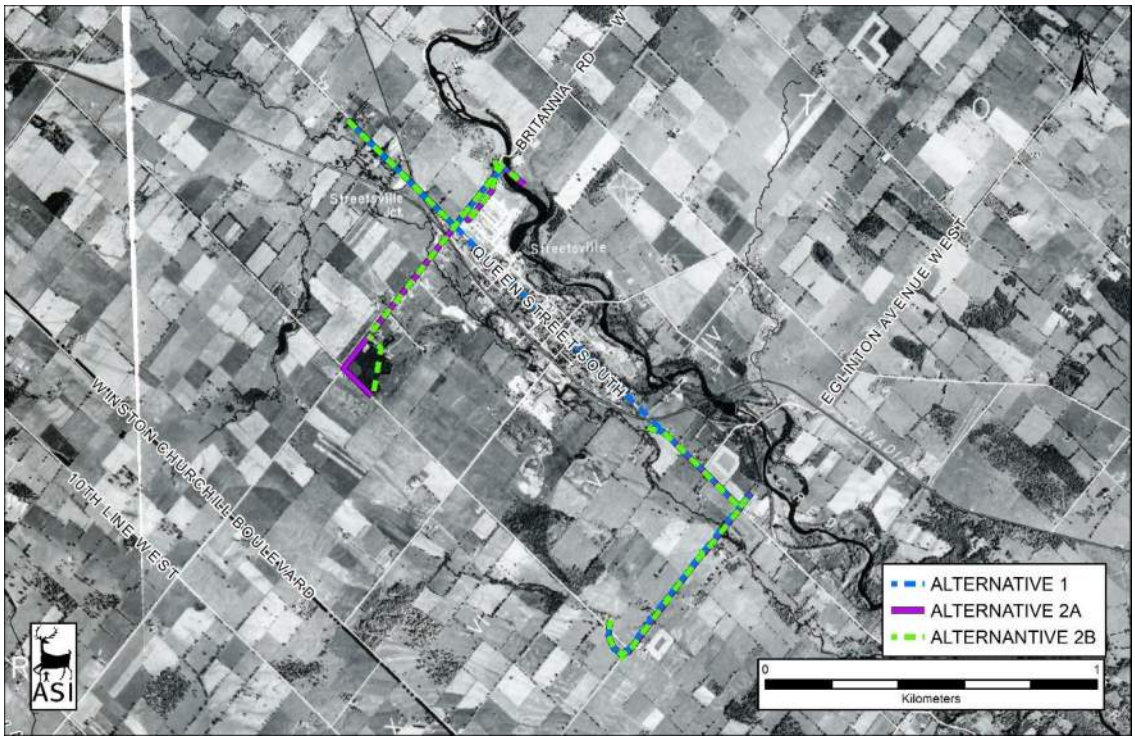

Figure 6: The study area overlaid on the 1954 aerial photograph

Reference: Plate 435.793 (Hunting Survey Corporation Limited 1954)

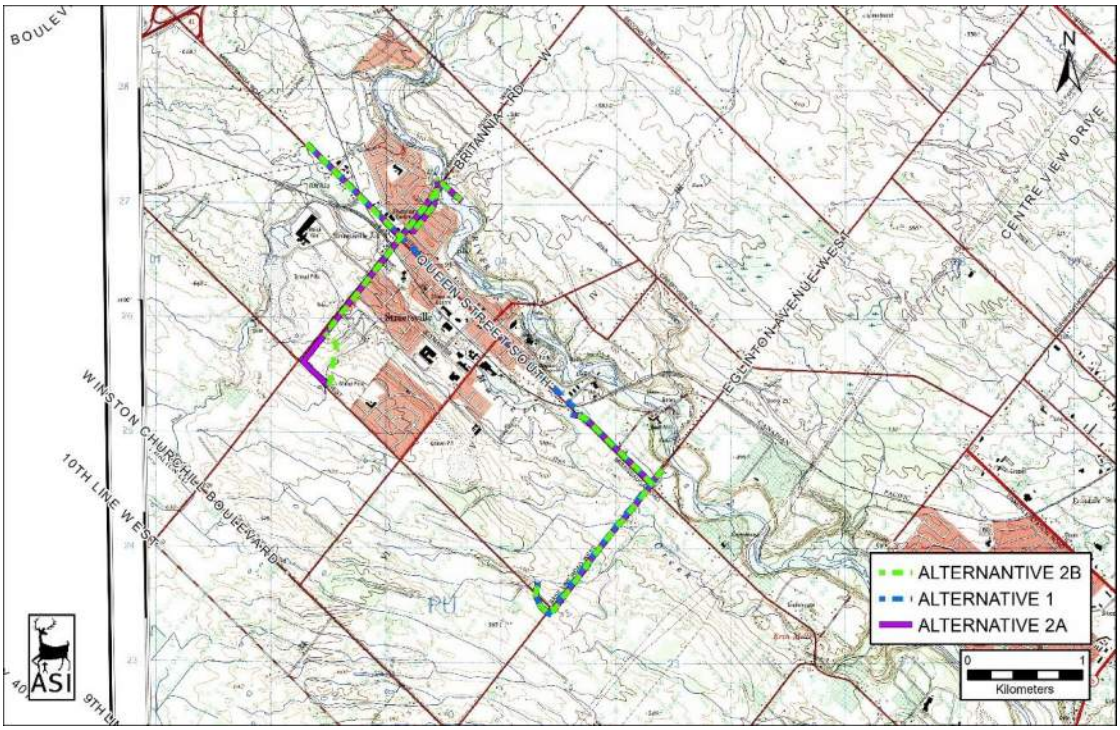

Figure 7: The study area overlaid on the 1973 Streesville NTS map
Base Map: NTS Sheet No. 30 M/12B (Department of Energy, Mines and Resources 1973)

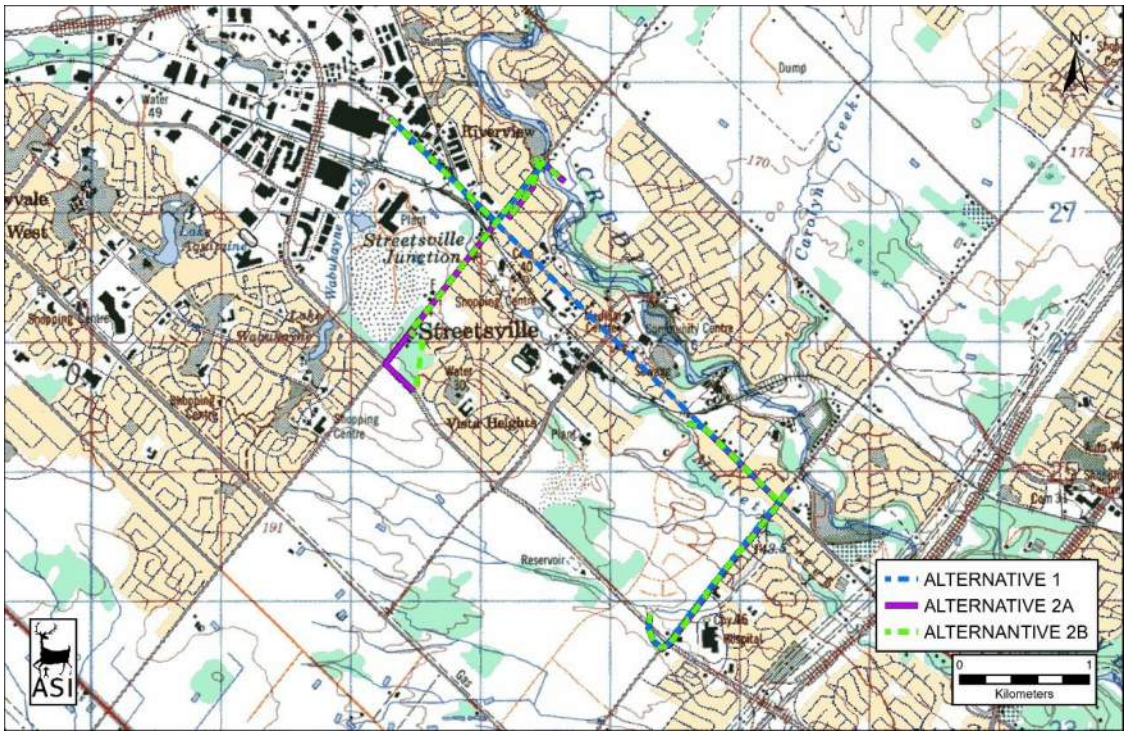

Figure 8: The study area overlaid on the 1994 Brampton NTS map
Base Map: NTS Sheet 30 M/12 (Department of Energy, Mines and Resources 1994)

3.2 Existing Conditions

3.2.1 Review of Existing Heritage Inventories

In order to make an identification of existing cultural heritage resources within the study area, a number of resources were consulted (MTCS 2016). They include:

- The City of Mississauga's *Municipal Register of Property of Cultural Heritage Value or Interest* provides a list of cultural heritage resources that are designated under Part IV and V of the *Ontario Heritage Act* and undesignated properties[2];
- *Cultural Landscape Inventory: City of Mississauga*[3]
- The inventory of Ontario Heritage Trust easements[4];
- The Ontario Heritage Trust's *Ontario Heritage Plaque Guide*, an online, searchable database of Ontario Heritage Plaques[5];
- *Ontario's Historical Plaques* website[6];
- Inventory of known cemeteries/burial sites in the Ontario Genealogical Society's online database[7];
- Parks Canada's, *Canada's Historic Places* website: available online, the searchable register provides information on historic places recognized for their heritage value at the local, provincial, territorial, and national levels[8];
- Parks Canada's *Directory of Federal Heritage Designations*, a searchable on-line database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses;[9]
- Canadian Heritage River System. The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage[10]; and,
- United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites[11].

In addition, the following stakeholders were contacted to gather information on potential cultural heritage resources, active and inactive cemeteries, and areas of identified Indigenous interest within and/or adjacent to the study area:

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[2] Reviewed 18 April 2019 (https://www7.mississauga.ca/documents/culture/heritage/2018-07-01_Mississauga_Heritage_Register_Web.pdf)
[3] Reviewed 24 April 2019 (http://www5.mississauga.ca/pdfs/Cultural_Landscape_Inventory_Jan05.pdf)
[4] Reviewed 24 April 2019 (http://www.heritagetrust.on.ca/en/index.php/property-types/easement-properties)
[5] Reviewed 24 April 2019 (https://www.heritagetrust.on.ca/en/index.php/online-plaque-guide)
[6] Reviewed 24 April 2019 (www.ontarioplaques.com)
[7] Reviewed 24 April 2019 (http://vitacollections.ca/ogscollections/2818487/data?grd=3186)
[8] Reviewed 24 April 2019 (http://www.historicplaces.ca/en/pages/about-apropos.aspx)
[9] Reviewed 24 April 2019 (http://www.pc.gc.ca/apps/dfhd/search-recherche_eng.aspx)
[10] Reviewed 24 April 2019 (http://chrs.ca/the-rivers/)
[11] Reviewed 24 April 2019 (http://whc.unesco.org/en/list/)

- Municipal consultation regarding the location of previously identified cultural heritage resources within and adjacent to the study area was carried out with Paula Wubbenhorst, Heritage Planner, City of Mississauga on 12 April, 29 April, 1 May, and 2 May, 2019.
- Karla Barboza, (A) Team Lead, Heritage, Ministry of Tourism, Culture and Sport, was also contacted to gather any information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email communication 12 April 2019). A response confirmed that there are no identified Provincial Heritage Properties within or adjacent to the study area.
- Kevin De Mille, Heritage Planner, Ontario Heritage Trust, was also contacted to gather any information on potential cultural heritage resources or concerns within and/or adjacent to the study area (email communication 12 April 2019). A response confirmed that there are no conservation easements or Trust-owned properties within or adjacent to the study area.

Based on the review of available municipal, provincial, and federal data, there are thirteen previously identified cultural heritage resources within and/or adjacent to the study area.

3.2.2 Peel West Trunk Diversions Study Area– Field Review

A field review of the study area was undertaken by Peter Carruthers of ASI, on 16 May 2019, to document the existing conditions of the study area. The field review was preceded by a review of available current and historical aerial photographs and maps (including online sources such as Bing and Google maps). These large-scale maps were reviewed for any potential cultural heritage resources which may be extant in the study area. The field review was conducted to confirm the location and condition of previously identified built heritage resources and cultural heritage landscapes, and identify any additional ones based on the criteria outlined in Section 2.2. The existing conditions of the study area are described below. Identified cultural heritage resources are discussed in Section 3.2.3 and are mapped in Section 8.0 of this report.

The study area consists of three alternative alignments for the West Trunk Sewer Diversions. Alignment 1: Single Version Concept, Alignment 2a: Two-Leg Diversion Concept, and Alignment 2b: Alternate Two-Leg Diversion Concept. Photographic plates of the study area for the three proposed alignments are provided below (Plates 1-20).

Alignment 1: Single Diversion Concept is primarily focused on Mississauga Road, Queen Street North, and Queen Street South (a single road, for ease of understanding in this section, Mississauga Road will be used when discussing this roadway); with a branch along Britannia Road West, starting east of the intersection with Queen Street North; and another along Eglinton Avenue West east of Mississauga Road to west of Erin Mills Parkway. The alignment is approximately 4.14 kilometres in length along Mississauga Road. Mississauga Road is oriented in a northwest-southeast alignment and features two lanes of northwest and southeast-bound vehicular traffic. Mississauga Road also has sidewalks and curbs on both sides. The portion of the study area that travels along Britannia Road West is approximately 620 metres in length from its intersection with Mississauga Road. Britannia Road West is oriented in a northeast to southwest alignment and features four lanes of northeast and southwest-bound vehicular traffic with curbs and sidewalks on both sides. The eastern end of the branch travels southeast to the Credit River. Alignment 1 was selected as the preliminary preferred alternative in February 2020, (hereafter referred to as Alternative 1).

Alignment 2a: Two-Leg Diversion Concept has a northern portion and southern portion. The northern portion is primarily focused on Britannia Road West, from the Credit River to Erin Mills Parkway. It has a branch that begins at the intersection of Britannia Road West and Queen Street North and travels north. The southern portion is primarily focused on Eglinton Avenue West from just east of Mississauga Road to Erin Mills Parkway. A branch of this portion of the study area travels north along Mississauga Road from the intersection of Eglinton Avenue West and Mississauga Road.

Alignment 2b: Alternate Two-Leg Diversion Concept also has a northern portion and southern portion. The southern portion of this alignment is the same as Alignment 2a. The northern portion is generally the same as 2a with the variation being on its western end where it travels south down Hogan Drive and through Turney Woods Park to Erin Mills Parkway.

Plate 1: Northern section of the study area, looking south on Mississauga Road towards Alpha Mills Road.

Plate 2: Northern section of the study area, looking north on Mississauga Road from Alpha Mills Road.

Plate 3: Commercial structures fronting on Mississauga Road, looking north from Britannia Road.

Plate 4: Intersection of Queen Street and Britannia Road, looking southwest.

Plate 5: Intersection of Queen Street and Britannia Road, looking southeast.

Plate 6: View of Britannia Road at Pioneer Drive, looking northeast.

Plate 7: View of Britannia Road at Turney Drive, looking southwest.

Plate 8: Intersection of Erin Mills Parkway and Britannia Road, looking southwest.

Plate 9: View of Britannia Road west of the Credit River, looking southwest.

Plate 10: View of the Credit River south of Britannia Road, looking south.

Plate 11: View of Erin Mills Parkway from north of Eglinton Avenue, looking southeast.

Plate 12: Eglinton Avenue, looking southwest from Credit Valley Road towards Erin Mills Parkway.

Plate 13: Intersection of Eglington Avenue and Mississauga Road, looking southwest.

Plate 14: Mississauga Road, looking southeast towards Eglinton Avenue.

Plate 15: Mississauga Road, looking southeast from Melody Drive.

Plate 16: Queen Street, looking northwest from at-grade rail crossing on the GO Milton Rail Corridor.

Plate 17: Residences on Queen Street in Streetsville, looking northwest from Reid Drive.

Plate 18: Queen Street, looking northwest from south of Beech Street in Streetsville.

Plate 19: Queen Street, looking northwest from Thomas Street in Streetsville.

Plate 20: Queen Street, looking northeast from Ontario Street.

3.2.3 Peel West Trunk Sewer Diversions Study Area– Identified Cultural Heritage Resources

Based on the results of the background research and field review, thirteen cultural heritage resources (including 7 BHRs and 6 CHLs) were identified within and adjacent to the study area. These built heritage resources and cultural heritage landscapes were all previously identified in the background research, with no additional potential cultural heritage resources identified during the field review. The cultural heritage resources include: two streetscapes, a watercourse, seven residences, two natural areas, and one former farmscape. The resources are summarized in Table 2. A detailed inventory of these cultural heritage resources within and/or adjacent to the study area are presented in Section 7.0 and mapping of the features is provided in Section 8.0.

Table 2: Summary of the existing and potential built heritage resources (BHRs) and cultural heritage landscapes (CHL) in the study area

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition
CHR 1	CHL	Streetsville Village Core	Streetscape	Identified in the 2005 *Cultural Landscape Inventory*
CHR 2	CHL	Mississauga Road Scenic Route	Streetscape	Identified in the 2005 *Cultural Landscape Inventory*
CHR 3	CHL	Credit River Corridor	Watercourse	Identified in the 2005 *Cultural Landscape Inventory*
CHR 4	BHR	21 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*
CHR 5	BHR	23 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*
CHR 6	BHR	25 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*
CHR 7	BHR	27 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*
CHR 8	BHR	24 Ardsley Street	Residence	Listed in the *Heritage Register for Mississauga*
CHR 9	BHR	4695 Beaufort Terrace	Residence	Listed in the *Heritage Register for Mississauga*

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition
CHR 10	CHL	1700 Britannia Road West	Former Farmscape	Listed in the *Heritage Register for Mississauga*
CHR 11	BHR	2275 - 2285 Britannia Road West	Residence	Designated Part IV
CHR 12	CHL	1760 The Chase	Natural Area	Listed in the *Heritage Register for Mississauga*
CHR 13	CHL	1745 Thorny Brae Place	Natural Area	Listed in the *Heritage Register for Mississauga*

3.3 Screening for Potential Impacts

To assess the potential impacts of the undertaking, the identified cultural heritage resource is considered against a range of possible impacts as outlined in the document entitled *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (MTC September 2010) which include:

- Destruction of any, or part of any, significant heritage attribute or feature (III.1).
- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance (III.2).
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden (III.3).
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship (III.4).
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature (III.5).
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces (III.6).
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern or excavation (III.7)

Several additional factors are also considered when evaluating potential impacts on identified cultural heritage resources. These are outlined in a document set out by the Ministry of Culture and Communications (now Ministry of Tourism, Culture and Sport) and the Ministry of the Environment entitled *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (October 1992) and include:

- Magnitude: the amount of physical alteration or destruction which can be expected;
- Severity: the irreversibility or reversibility of an impact;
- Duration: the length of time an adverse impact persists;
- Frequency: the number of times an impact can be expected;
- Range: the spatial distribution, widespread or site specific, of an adverse impact; and
- Diversity: the number of different kinds of activities to affect a heritage resource.

Where any above-ground cultural heritage resources which may be affected by direct or indirect impacts are identified, appropriate mitigation measures should be developed. This may include completing a heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

The preferred alternative for the Peel West Trunk Sewer Diversion was selected in February 2020, with Alternative 1 (focused on Mississauga Road/ Queen Street North and South) carried forward for consideration. All potential cultural heritage resources that are within or adjacent to the main alignment of Alternative 1 and within or adjacent to any of the six staging areas (SA0, SA1, SA2.3, SA4.1, SA10, and SA17) are screened for potential impacts in Section 3.3.1. As the installation of the main trunk sewer is anticipated to be completed by tunnelling, no direct impacts to any potential cultural heritage resources within or adjacent to the main alignment are anticipated (email communication with Hatch, 17 March 2020). Above-ground disturbance including excavating, grading, and staging is anticipated to be confined to the six staging areas, with potential direct and indirect impacts for any potential cultural heritage resources identified within or adjacent to these six staging areas. Alternative 1 mapping including mapping of each staging area is provided in Figure 2 with the location of potential cultural heritage resources in relation to the staging areas provided in Section 8.0.

3.3.1 Potential Impacts of the Proposed Undertaking

The proposed undertaking for the Peel West Trunk Sewer Diversions Municipal Class EA involves the construction of a trunk sewer to be built along Mississauga Road (including Queen Street North and Queen Street South); with a branch along Britannia Road West, starting east of the intersection with Queen Street North; and another along Eglinton Avenue West east of Mississauga Road to west of Erin Mills Parkway. Mapping of the preferred alternative and associated staging areas is provided in Figure 2, and study area mapping with photographic plate locations and the location of the identified cultural heritage resource is provided in Section 8.0. The staging area boundaries depicted represents the proposed limit of physical impact and of all permanent and temporary easements.

Table 3 outlines the potential impacts on all identified cultural heritage resources within and adjacent to the overall study area. Table 4 outlines the impacts to identified cultural heritage resources for each staging area.

Table 3: Preferred Alternative - Potential Impacts to Cultural Heritage Resources

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
CHR 1	• Alternative 1 is immediately adjacent to CHR 1. No direct impacts are anticipated as a result of tunneling under this CHR. • Indirect impacts related to SA4.1 include temporary construction disturbances adjacent to CHR 1. No direct impacts to CHR 1 are anticipated as a result of SA4.1.	• Suitable mitigation measures include establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources. • Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
		identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.
CHR 2	• Alternative 1 is immediately adjacent to CHR 2. No direct impacts are anticipated as a result of tunneling under this CHR.	• Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.
	• Direct impacts to CHR 2 are anticipated as a result of staging areas SA2.3 and 4.1.	• Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.
	• Indirect impacts to CHR 2 related to SA2.3 include construction-related disturbance in the staging area directly adjacent to the listed property at 6300 Mississauga Road. Indirect impacts include soil disturbance and excavation of a tunneling shaft adjacent to the listed property, however no direct impacts to the listed property at 6300 Mississauga Road are anticipated.	• As the property at 6300 Mississauga Road is Listed in the *Heritage Register for Mississauga* and there are indirect impacts anticipated, a resource-specific Heritage Impact Assessment (HIA) may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, given that there will be no direct impacts and construction will be adjacent to the listed property, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case.
	• Direct impacts to CHR 2 related to SA4.1 include a temporary staging area outside the Queen Street North ROW on the listed property at 3 Queen Street North. Direct but temporary construction impacts are anticipated to be confined to the parking lot, with no permanent impacts to the structure anticipated.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to the listed property at 3 Queen Street North. • As the property at 3 Queen Street North is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official*

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
	• Direct temporary impacts are also anticipated in the Queen Street North ROW adjacent to 3 Queen Street North through the excavation of a tunneling shaft as part of SA4.1.	*Plan* clause 7.4.1.12. However, given that there will be no direct impacts to the structure and is anticipated to be confined to the parking lot adjacent to the ROW and temporary in duration, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case.
	• Indirect impacts to CHR 2 related to SA4.1 include a temporary staging area adjacent to listed properties at4, 6, and 14, and 17 Queen Street North and 1965 Britannia Road West. No direct impacts to these properties are anticipated.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to these adjacent cultural heritage resources. • Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these adjacent cultural heritage resources.
	• Direct impacts to CHR 2 related to SA10 are anticipated with the staging area within the listed property at 5267 Mississauga Road. No structure is visible on the property, and direct impacts are anticipated to include grading, vegetation removal, and excavation of shaft location within the staging area.	• As the property at 5267 Mississauga Road is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, given that there are no structures or identifiable cultural heritage attributes on the property, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts.
CHR 3	• Alternative 1 is will result in tunneling within CHR 3. Direct impacts such as soil excavation and the installation of sewer pipe are anticipated. However, these impacts are anticipated to be located underground and not visible to the public, and as such, are considered minimally impactful from a cultural heritage perspective. • Direct impacts to CHR 3 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area SA1.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHR 3. • Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these adjacent cultural heritage resources. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts.

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
	• Indirect impacts to CHR 3 are anticipated at SA1 due to property acquisitions in the form of permanent easements. • Indirect impacts to CHR 3 are anticipated at SA10 as it is adjacent to CHR 3. No direct impacts to CHR 3 are anticipated at SA10.	
CHR 4	• No impacts to CHR 4 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 4.	• n/a
CHR 5	• No impacts to CHR 5 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 5.	• n/a
CHR 6	• No impacts to CHR 6 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 6.	• n/a
CHR 7	• No impacts to CHR 7 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 7.	• n/a
CHR 8	• No impacts to CHR 8 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 8.	• n/a
CHR 9	• No direct impacts to CHR 9 are anticipated as a result of Alternative 1 tunneling or any staging areas. • Alternative 1 tunneling is anticipated to be under the Eglinton Avenue West ROW adjacent to CHR 9	• n/a
CHR 10	• Direct impacts to CHR 10 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area SA1. • Indirect impacts to CHR 10 are anticipated at SA1 due to property acquisitions in the form of permanent easements.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHR 10. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts. • As the property at 1700 Britannia Road West (CHR 10) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. • Given there are no structures or apparent landscape features of significant cultural heritage value on CHR 10, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case.

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
CHR 11	• No impacts to CHR 11 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 11.	• n/a
CHR 12	• No direct impacts to CHR 12 are anticipated as a result of Alternative 1 tunneling or any staging areas. • Alternative 1 tunneling is anticipated to be under the Eglinton Avenue West ROW adjacent to CHR 12	• n/a
CHR 13	• No impacts to CHR 13 are anticipated as neither Alternative 1 tunneling or any staging areas are adjacent to CHR 13.	• n/a

Table 4: Potential Impacts to Cultural Heritage Resources for Staging Areas (SA)

Staging Area (SA)	Potential Impact(s)
SA0	No impacts
SA1	Direct impacts to CHR 10 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area. Indirect impacts to CHR 10 are anticipated at SA1 due to property acquisitions in the form of permanent easements.
SA2.3	SA2.3 is within CHL 2, with impacts anticipated directly adjacent to listed property at 6300 Mississauga Road. No direct or indirect impacts anticipated to this listed property.
SA4.1	SA4.1 is within CHL 2, within ROW to the northeast of Britannia Road West and Queen Street North and is anticipated to directly impact the listed property at 3 Queen Street North. Temporary construction impacts are anticipated to the parking lot of the listed property, with no permanent impacts to the structure anticipated. Direct impacts are anticipated in the Queen Street North ROW adjacent to 3 Queen Street North with tunneling shaft excavation. SA4.1 is also adjacent to listed properties at 17 Queen Street North and 1965 Britannia Road West, with indirect impacts to both anticipated. SA4.1 is also adjacent to listed properties at 4, 6, and 14 Queen Street North on the southwest side of Queen Street North, with indirect impacts anticipated. SA4.1 is adjacent to CHR 1, but not anticipated to result in permanent impacts and only subject to temporary construction-related disturbances.
SA10	SA10 is within CHL 2, with the staging area within the listed property at 5267 Mississauga Road. No structure is visible on the property, and direct impacts are anticipated to include grading, vegetation removal, and excavation of shaft location within the staging area. SA10 is adjacent to listed properties at 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard, with no direct or indirect impacts anticipated. SA10 is also adjacent to CHR 3, the Credit River, with no direct or indirect impacts anticipated.
SA17	No impacts

Direct impacts to CHRs 2,3 and 10 are anticipated as a result of the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHRs that are anticipated to be directly impacted include:

CHR 2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
CHR 10: 1700 Britannia Road West (SA1)

As the property at 3 Queen Street North (part of CHR 2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

As the properties at 5267 Mississauga Road (part of CHR 2), and 1700 Britannia Road West (CHR 10) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHR 2) and 1700 Britannia Road (CHR 10), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

Direct impacts to CHR 3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHR 3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHR 3.

Indirect impacts to CHRs 1, 2 and 3 are anticipated as a result of their location adjacent to the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHRs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:

CHR 1: 3 Queen Street South (listed, adjacent to SA4.1)
CHR 2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
CHR 3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified

cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West,5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.

4.0 CONCLUSIONS

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating to the early nineteenth century. A review of federal registers and municipal and provincial inventories revealed that there are thirteen previously identified features of cultural heritage value (including 7 BHRs and 6 CHLs) within and/or adjacent to the study area. No additional cultural heritage resources were identified during field review.

Key Findings

- A field review of the study area confirmed that there are thirteen cultural heritage resources within and/ or adjacent to the study area, including three identified in the 2005 *Cultural Landscape Inventory*¸ nine listed in the *Heritage Register for Mississauga*, and one designated under Part IV of the *Ontario Heritage Act*.

- The identified cultural heritage resources include: two streetscapes (CHR 1, 2); one watercourse and associated lands (CHR 3); seven residences (CHR 4, 5, 6, 7, 8, 9, 11); two natural areas (CHR 12 and 13); and one former farmscape (CHR 10).

- The identified cultural heritage resources are historically and contextually associated with early-nineteenth to mid-twentieth century land use patterns in Streetsville and the former Toronto Township.

Impact Assessment

- Direct impacts to CHRs 2,3 and 10 are anticipated as a result of the preferred alternative and required staging areas. Specific properties within these CHRs that are anticipated to be directly impacted include:
  - CHR 2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
  - CHR 10: 1700 Britannia Road West (SA1)

- Indirect impacts to CHRs 1, 2,3 are anticipated as a result of their location adjacent to the preferred alternative and required staging areas. Specific properties within these CHRs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
  - CHR 1: 3 Queen Street South (listed, adjacent to SA4.1)
  - CHR 2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
  - CHR 3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)
- Where impacts to properties or adjacent to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. Properties that may require a HIA include:
  - 1700 Britannia Road West (listed, within SA1);
  - 3 Queen Street South (listed, adjacent to SA4.1);
  - 6300 Mississauga Road (listed, adjacent to SA2.3);
  - 3 Queen Street North (listed, within SA4.1);
  - 4 Queen Street North (listed, adjacent to SA4.1);
  - 6 Queen Street North (listed, adjacent to SA4.1);
  - 14 Queen Street North (listed, adjacent to SA4.1);
  - 17 Queen Street North (listed, adjacent to SA4.1);
  - 1965 Britannia Road West (listed, adjacent to SA4.1);
  - 5267 Mississauga Road (listed, within SA10);
  - 5235 Mississauga Road (listed, adjacent to SA10);
  - 5306 Mississauga Road (listed, adjacent to SA10); and
  - 2125 Erin Centre Boulevard (listed, adjacent to SA10).

5.0 RECOMMENDATIONS

Background research, data collection, and field review was conducted for the study area and it was determined that thirteen potential cultural heritage resources (including 7 BHRs and 6 CHLs) are located within and/or adjacent to the study area. Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.

3. No direct impacts to any properties with identified cultural heritage value are anticipated as a result of tunnelling activities for the preferred alternative. However, indirect impacts related to vibrations should be monitored by a structural engineer to ensure that there are no indirect impacts.

4. Direct impacts to CHRs 2,3 and 10 are anticipated as a result of the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties with potential cultural heritage value within these CHRs that are anticipated to be directly impacted include:
   CHR 2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
   CHR 10: 1700 Britannia Road West (SA1)

5. As the property at 3 Queen Street North (part of CHR 2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

6. As the properties at 5267 Mississauga Road (part of CHR 2), and 1700 Britannia Road West (CHR 10) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHR 2) and 1700 Britannia Road (CHR 10), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these case. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

7. Direct impacts to CHR 3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHR 3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHR 3.

8. Indirect impacts to CHRs 1, 2 and 3 are anticipated as a result of their location adjacent to the preferred alternative and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHRs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
   CHR 1: 3 Queen Street South (listed, adjacent to SA4.1)

CHR 2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)

CHR 3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

9. Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West, 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

10. Should future work require an expansion of the study area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on potential heritage resources.

11. This report should be submitted to heritage planning staff at the City of Mississauga, the Ministry of Heritage, Sport, Tourism and Culture Industry, and any other relevant heritage stakeholders that have an interest in this project.

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7.0 CULTURAL HERITAGE RESOURCE INVENTORY

Table 5: Inventory of existing and potential built heritage resources (BHR) and cultural heritage landscapes (CHL) within and/or adjacent to the study area

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 1	CHL	Streetsville Village Core	Streetscape	Identified in the 2005 *Cultural Heritage Landscape Inventory*	Historical: -Streets depicted in the 1859 *Tremaine Map.* -Residences depicted in the 1909 NTS map. Design: -Residences feature similar scale, massing, and setbacks off Queen Street South. -There is a mixed use between residences and commercial properties. -There are a variety of styles that demonstrates the continued mixed use of the Queen Street South and Streetsville neighbourhood from the late nineteenth century. Context: -Located on the northeast and southwest side of Queen Street South, an early transportation route in the community of Streetsville. -Reflects the nineteenth-century settlement along Queen Street South in Streetsville through their style, scale/massing, set back and landscape features. Properties within or in the vicinity of the study area that support or contribute to the heritage character of the streetscape include: 4 Caroline Street 3 Main Street (L) 6 Main Street (L) 7 Main Street* 7 Pearl Street* 42 Queen Street South (L) 44 Queen Street South (L) 45 Queen Street South 47 Queen Street South* 49 Queen Street South 52 Queen Street South 53 Queen Street South 56 Queen Street South 57 Queen Street South 58 Queen Street South 60 Queen Street South 62 Queen Street South* 63 Queen Street South 66 Queen Street South 69 Queen Street South (C) 70 Queen Street South 81 Queen Street South 82 Queen Street South 85 Queen Street South (L) 89 Queen Street South 93 Queen Street South (L) 182 Queen Street South 184 Queen Street South 186 Queen Street South 187 Queen Street South 188 Queen Street South 190 Queen Street South 194 Queen Street South 200 Queen Street South 201 Queen Street South (L) 204 Queen Street South 205 Queen Street South 206 Queen Street South 208 Queen Street South* 209 Queen Street South 210 Queen Street South* 212 Queen Street South 213 Queen Street South 214 Queen Street South (L) 220 Queen Street South 221 Queen Street South (L) 222 Queen Street South 223 Queen Street South* 224 Queen Street South 228 Queen Street South* 229 Queen Street South 232 Queen Street South* 288 Queen Street South (L) 291 Queen Street South 292 Queen Street South* 295 Queen Street South* (C) 296 Queen Street South (L) 299 Queen Street South* (T) (P) 300 Queen Street South* 302 Queen Street South (L) 306 Queen Street South 307 Queen Street South*(L) 308 Queen Street South 309 Queen Street South 311 Queen Street South 312 Queen Street South (L) 316 Queen Street South (L) 317 Queen Street South (L) 318 Queen Street South 319 Queen Street South (L) 322 Queen Street South (L) 323 Queen Street South 324 Queen Street South 326 Queen Street South 327 Queen Street South* 328 Queen Street South 330 Queen Street South 331 Queen Street South	 Queen Street in Streetville Village Core, loooking northwest from Mill Street. Queen Street in Streetville Village Core, loooking southwest from Main Street.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					95 Queen Street South 98 Queen Street South 99 Queen Street South 101 Queen Street South 104 Queen Street South 108 Queen Street South 110 Queen Street South 112 Queen Street South 113 Queen Street South 115 Queen Street South 125 Queen Street South 127 Queen Street South 128 Queen Street South 129 Queen Street South 131 Queen Street South 136 Queen Street South 137 Queen Street South 142 Queen Street South 147 Queen Street South 148 Queen Street South 151 Queen Street South (L) 154 Queen Street South (L) 157 Queen Street South* 158 Queen Street South 167 Queen Street South (L) 168 Queen Street South 175 Queen Street South 180 Queen Street South 181 Queen Street South 233 Queen Street South* 234 Queen Street South* 235 Queen Street South* 236 Queen Street South 237 Queen Street South 238 Queen Street South 241 Queen Street South 242 Queen Street South (L) 248 Queen Street South 249 Queen Street South 251 Queen Street South 252 Queen Street South (L) 254 Queen Street South 256 Queen Street South 257 Queen Street South 258 Queen Street South (L) 261 Queen Street South (L) 262 Queen Street South 263 Queen Street South* 264 Queen Street South* 265 Queen Street South* 271 Queen Street South* 274 Queen Street South* 275 Queen Street South 279 Queen Street South (L) 280 Queen Street South* 281 Queen Street South 283 Queen Street South 287 Queen Street South (L) 332 Queen Street South 334 Queen Street South 335 Queen Street South 336 Queen Street South 337 Queen Street South (L) 338 Queen Street South 339 Queen Street South 340 Queen Street South (L) 343 Queen Street South (L) 344 Queen Street South 345 Queen Street South (L) 347 Queen Street South 350 Queen Street South (L) 351 Queen Street South 353 Queen Street South 354 Queen Street South (L) 356 Queen Street South (L) 357 Queen Street South (L) 360 Queen Street South (L) 361 Queen Street South 362 Queen Street South 362-A Queen Street South 364 Queen Street South (L) 365 Queen Street South (L) 366 Queen Street South 370 Queen Street South 371 Queen Street South 27 Reid Mill (P) *Designated Part IV (L) Listed on the City of Mississauga Heritage Register prior to 2005 (C) Cemetery (T) Significant Tree (P) Plaque	 St. Andrew's Presbyterian Church and Cemetery in Streetville Village Core, loooking northwest (Google Streetview).

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 2	CHL	Mississauga Road Scenic Route	Streetscape	Identified in the 2005 *Cultural Landscape Inventory*	Historical: -Streets depicted in the 1859 *Tremaine Map*. -Residences depicted in the 1909 NTS map. Design: -Residences feature similar scale, massing, and setbacks off Queen Street South. -There is a mixed use between residences and commercial properties. -There are a variety of styles, and demonstrate the continued residential occupation of the Queen Street South and Streetsville neighbourhood from the late nineteenth century. Context: -Located on the northeast and southwest side of Queen Street South, an early transportation route in the community of Streetsville. -Reflects the nineteenth-century settlement along Queen Street South in Streetsville through their style, scale/massing, set back and landscape features. Properties within or in the vicinity of the study area that support or contribute to the heritage character of the streetscape include: 4 Caroline Street 2125 Erin Centre Boulevard 8 Falconer Drive 1 James Street 2 James Street 3 Main Street (L) 6 Main Street (L) 7 Main Street* 1918 Melody Drive 5020 Mississauga Road 5021 Mississauga Road 5028 Mississauga Road 5029 Mississauga Road 5036 Mississauga Road 5037 Mississauga Road 5044 Mississauga Road 5045 Mississauga Road 5087 Mississauga Road 5090 Mississauga Road 5095 Mississauga Road 5098 Mississauga Road 5103 Mississauga Road 5106 Mississauga Road 5111 Mississauga Road 5114 Mississauga Road 5119 Mississauga Road 5127 Mississauga Road 5135 Mississauga Road 5155 Mississauga Road* 5158 Mississauga Road 29 Queen Street South 31 Queen Street South 32 Queen Street South 33 Queen Street South 34 Queen Street South 35 Queen Street South 36 Queen Street South 37 Queen Street South 38 Queen Street South 40 Queen Street South 41 Queen Street South (L) 42 Queen Street South (L) 44 Queen Street South (L) 45 Queen Street South 47 Queen Street South* 49 Queen Street South 52 Queen Street South 53 Queen Street South 56 Queen Street South 57 Queen Street South 58 Queen Street South 60 Queen Street South 62 Queen Street South* 63 Queen Street South 66 Queen Street South 69 Queen Street South (C) 70 Queen Street South 81 Queen Street South 82 Queen Street South 85 Queen Street South (L) 234 Queen Street South* 235 Queen Street South* 236 Queen Street South 237 Queen Street South 238 Queen Street South 241 Queen Street South 242 Queen Street South (L) 248 Queen Street South 249 Queen Street South 251 Queen Street South 252 Queen Street South (L) 254 Queen Street South 256 Queen Street South 257 Queen Street South 258 Queen Street South (L) 261 Queen Street South (L) 262 Queen Street South 263 Queen Street South* 264 Queen Street South* 265 Queen Street South* 271 Queen Street South* 274 Queen Street South* 275 Queen Street South 279 Queen Street South (L) 280 Queen Street South* 281 Queen Street South 283 Queen Street South 287 Queen Street South (L) 288 Queen Street South (L) 291 Queen Street South	 Residences within the Mississauga Road Scenic Route north of Reid Drive. Mississauga Scenic Route, looking northwest from south of Beech Street.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description			Photos
					5166 Mississauga Road	89 Queen Street South	292 Queen Street South*	
					5174 Mississauga Road	93 Queen Street South (L)	295 Queen Street South* (C)	
					5175 Mississauga Road	95 Queen Street South	296 Queen Street South (L)	
					5182 Mississauga Road	98 Queen Street South	299 Queen Street South* (T) (P)	
					5190 Mississauga Road	99 Queen Street South	300 Queen Street South*	
					5198 Mississauga Road	101 Queen Street South	302 Queen Street South (L)	
					5206 Mississauga Road	104 Queen Street South	306 Queen Street South	
					5214 Mississauga Road	108 Queen Street South	307 Queen Street South* (L)	
					5215 Mississauga Road	110 Queen Street South	308 Queen Street South	
					5222 Mississauga Road	112 Queen Street South	309 Queen Street South	
					5230 Mississauga Road	113 Queen Street South	311 Queen Street South	
					5235 Mississauga Road	115 Queen Street South	312 Queen Street South (L)	
					5238 Mississauga Road	125 Queen Street South	316 Queen Street South (L)	
					5246 Mississauga Road	127 Queen Street South	317 Queen Street South (L)	
					5267 Mississauga Road	128 Queen Street South	318 Queen Street South	
					5306 Mississauga Road (L)	129 Queen Street South	319 Queen Street South (L)	
					6190 Mississauga Road	131 Queen Street South	322 Queen Street South (L)	
					6216 Mississauga Road	136 Queen Street South	323 Queen Street South	
					6226 Mississauga Road	137 Queen Street South	324 Queen Street South	
					6300 Mississauga Road	142 Queen Street South	326 Queen Street South	
					2006 Montcrest Court	147 Queen Street South	327 Queen Street South*	
					2023 Montcrest Court	148 Queen Street South	328 Queen Street South	
					7 Pearl Street*	151 Queen Street South (L)	330 Queen Street South	
					2 Queen Street North	154 Queen Street South (L)	331 Queen Street South	
					3 Queen Street North	157 Queen Street South*	332 Queen Street South	
					4 Queen Street North	158 Queen Street South	334 Queen Street South	
					14 Queen Street North	167 Queen Street South (L)	335 Queen Street South	
					17 Queen Street North	168 Queen Street South	336 Queen Street South	
					20 Queen Street North	175 Queen Street South	337 Queen Street South (L)	
					21 Queen Street North	180 Queen Street South	338 Queen Street South	
					26 Queen Street North	181 Queen Street South	339 Queen Street South	
					40 Queen Street North	182 Queen Street South	340 Queen Street South (L)	
					53 Queen Street North	184 Queen Street South	343 Queen Street South (L)	
					57 Queen Street North	186 Queen Street South	344 Queen Street South	
					61 Queen Street North	187 Queen Street South	345 Queen Street South (L)	
					133 Queen Street North	188 Queen Street South	347 Queen Street South	
					135 Queen Street North	190 Queen Street South	350 Queen Street South (L)	
					1 Queen Street South	194 Queen Street South	351 Queen Street South	
					5 Queen Street South	200 Queen Street South	353 Queen Street South	
					6 Queen Street South	201 Queen Street South (L)	354 Queen Street South (L)	
					7 Queen Street South	204 Queen Street South	356 Queen Street South (L)	
					9 Queen Street South	205 Queen Street South	357 Queen Street South (L)	
					10 Queen Street South	206 Queen Street South	360 Queen Street South (L)	
					11 Queen Street South	208 Queen Street South*	361 Queen Street South	
					12 Queen Street South	209 Queen Street South	362 Queen Street South	
					13 Queen Street South	210 Queen Street South*	362-A Queen Street South	
					14 Queen Street South	212 Queen Street South	364 Queen Street South (L)	
					15 Queen Street South	213 Queen Street South	365 Queen Street South (L)	
					17 Queen Street South	214 Queen Street South (L)	366 Queen Street South	

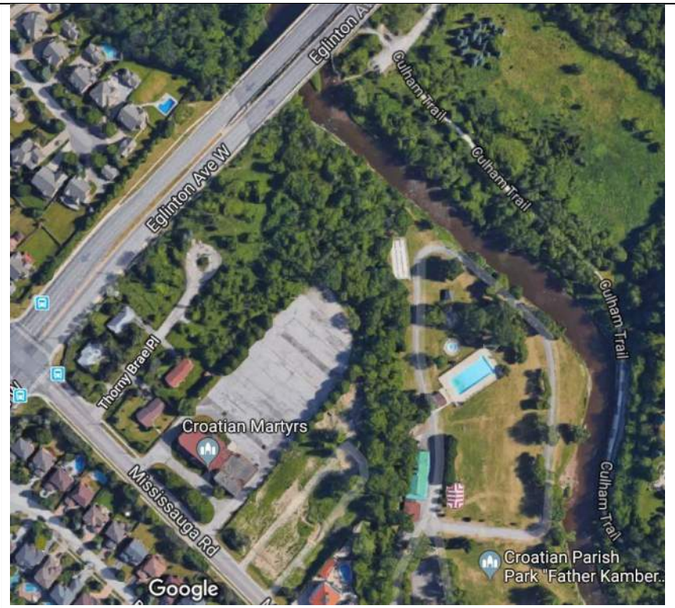
Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					18 Queen Street South 19 Queen Street South 20 Queen Street South 21 Queen Street South 23 Queen Street South 25 Queen Street South 26 Queen Street South 27 Queen Street South 28 Queen Street South (L) 220 Queen Street South 221 Queen Street South (L) 222 Queen Street South 223 Queen Street South* 224 Queen Street South 228 Queen Street South* 229 Queen Street South 232 Queen Street South* 233 Queen Street South* 370 Queen Street South 371 Queen Street South 27 Reid Mill (P) 5091 Rothesay Court 5092 Rothesay Court 1988 Royal Credit Boulevard 1989 Royal Credit Boulevard 1775 Thorny Brae Place *Designated Part IV (L) Listed on the City of Mississauga Heritage Register prior to 2005 (C) Cemetery (T) Significant Tree (P) Plaque	
CHR 3	CHL	Credit River Corridor	Watercourse	Identified in the 2005 *Cultural Landscape Inventory*	Historical: -Surveyed by Augustus Jones, named “Mis.sin.ni.he” or “Mazinigae-zeebiy by the Mississaugas, which translates to either “the trusting creek” or “to write or give and make credit” -Historically considered to be one of the best potential power sources for milling in all of southern Ontario, which led to the development of early saw and grist mill industries, and later textile mills, distilleries, bottling plants, and hydro-electric plans spawned communities throughout the river valley. Design: -The river is almost 90 kilometres long, beginning in Orangeville, flowing through nine municipalities before draining into Lake Ontario at Port Credit. -Within Mississauga, the Credit River flows for approximately 24 kilometres, meandering from the northwest to southeast. Context: -The Credit River played a significant role in the development of the City of Mississauga, from shaping the landscape to providing a life line for Indigenous people, European settlers, and modern communities.	 Credit River south of Britannia Road.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 4	BHR	21 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map -Previous bungalow was demolished between 2009 and 2011 and present structure was built after (according to Google Streetview) Design: -One-and-a-half storey bungalow with two-car garage below the bungalow -Covered front entrance with pillars Context: -Located on the northeast side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 21 Amity Road (Google Streetview)
CHR 5	BHR	23 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey brick bungalow with vinyl-cladding on the southern part of the front elevation -Hipped roof with a chimney on the north end -Two car garage below the bungalow Context: -Located on the northeast side of Amity Road	 Residence at 23 Amity Road (Google Streetview)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 6	BHR	25 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey brick bungalow with attached one-car garage -Covered front porch Context: -Located on the northwest side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 25 Amity Road (Google Streetview)
CHR 7	BHR	27 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey bungalow -Roof overhangs the southwest elevation Context: -Located on the northwest side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 27 Amity Road (Google Streetview)

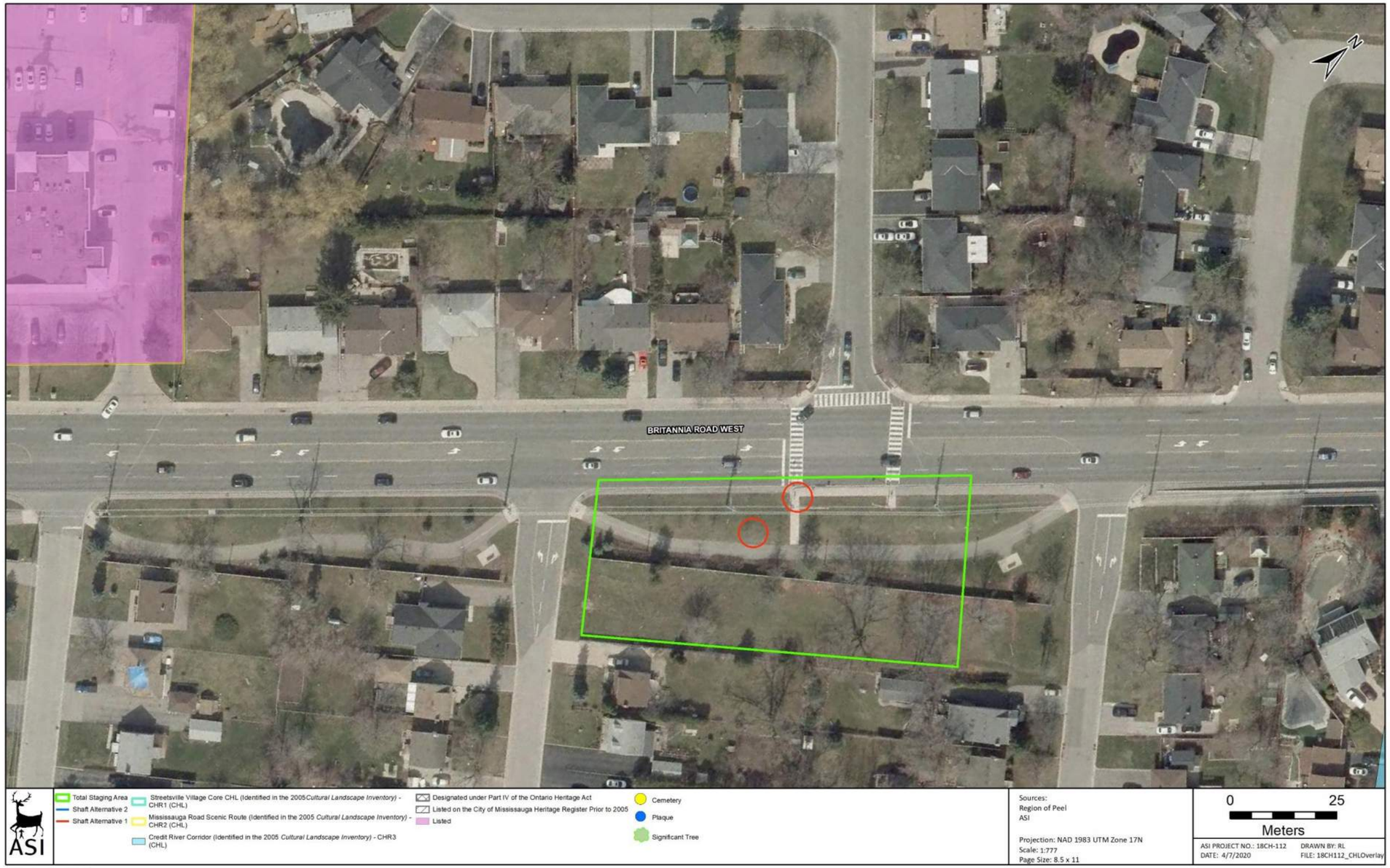
Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 8	BHR	24 Ardsley Street	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 6, Concession IV WCR; was occupied by Jos. J. Rutledge in nineteenth century mapping -A house is depicted in the vicinity on the 1954 aerial photograph Design: -One-and-a-half storey T-plan house -One-storey addition to southwest elevation and attached garage Context: -Located on the northwest side of Ardsley Street, a residential road in the community of Streetsville -Reflects twentieth century settlement practices in the community of Streetsville	 Residence at 24 Ardsley Street (Google Streetview)
CHR 9	BHR	4695 Beaufort Terrace	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 3, Range V NDS; was occupied by Wm. Douglass and Geo. Dunning in nineteenth century mapping -Beaufort Terrace and a developed area is depicted in the 1994 NTS map Design: -Two-storey brick house with attached two-car garage Context: -Located on the northwest side of Beaufort Terrace, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 1700 Britannia Road West (Google Streetview)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 10	CHL	1700 Britannia Road West	Former Farmscape	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 5, Concession IV WCR; was occupied by Richard Caslor and Solomon Caslor in nineteenth century mapping -A residence is depicted on 1859 *Tremaine Map* in vicinity of the parcel near the intersection of the Credit River and Britannia Road West Design: -At the time of field review, there was no house present Context: -Located on the south side of Britannia Road West, an early transportation route north of Streetsville NOTE- At the time of field review there was no residence or any extant historical agricultural features visible from the adjacent ROW.	 Satelite imagery of the former farmscape at 1700 Britannia Road West (Google Maps)
CHR 11	BHR	2275 - 2285 Britannia Road West	Residence	Designated Part IV	Historical: -Located in Lot 6, Concession V WCR; was occupied by John C. Hyde and John Rutledge in nineteenth century mapping -A house is depicted in the vicinity on the 1909 NTS map -House moved to its present location between 2012 and 2014 Design: -One-and-a-half storey house -Re-clad in vinyl after the house was moved -Gable roof with two chimneys -Door to property on the southeast elevation Context: -Located on the northwest side of Britannia Road West, an early transportation route north of Streetsville -Reflects nineteenth-century settlement practices in the former Toronto Township	 North elevation of residence at 2275 Britania Road.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHR 12	CHL	1760 The Chase	Natural Area	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 2. Range V NDS; was occupied by Wm. Blair and Andrew A. Blair in nineteenth century mapping -A residence and orchard are depicted in the 1877 *Illustrated Historical Atlas* in the vicinity of the parcel near the northern edge of the property at Eglinton Avenue West Design: -At the time of field review there were no structures present Context: - Located on the northeast side of The Chase, south of Eglinton Avenue West, an early transportation route south of Streetsville NOTE- At the time of field review there was no residence, structures, or any extant historical agricultural features visible from the adjacent ROWs.	 Satelite imagery of the natural area at 1760 The Chase (Google Maps)
CHR 13	CHL	1745 Thorny Brae Place	Natural Area	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 3, Range V NDS; was occupied by Wm Douglass and Geo. Dunning in nineteenth century mapping -A house is depicted in the vicinity of the parcel on the 1954 aerial photograph Design: -At the time of field review there were no structures present Context: -Located on the northeast side of Thorny Brace Place, a residential road in the community of Streetsville NOTE- At the time of field review there was no residence or any extant historical residential features visible from the adjacent ROWs.	 Satelite imagery of the natural area at 1745 Thorny Brae Place (Google Maps)

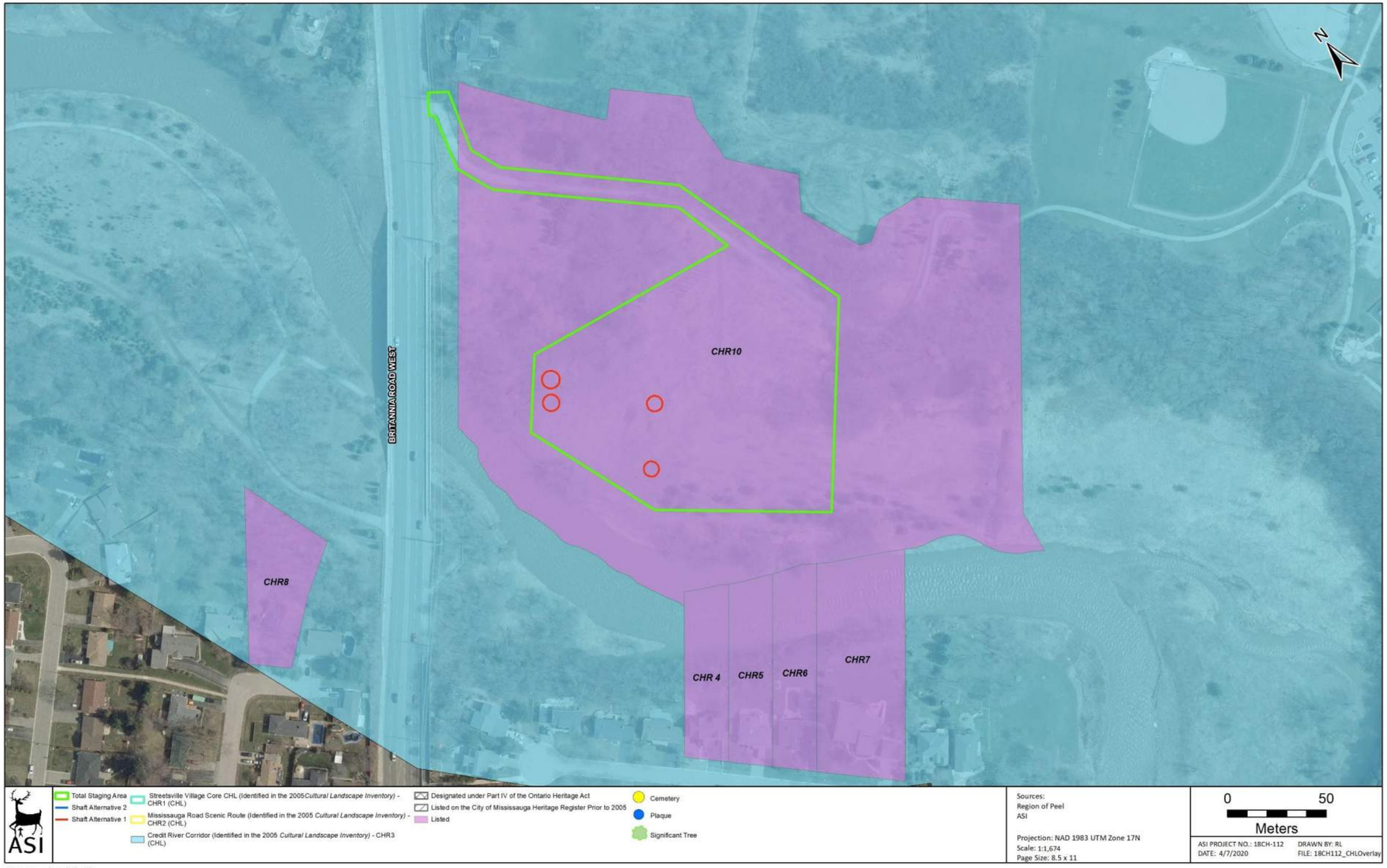
8.0 CULTURAL HERITAGE RESOURCE MAPPING

Figure 9: Overview of cultural heritage resources (CHRs) and the preferred alternative



CHL Overlay (SA 0)

Figure 10: Location of cultural heritage resources (CHRs) adjacent to SA0



CHL Overlay (SA 1)

Figure 11: Location of cultural heritage resources (CHRs) within and adjacent to SA1

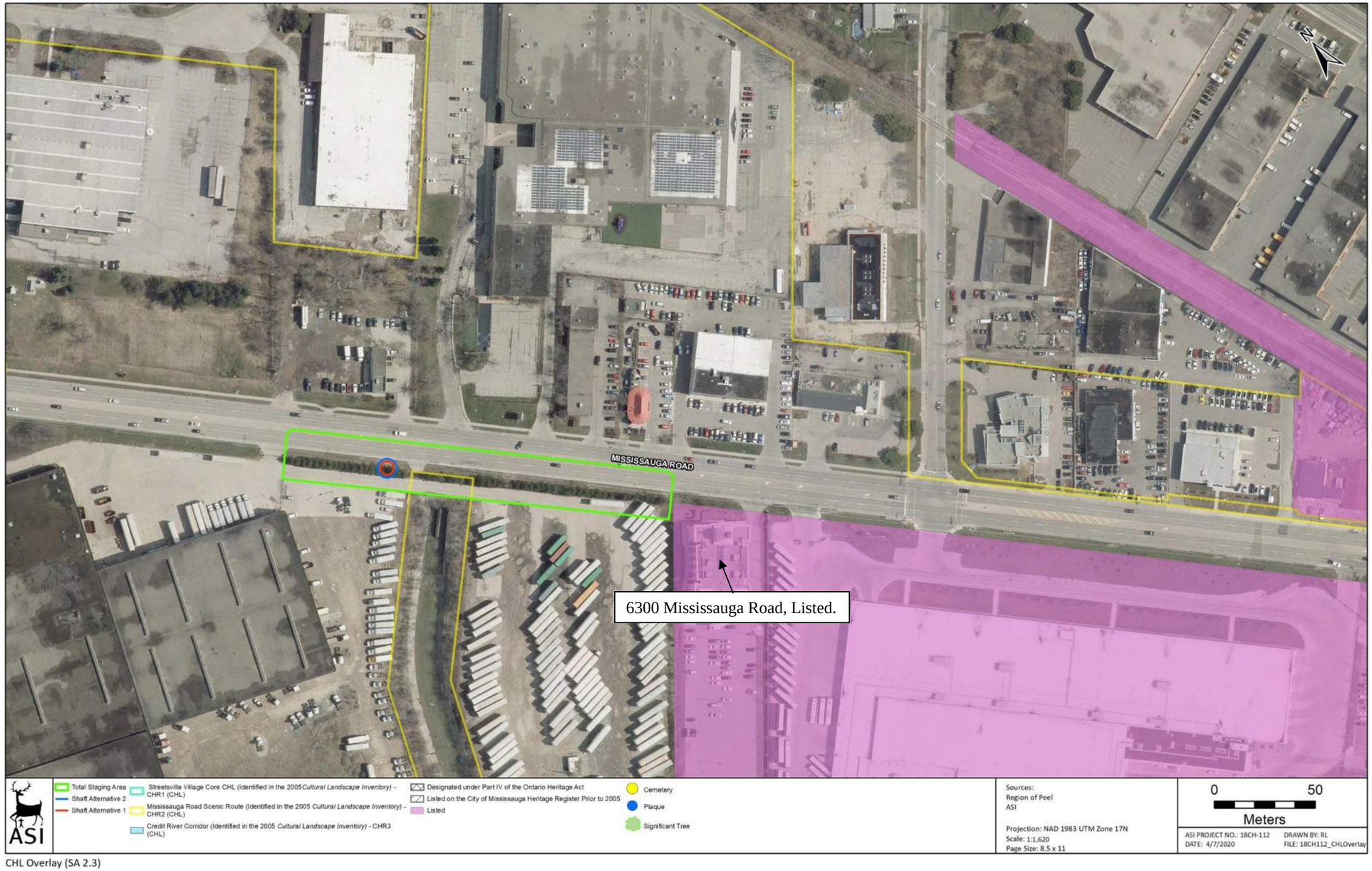
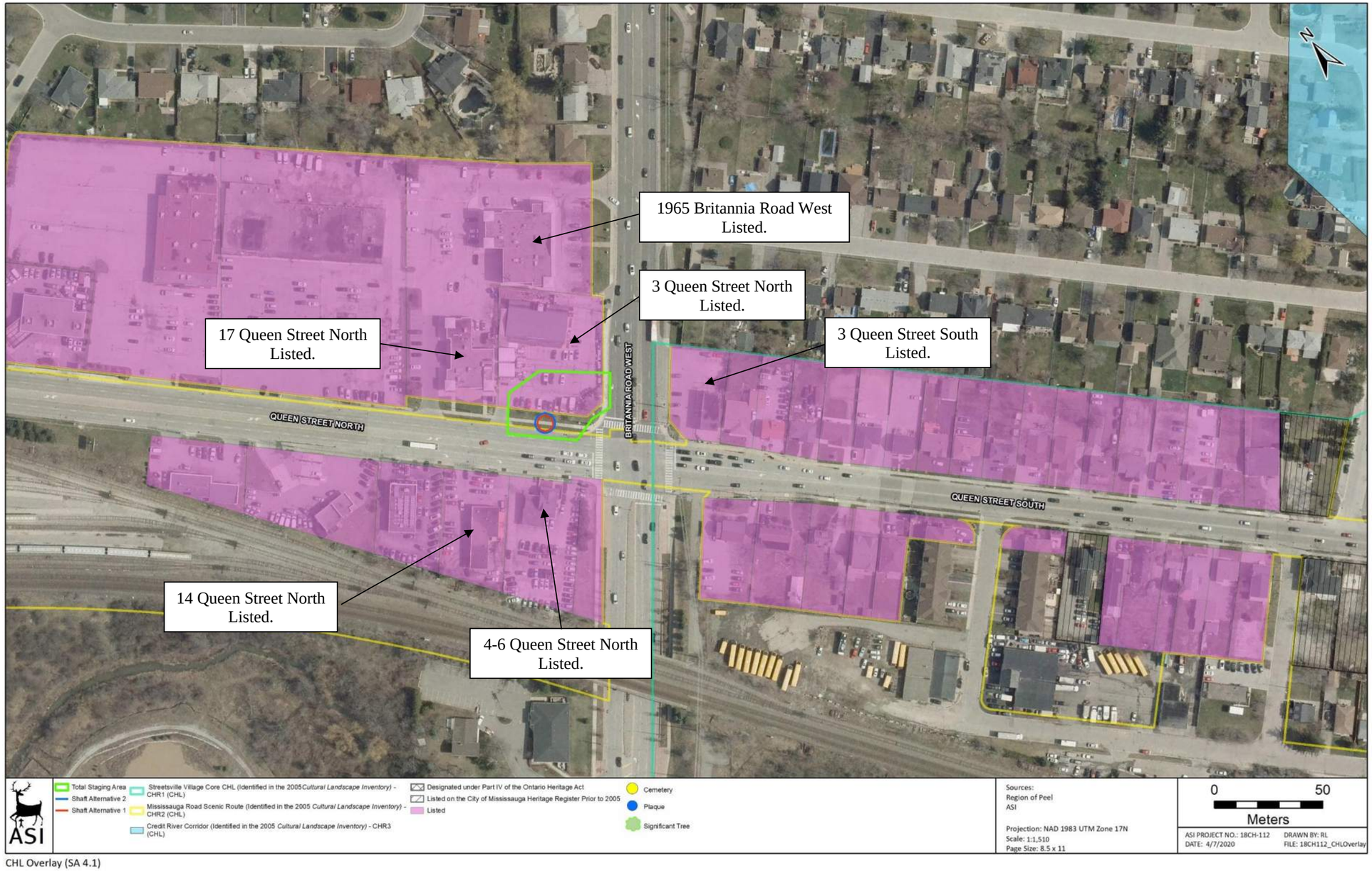
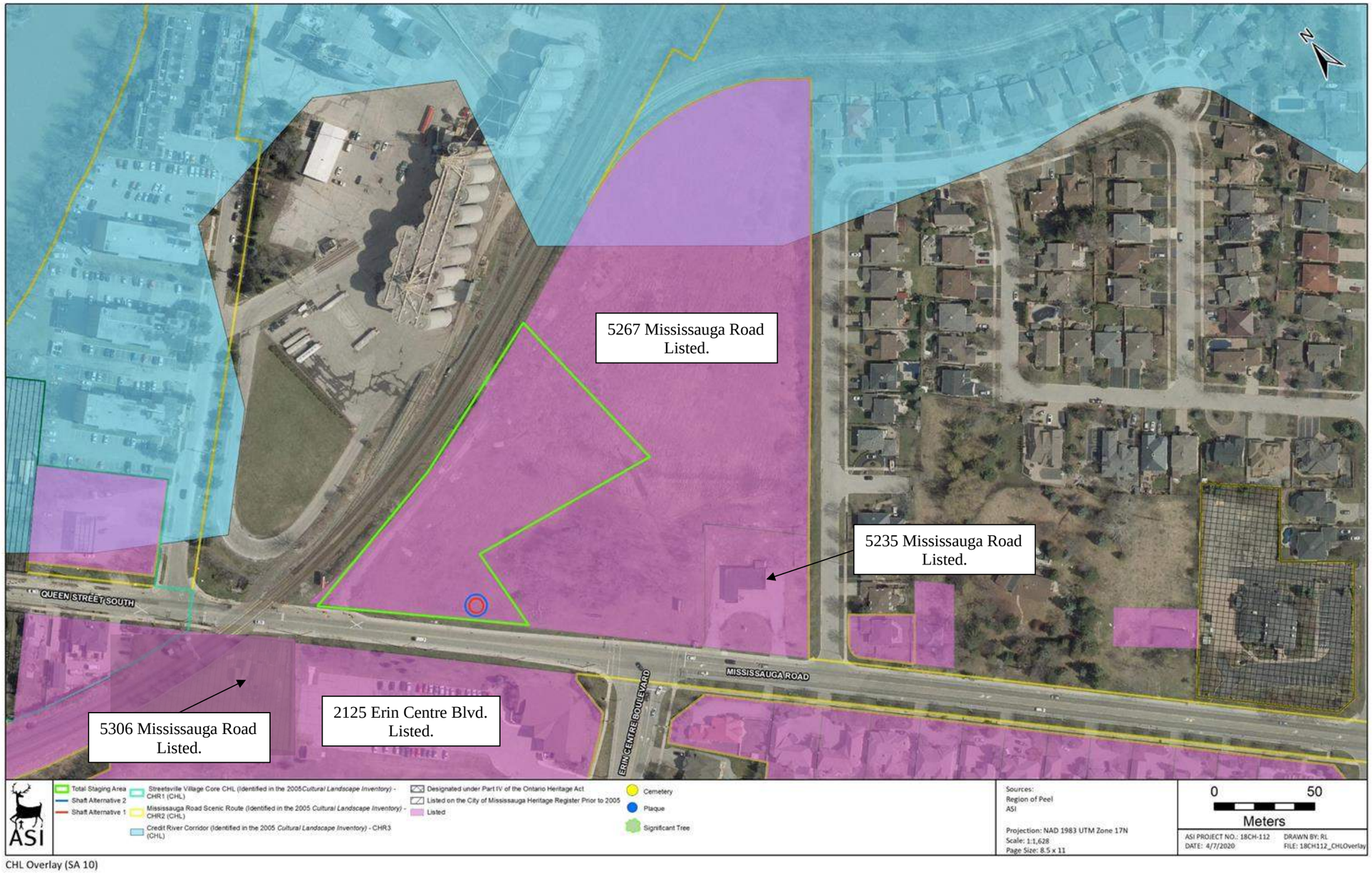


Figure 12: Location of cultural heritage resources (CHRs) adjacent to SA 2.3



CHL Overlay (SA 4.1)

Figure 13: Location of cultural heritage resources (CHRs) within and adjacent to SA 4.1



CHL Overlay (SA 10)

Figure 14: Location of cultural heritage resources (CHRs) within and adjacent to SA 10

Figure 15: Location of cultural heritage resources (CHRs) adjacent to SA 17

CULTURAL HERITAGE REPORT:
EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT

WEST TRUNK SEWER DIVERSIONS – ALTERNATIVE 4

CITY OF MISSISSAUGA
REGION OF PEEL, ONTARIO

DRAFT REPORT

Prepared for:

Hatch Corporation
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ASI File: 21CH-091

July 2021

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CULTURAL HERITAGE REPORT:
EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT

WEST TRUNK SEWER DIVERSIONS – ALTERNATIVE 4

CITY OF MISSISSAUGA
REGION OF PEEL, ONTARIO

EXECUTIVE SUMMARY

ASI was contracted by Hatch Corporation to conduct a Cultural Heritage Report for the Peel West Trunk Sewer Diversions Schedule 'B' Municipal Class Environmental Assessment (EA), in the community of Streetsville in the City of Mississauga, for the Region of Peel, Ontario. This project involves construction of diversion sewers connecting the existing Credit Valley Trunk Sewer to the new West Trunk Sewer at Erin Mills Parkway. The original EA study area was comprised of three proposed alignment alternatives: 1, 2a, and 2b. The preliminary preferred Alternative 1 on Mississauga Road (including Queen Street North and Queen Street South), Britannia Road, and Eglinton Avenue was selected in February 2020. ASI completed a Cultural Heritage Assessment Report for the original study area in March 2020 (ASI 2020). However, following the decision to select Alternative 1 as the preferred option, a fourth alternative known as "Alternative 4" was developed. This Cultural Heritage Report is intended to address the proposed Alternative 4 that has been added to the project.

The purpose of this report is to identify existing conditions of the study area, present an inventory of known and potential built heritage resources (BHRs) and cultural heritage landscapes (CHLs) located within the study area, identify direct and indirect impacts, and propose appropriate mitigation measures. The results of background historical research and a review of secondary source material revealed a study area with an urban land use history dating back to the early nineteenth century. A field review was conducted for the proposed alignment alternatives to confirm the location of and to document previously identified cultural heritage resources, and to identify and document any potential additional ones.

Background research, data collection, and field review conducted for the study area determined that thirteen potential cultural heritage resources (including seven BHRs and six CHLs) are located within the study area. A total of 13 potential cultural heritage resources were identified within or adjacent to Alternatives 1 through 4 and associated Staging Areas (SA). With regards to Alternative 4, direct impacts are anticipated for three CHLs (CHL2, 3, and 4) and indirect impacts anticipated for 3 CHLs (CHL1-3).

Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. No direct impacts to any properties with identified cultural heritage value are anticipated as a result of tunnelling activities for Alternative 4. However, excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure that all BHRs and CHLs are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. Should this vibration assessment determine that the structures or landscape features within the BHRs or CHLs will be subject to adverse impacts due to vibration, a vibration monitoring plan should be prepared and implemented as part of the detailed design phase of the project to lessen vibration impacts related to construction.

3. Direct impacts to CHLs 2,3 and 4 are anticipated as a result of Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties with potential cultural heritage value within these CHLs that are anticipated to be directly impacted include:
   CHL2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
   CHL4: 1700 Britannia Road West (SA1)

4. As the property at 3 Queen Street North (part of CHL2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

5. As the properties at 5267 Mississauga Road (part of CHL2), and 1700 Britannia Road West (CHL4) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHL2) and 1700 Britannia Road (CHL4), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these case. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

6. Direct impacts to CHL3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHL3.

7. Indirect impacts to CHLs 1, 2 and 3 are anticipated as a result of their location adjacent to Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHLs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
   CHL1: 3 Queen Street South (listed, adjacent to SA4.1)
   CHL2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
   CHL3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

8. Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West, 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

9. Should future work require an expansion of the study area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on potential heritage resources.

10. This report should be submitted to heritage planning staff at the City of Mississauga, the Ministry of Heritage, Sport, Tourism and Culture Industry, and any other relevant heritage stakeholders that have an interest in this project.

PROJECT PERSONNEL

Senior Project Manager:	Lindsay Graves, MA, CAHP *Senior Cultural Heritage Specialist | Senior Project Manager, Cultural Heritage Division*
Project Manager:	James Neilson, MES (Planning), CAHP *Cultural Heritage Specialist | Project Manager Cultural Heritage Division*
Project Coordinator:	Katrina Thach, BA (Hon) *Associate Archaeologist | Project Coordinator Environmental Assessment Division*
Report Preparation:	James Neilson
Graphics Preparation:	Robin Latour, MPhil, PDip *Associate Archaeologist | Geomatics Specialist Operations Division*
Field Review:	Peter Carruthers *Senior Archaeologist*
	Kirstyn Allam, Hon. BA, Dip. Advanced Museum Studies *Cultural Heritage Assistant, Cultural Heritage Division*
Report Reviewers:	Lindsay Graves
	John Sleath, MA *Cultural Heritage Specialist | Project Manager Cultural Heritage Division*

QUALIFIED PERSONS INVOLVED IN THE PROJECT

Lindsay Graves, MA, CAHP
Senior Cultural Heritage Specialist |Senior Project Manager - Cultural Heritage Division

The Senior Project Manager for this Cultural Heritage Report is **Lindsay Graves** (MA, Heritage Conservation), Senior Cultural Heritage Specialist and the Environmental Assessment Coordinator for the Cultural Heritage Division at ASI. She was responsible for: overall project scoping and approach; development and confirmation of technical findings and study recommendations; application of relevant standards, guidelines and regulations; and implementation of quality control procedures. Lindsay is academically trained in the fields of heritage conservation, cultural anthropology, archaeology, and collections management and has over 15 years of experience in the field of cultural heritage resource management. This work has focused on the assessment, evaluation, and protection of above ground cultural heritage resources. Lindsay has extensive experience undertaking archival research, heritage survey work, heritage evaluation and heritage impact assessment. She has also contributed to cultural heritage landscape studies and heritage conservation plans, led heritage commemoration and interpretive programs, and worked collaboratively with multidisciplinary teams to sensitively plan interventions at historic sites/places. In addition, she is a leader in the completion of heritage studies required to fulfill Class EA processes and has served as Project Manager for over 100 heritage assessments during her time at ASI. Lindsay is a member of the Canadian Association of Heritage Professionals.

James Neilson, MES (Planning)
Cultural Heritage Specialist | Project Manager - Cultural Heritage Division

The Project Manager for this Cultural Heritage Report is **James Neilson** (MES Planning), who is a Cultural Heritage Specialist and Project Manager within the Cultural Heritage Division at ASI. He was responsible for day-to-day management activities, including scoping and conducting research activities and drafting of study findings and recommendations. He has nine years of experience in the heritage field, as a heritage planner in the public sector for the City of Toronto and within the private sector with ERA Architects and ASI since 2017. James' public sector experience involved reviewing heritage permit and demolition applications for building permits, minor variances and site plans under the *Ontario Heritage Act* and *Planning Act*. He also has extensive experience writing heritage impact assessments for development applications, evaluating properties for their heritage significance, assessing and mitigating impacts to heritage properties, and negotiating best possible outcomes for the long-term conservation of heritage properties. James is a member of the Canadian Association of Heritage Professionals and a Candidate Member of OPPI.

GLOSSARY

Term	Definition
Adjacent	"contiguous properties as well as properties that are separated from a heritage property by narrow strip of land used as a public or private road, highway, street, lane, trail, right-of-way, walkway, green space, park, and/or easement or as otherwise defined in the municipal official plan" (Ministry of Tourism, Culture and Sport 2010).
Built Heritage Resource (BHR)	"…a building, structure, monument, installation or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. Built heritage resources are located on property that may be designated under Parts IV or V of the *Ontario Heritage Act*, or that may be included on local, provincial, federal and/or international registers" (Government of Ontario 2020:41).
Cultural Heritage Landscape (CHL)	"…a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under the *Ontario Heritage Act*, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms" (Government of Ontario 2020:42).
Cultural Heritage Resource	Includes above-ground resources such as built heritage resources and cultural heritage landscapes, and built or natural features below-ground including archaeological resources (Government of Ontario 2020).
Known Cultural Heritage Resource	A known cultural heritage resource is a property that has recognized cultural heritage value or interest. This can include a property listed on a Municipal Heritage Register, designated under Part IV or V of the *Ontario Heritage Act*, or protected by a heritage agreement, covenant or easement, protected by the *Heritage Railway Stations Protection Act or* the *Heritage Lighthouse Protection Act*, identified as a Federal Heritage Building, or located within a UNESCO World Heritage Site (Ministry of Tourism, Culture and Sport 2016).
Impact	Includes negative and positive, direct and indirect effects to an identified cultural heritage resource. Direct impacts include destruction of any, or part of any, significant heritage attributes or features and/or unsympathetic or incompatible alterations to an identified resource. Indirect impacts include, but are not limited to, creation of shadows, isolation of heritage attributes, direct or indirect obstruction of significant views, change in land use, land disturbances (Ministry of Tourism and Culture 2006). Indirect impacts also include potential vibration impacts

	(See Section 2.5 for complete definition and discussion of potential impacts).
Mitigation	Mitigation is the process of lessening or negating anticipated adverse impacts to cultural heritage resources and may include, but are not limited to, such actions as avoidance, monitoring, protection, relocation, remedial landscaping, and documentation of the cultural heritage landscape and/or built heritage resource if to be demolished or relocated.
Potential Cultural Heritage Resource	A potential cultural heritage resource is a property that has the potential for cultural heritage value or interest. This can include properties/project area that contain a parcel of land that is the subject of a commemorative or interpretive plaque, is adjacent to a known burial site and/or cemetery, is in a Canadian Heritage River Watershed, or contains buildings or structures that are 40 or more years old (Ministry of Tourism, Culture and Sport 2016).
Significant	With regard to cultural heritage and archaeology resources, significant means "resources that have been determined to have cultural heritage value or interest. Processes and criteria for determining cultural heritage value or interest are established by the Province under the authority of the *Ontario Heritage Act.* While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation" (Government of Ontario 2020:51).
Vibration Zone of Influence	Area within a 50 m buffer of construction-related activities in which there is potential to affect an identified cultural heritage resource. A 50 m buffer is applied in the absence of a project-specific defined vibration zone of influence based on existing secondary source literature and direction provided from the MHSTCI (Wiss 1981; Rainer 1982; Ellis 1987; Crispino and D'Apuzzo 2001; Carman et al. 2012). This buffer accommodates the additional threat from collisions with heavy machinery or subsidence (Randl 2001).

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1.0 INTRODUCTION

1.1 Report Purpose

ASI was contracted by Hatch Corporation to conduct a Cultural Heritage Report for the Peel West Trunk Sewer Diversions Schedule 'B' Municipal Class Environmental Assessment (EA), in the in the community of Streetsville in the City of Mississauga, for the Region of Peel, Ontario. The purpose of this report is to identify existing conditions of the study area, present an inventory of known and potential built heritage resources (BHRs) and cultural heritage landscapes (CHLs) located within the study area, identify direct and indirect impacts, and propose appropriate mitigation measures.

1.2 Project Overview

The project involves construction of diversion sewers connecting the existing Credit Valley Trunk Sewer to the new West Trunk Sewer at Erin Mills Parkway. The original EA study area was comprised of three proposed alignment alternatives: 1, 2a, and 2b (Figure 1). The preliminary preferred Alternative 1 on Mississauga Road (including Queen Street North and Queen Street South), Britannia Road, and Eglinton Avenue was selected in February 2020. ASI completed a Cultural Heritage Assessment Report for the original study area in March 2020 (ASI 2020). However, following the decision to select Alternative 1 as the preferred option, a fourth alternative known as "Alternative 4" was developed (Figure 2). This Cultural Heritage Report is intended to address the proposed Alternative 4 that has been added to the project.

1.3 Description of Study Area

This Cultural Heritage Report will focus on the project study area and adjacent properties (Figure 2). This project study area has been defined as inclusive of those lands that may contain BHRs or CHLs that may be subject to direct or indirect impacts as a result of the proposed undertaking. Properties within the study area are located in the City of Mississauga.

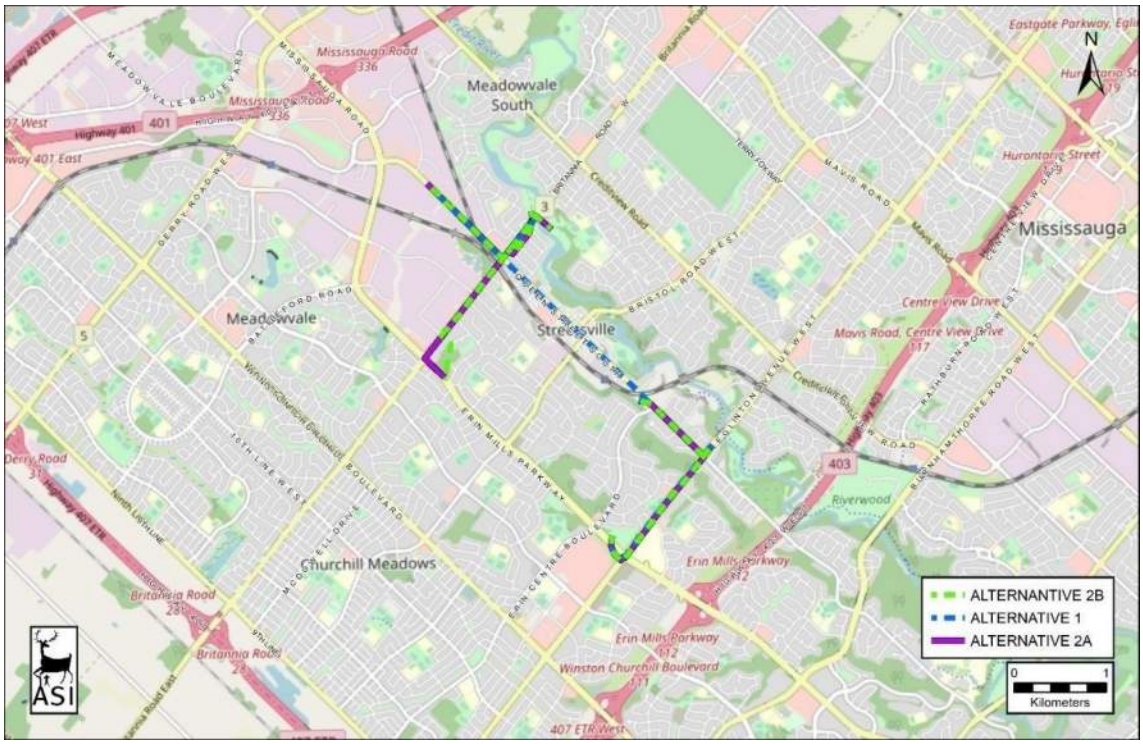


Figure 1: Location of the Alternatives 1, 2a and 2b
Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

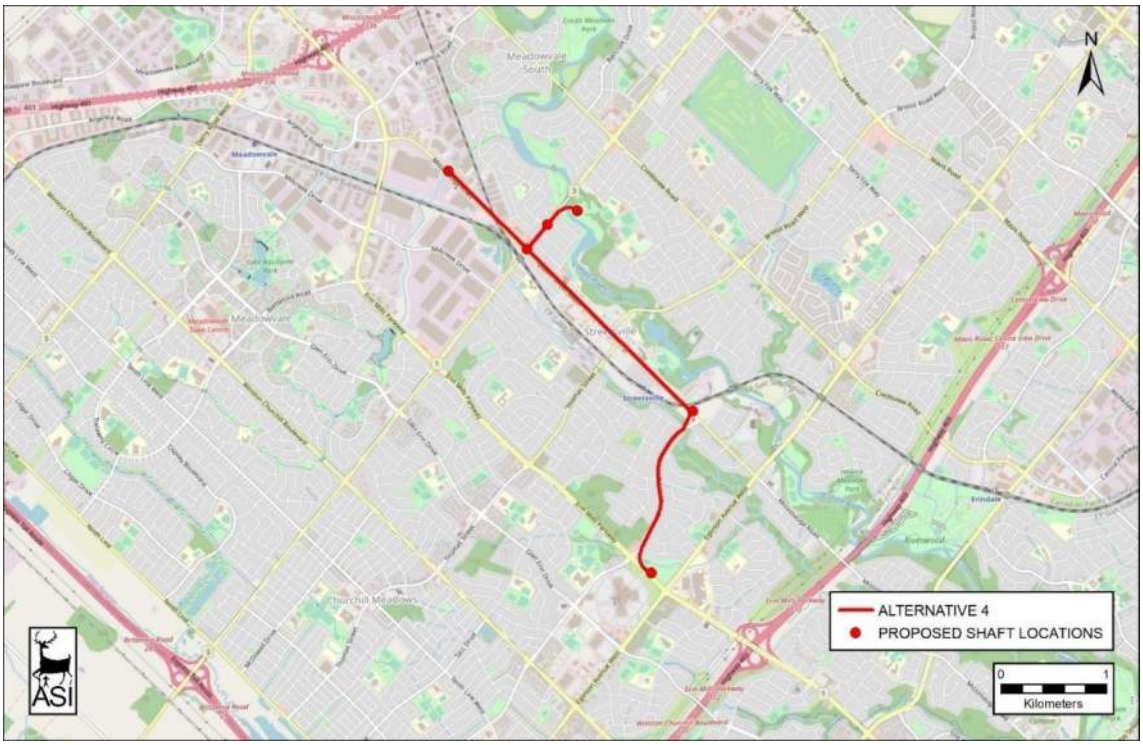


Figure 2: Location of the Alternative 4
Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

2.0 METHODOLOGY

2.1 Regulatory Requirements

The *Ontario Heritage Act* (OHA) (Ministry of Culture 1990) is the primary piece of legislation that determines policies, priorities and programs for the conservation of Ontario's heritage. There are many other provincial acts, regulations and policies governing land use planning and resource development support heritage conservation including:

- The *Planning Act* (Ministry of Municipal Affairs and Housing 1990), which states that "conservation of features of significant architectural, cultural, historical, archaeological or scientific interest" (cultural heritage resources) is a "matter of provincial interest". The Provincial Policy Statement (Government of Ontario 2020), issued under the Planning Act, links heritage conservation to long-term economic prosperity and requires municipalities and the Crown to conserve significant cultural heritage resources.
- The *Environmental Assessment Act* (Ministry of the Environment 1990), which defines "environment" to include cultural conditions that influence the life of humans or a community. Cultural heritage resources, which includes archaeological resources, built heritage resources and cultural heritage landscapes, are important components of those cultural conditions.

The Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) is charged under Section 2.0 of the OHA with the responsibility to determine policies, priorities, and programs for the conservation, protection, and preservation of the heritage of Ontario. The Ministry of Tourism, Culture and Sport (now administered by MHSTCI) published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (Ministry of Tourism, Culture and Sport 2010) (hereinafter "Standards and Guidelines"). These Standards and Guidelines apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest (CHVI). The Standards and Guidelines provide a series of guidelines that apply to provincial heritage properties in the areas of identification and evaluation; protection; maintenance; use; and disposal. For the purpose of this report, the Standards and Guidelines provide points of reference to aid in determining potential heritage significance in identification of BHRs and CHLs. While not directly applicable for use in properties not under provincial ownership, the Standards and Guidelines are regarded as best practice for guiding heritage assessments and ensure that additional identification and mitigation measures are considered.

Similarly, the *Ontario Heritage Tool Kit* (Ministry of Culture 2006) provides a guide to evaluate heritage properties. To conserve a BHR or CHL, the *Ontario Heritage Tool Kit* states that a municipality or approval authority may require a heritage impact assessment and/or a conservation plan to guide the approval, modification, or denial of a proposed development.

2.2 Municipal/Regional Heritage Policies

The study area is located within the City of Mississauga, in the Region of Peel. Policies relating to BHRs and CHLs were reviewed from the following sources:

- City of Mississauga *Official Plan* (City of Mississauga 2020)

- Region of Peel *Official Plan* (Region of Peel 2018)

2.3 Identification of Built Heritage Resources and Cultural Heritage Landscapes

This Cultural Heritage Report follows guidelines presented in the *Ontario Heritage Tool Kit* (Ministry of Culture 2006) and *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (Ministry of Tourism, Culture and Sport 2016). The objective of this report is to present an inventory of known and potential BHRs and CHLs, and to provide a preliminary understanding of known and potential BHRs and CHLs located within areas anticipated to be directly or indirectly impacted by the proposed project.

In the course of the cultural heritage assessment process, all potentially affected BHRs and CHLs are subject to identification and inventory. Generally, when conducting an identification of BHRs and CHLs within a study area, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of BHRs and CHLs in a geographic area: background research and desktop data collection; field review; and identification.

Background historical research, which includes consultation of primary and secondary source research and historical mapping, is undertaken to identify early settlement patterns and broad agents or themes of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth- and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as having cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles or construction methods, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified BHRs and CHLs. The field review is also used to identify potential BHRs or CHLs that have not been previously identified on federal, provincial, or municipal databases or through other appropriate agency data sources.

During the cultural heritage assessment process, a property is identified as a potential BHR or CHL based on research, the MHSTCI screening tool, and professional expertise. In addition, use of a 40-year-old benchmark is a guiding principle when conducting a preliminary identification of BHRs and CHLs. While identification of a resource that is 40 years old or older does not confer outright heritage significance, this benchmark provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from having cultural heritage value or interest.

2.4 Background Information Review

To make an identification of previously identified known or potential BHRs and CHLs within the study area, the following resources were consulted as part of this Cultural Heritage Report.

2.4.1 Review of Existing Heritage Inventories

A number of resources were consulted in order to identify previously identified BHRs and CHLs within the study area. These resources, reviewed on 15 June 2021, include:

- The City of Mississauga's *Municipal Register of Property of Cultural Heritage Value or Interest* provides a list of BHRs and CHLs that are designated under Part IV and V of the *Ontario Heritage Act* and undesignated properties;
- *Cultural Landscape Inventory: City of Mississauga*
- The inventory of Ontario Heritage Trust easements;
- The Ontario Heritage Trust's *Ontario Heritage Plaque Guide*, an online, searchable database of Ontario Heritage Plaques;
- *Ontario's Historical Plaques* website;
- Inventory of known cemeteries/burial sites in the Ontario Genealogical Society's online database;
- Parks Canada's, *Canada's Historic Places* website: available online, the searchable register provides information on historic places recognized for their heritage value at the local, provincial, territorial, and national levels;
- Parks Canada's *Directory of Federal Heritage Designations*, a searchable on-line database that identifies National Historic Sites, National Historic Events, National Historic People, Heritage Railway Stations, Federal Heritage Buildings, and Heritage Lighthouses;
- Canadian Heritage River System. The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage; and,
- United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites.

2.4.2 Stakeholder Data Collection

The following individuals, groups, and/or organizations were contacted to gather information on known and potential BHRs and CHLs, active and inactive cemeteries, and areas of identified Indigenous interest within the study area:

- Municipal consultation regarding the location of previously identified BHRs and CHLs within and adjacent to the study area was carried out with Paula Wubbenhorst, Heritage Planner, City of Mississauga on 12 April, 29 April, 1 May, 2 May, 2019 and 24 June 2021.
- Karla Barboza, (A) Team Lead, Heritage, Ministry of Tourism, Culture and Sport, was also contacted to gather any information on potential BHRs and CHLs or concerns within and/or adjacent to the study area (email communication 12 April 2019 and 24 June 2021). A response

confirmed that there are no identified Provincial Heritage Properties within or adjacent to the study area.

- Kevin De Mille, Heritage Planner, Ontario Heritage Trust, was also contacted to gather any information on potential BHRs and CHLs or concerns within and/or adjacent to the study area (email communication 12 April 2019). A response confirmed that there are no conservation easements or Trust-owned properties within or adjacent to the study area. As part of the current report for Alternative 4, ASI contacted the Ontario Heritage Trust to confirm that there are no conservation easements or Trust-owned properties within or adjacent to the Alternative 4 study area (email dated 24 June 2021). No response has been received as of the time of reporting.

2.5 Preliminary Impact Assessment Methodology

To assess the potential impacts of the undertaking, identified BHRs and CHLs are considered against a range of possible negative impacts, based on the *Ontario Heritage Tool Kit InfoSheet #5: Heritage Impact Assessments and Conservation Plans* (Ministry of Tourism and Culture 2006). These include:

- Direct impacts:
  - Destruction of any, or part of any, significant heritage attributes or features; and
  - Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance.
- Indirect impacts
  - Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden;
  - Isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
  - Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
  - A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces; and
  - Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect an archaeological resource.

Indirect impacts from construction-related vibration have the potential to negatively affect BHRs or CHLs depending on the type of construction methods and machinery selected for the project and proximity and composition of the identified resources. Potential vibration impacts are defined as having potential to affect an identified BHRs and CHLs where work is taking place within 50 m of features on the property. A 50 m buffer is applied in the absence of a project-specific defined vibration zone of influence based on existing secondary source literature and direction provided from the MHSTCI (Wiss 1981; Rainer 1982; Ellis 1987; Crispino and D'Apuzzo 2001; Carman et al. 2012). This buffer accommodates any additional or potential threat from collisions with heavy machinery or subsidence (Randl 2001).

Several additional factors are also considered when evaluating potential impacts on identified BHRs and CHLs. These are outlined in a document set out by the Ministry of Culture and Communications (now

MHSTCI) and the Ministry of the Environment entitled *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992) and include:

- Magnitude: the amount of physical alteration or destruction which can be expected;
- Severity: the irreversibility or reversibility of an impact;
- Duration: the length of time an adverse impact persists;
- Frequency: the number of times an impact can be expected;
- Range: the spatial distribution, widespread or site specific, of an adverse impact; and
- Diversity: the number of different kinds of activities to affect a heritage resource.

The proposed undertaking should endeavor to avoid negative adverse affects to known and potential BHRs and CHLs and interventions should be managed in such a way that identified significant BHRs and CHLs are conserved. When the nature of the undertaking is such that adverse impacts are unavoidable, it may be necessary to implement alternative approaches or mitigation strategies that alleviate the negative effects on identified BHRs and CHLs. Mitigation is the process of lessening or negating anticipated adverse impacts to BHRs and CHLs and may include, but are not limited to, such actions as avoidance, monitoring, protection, relocation, remedial landscaping, and documentation of the BHR or CHL if to be demolished or relocated.

Various works associated with infrastructure improvements have the potential to affect BHRs and CHLs in a variety of ways, and as such, appropriate mitigation measures for the undertaking need to be considered.

3.0 SUMMARY OF HISTORICAL DEVELOPMENT WITHIN THE STUDY AREA

This section provides a brief summary of historical research. A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of physiography, Indigenous land use, and Euro-Canadian settlement.

3.1 Physiography

The study area is situated within the Iroquois Plain physiographic region of southern Ontario (Chapman and Putnam 1984). The Iroquois Plain physiographic region of Southern Ontario is a lowland region bordering Lake Ontario. This region is characteristically flat and formed by lacustrine deposits laid down by the inundation of Lake Iroquois, a body of water that existed during the late Pleistocene. This region extends from the Trent River in the east, around the western part of Lake Ontario to the Niagara River, spanning a distance of 300 km (Chapman and Putnam 1984:190). The old shorelines of Lake Iroquois include cliffs, bars, beaches and boulder pavements. The old sandbars in this region are good aquifers that supply water to farms and villages. The gravel bars are quarried for road and building material, while the clays of the old lake bed have been used for the manufacture of bricks (Chapman and Putnam 1984:196).

3.2 Summary of Early Indigenous History in Southern Ontario

Southern Ontario has been occupied by human populations since the retreat of the Laurentide glacier approximately 13,000 years before present (BP) (Ferris 2013). Populations at this time would have been highly mobile, inhabiting a boreal-parkland similar to the modern sub-arctic. By approximately 10,000 BP, the environment had progressively warmed (Edwards and Fritz 1988) and populations now occupied less extensive territories (Ellis and Deller 1990).

Between approximately 10,000-5,500 BP, the Great Lakes basins experienced low-water levels, and many sites which would have been located on those former shorelines are now submerged. This period produces the earliest evidence of heavy wood working tools, an indication of greater investment of labour in felling trees for fuel, to build shelter, and watercraft production. These activities suggest prolonged seasonal residency at occupation sites. Polished stone and native copper implements were being produced by approximately 8,000 BP; the latter was acquired from the north shore of Lake Superior, evidence of extensive exchange networks throughout the Great Lakes region. The earliest evidence for cemeteries dates to approximately 4,500-3,000 BP and is indicative of increased social organization, investment of labour into social infrastructure, and the establishment of socially prescribed territories (Ellis et al. 1990, 2009; Brown 1995:13).

Between 3,000-2,500 BP, populations continued to practice residential mobility and to harvest seasonally available resources, including spawning fish. The Woodland period begins around 2,500 BP and exchange and interaction networks broaden at this time (Spence et al. 1990:136, 138) and by approximately 2,000 BP, evidence exists for macro-band camps, focusing on the seasonal harvesting of resources (Spence et al. 1990:155, 164). By 1,500 BP there is macro botanical evidence for maize in southern Ontario, and it is thought that maize only supplemented people's diet. There is earlier phytolithic evidence for maize in central New York State by 2,300 BP - it is likely that once similar analyses are conducted on Ontario ceramic vessels of the same period, the same evidence will be found (Birch and Williamson 2013:13–15). Bands likely retreated to interior camps during the winter. It is generally understood that these populations were Algonquian-speakers during these millennia of settlement and land use.

From the beginning of the Late Woodland period at approximately 1,000 BP, lifeways became more similar to that described in early historical documents. Between approximately 1000-1300 Common Era (CE), the communal site is replaced by the village focused on horticulture. Seasonal disintegration of the community for the exploitation of a wider territory and more varied resource base was still practised (Williamson 1990:317). By 1300-1450 CE, this episodic community disintegration was no longer practised and populations now communally occupied sites throughout the year (Dodd et al. 1990:343). From 1450-1649 CE this process continued with the coalescence of these small villages into larger communities (Birch and Williamson 2013). Through this process, the socio-political organization of the First Nations, as described historically by the French and English explorers who first visited southern Ontario, was developed. By 1600 CE, the communities within Simcoe County had formed the Confederation of Nations encountered by the first European explorers and missionaries. In the 1640s,

the traditional enmity between the Haudenosaunee[1] and the Huron-Wendat (and their Algonquian allies such as the Nippissing and Odawa) led to the dispersal of the Huron-Wendat.

Shortly after dispersal of the Wendat and their Algonquian allies, Ojibwa began to expand into southern Ontario and Michigan from a "homeland" along the east shore of Georgian Bay, west along the north shore of Lake Huron, and along the northeast shore of Lake Superior and onto the Upper Peninsula of Michigan (Rogers 1978:760–762). This history was constructed by Rogers using both Anishinaabek oral tradition and the European documentary record, and notes that it included Chippewa, Ojibwa, Mississauga, and Saulteaux or "Southeastern Ojibwa" groups. Ojibwa, likely Odawa, were first encountered by Samuel de Champlain in 1615 along the eastern shores of Georgian Bay. Etienne Brule later encountered other groups and by 1641, Jesuits had journeyed to Sault Sainte Marie (Thwaites 1896:11:279) and opened the Mission of Saint Peter in 1648 for the occupants of Manitoulin Island and the northeast shore of Lake Huron. The Jesuits reported that these Algonquian peoples lived "solely by hunting and fishing and roam as far as the "Northern sea" to trade for " Furs and Beavers, which are found there in abundance" (Thwaites 1896-1901, 33:67), and "all of these Tribes are nomads, and have no fixed residence, except at certain seasons of the year, when fish are plentiful, and this compels them to remain on the spot" (Thwaites 1896-1901, 33:153). Algonquian-speaking groups were historically documented wintering with the Huron-Wendat, some who abandoned their country on the shores of the St. Lawrence because of attacks from the Haudenosaunee (Thwaites 1896-1901, 27:37).
Other Algonquian groups were recorded along the northern and eastern shores and islands of Lake Huron and Georgian Bay - the "Ouasouarini" [Chippewa], the "Outchougai" [Outchougai], the "Atchiligouan" [Achiligouan] near the mouth of the French River and north of Manitoulin Island the "Amikouai, or the nation of the Beaver" [Amikwa; Algonquian] and the "Oumisagai" [Missisauga; Chippewa] (Thwaites 1896-1901, 18:229, 231). At the end of the summer 1670, Father Louys André began his mission work among the Mississagué, who were located on the banks of a river that empties into Lake Huron approximately 30 leagues from the Sault (Thwaites 1896-1901, 55:133-155).

After the Huron had been dispersed, the Haudenosaunee began to exert pressure on Ojibwa within their homeland to the north. While their numbers had been reduced through warfare, starvation, and European diseases, the coalescence of various Anishinaabek groups led to enhanced social and political strength (Thwaites 1896-1901, 52:133) and Sault Sainte Marie was a focal point for people who inhabited adjacent areas both to the east and to the northwest as well as for the Saulteaux, who considered it their home (Thwaites 1896-1901, 54:129-131). The Haudenosaunee established a series of settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. From east to west, these villages consisted of Ganneious, on Napanee Bay, an arm of the Bay of Quinte; Quinte, near the isthmus of the Quinte Peninsula; Ganaraske, at the mouth of the Ganaraska River; Quintio, at the mouth of the Trent River on the north shore of Rice Lake; Ganatsekwyagon (or Ganestiquiagon), near the mouth of the Rouge River; Teyaiagon, near the mouth of the Humber River; and Quinaouatoua, on the portage between the western end of Lake Ontario and the Grand River (Konrad 1981:135). Their locations near the mouths of the Humber and Rouge Rivers, two branches of the Toronto Carrying Place, strategically linked these settlements with the upper Great Lakes through Lake Simcoe. The inhabitants of these villages were agriculturalists, growing maize, pumpkins and

[1] The Haudenosaunee are also known as the New York Iroquois or Five Nations Iroquois and after 1722 Six Nations Iroquois. They were a confederation of five distinct but related Iroquoian–speaking groups – the Seneca, Onondaga, Cayuga, Oneida, and Mohawk. Each lived in individual territories in what is now known as the Finger Lakes district of Upper New York. In 1722 the Tuscarora joined the confederacy.

squash, but their central roles were that of portage starting points and trading centres for Iroquois travel to the upper Great Lakes for the annual beaver hunt (Konrad 1974; Williamson et al. 2008:50–52). Ganatsekwyagon, Teyaiagon, and Quinaouatoua were primarily Seneca; Ganaraske, Quinte and Quintio were likely Cayuga, and Ganneious was Oneida, but judging from accounts of Teyaiagon, all of the villages might have contained peoples from a number of the Iroquois constituencies (ASI 2013).

During the 1690s, some Ojibwa began moving south into extreme southern Ontario and soon replaced, the Haudenosaunee by force. By the first decade of the eighteenth century, the Michi Saagiig Nishnaabeg (Mississauga Nishnaabeg) had settled at the mouth of the Humber, near Fort Frontenac at the east end of Lake Ontario and the Niagara Region and within decades were well established throughout southern Ontario. In 1736, the French estimated there were 60 men at Lake Saint Clair and 150 among small settlements at Quinte, the head of Lake Ontario, the Humber River, and Matchedash (Rogers 1978:761). This history is based almost entirely on oral tradition provided by Anishinaabek elders such as George Copway (Kahgegagahbowh), a Mississauga born in 1818 near Rice Lake who followed a traditional lifestyle until his family converted to Christianity (MacLeod 1992:197; Smith 2000). According to Copway, the objectives of campaigns against the Haudenosaunee were to create a safe trade route between the French and the Ojibwa, to regain the land abandoned by the Huron-Wendat. While various editions of Copway's book have these battles occurring in the mid-seventeenth century, common to all is a statement that the battles occurred around 40 years after the dispersal of the Huron-Wendat (Copway 1850:88, 1851:91, 1858:91). Various scholars agree with this timeline ranging from 1687, in conjunction with Denonville's attack on Seneca villages (Johnson 1986:48; Schmalz 1991:21–22) to around the mid- to late-1690s leading up to the Great Peace of 1701 (Schmalz 1977:7; Bowman 1975:20; Smith 1975:215; Tanner 1987:33; Von Gernet 2002:7–8).

Robert Paudash's 1904 account of Mississauga origins also relies on oral history, in this case from his father, who died at the age of 75 in 1893 and was the last hereditary chief of the Mississauga at Rice Lake. His account in turn came from his father Cheneebeesh, who died in 1869 at the age of 104 and was the last sachem or Head Chief of all the Mississaugas. He also relates a story of origin on the north shore of Lake Huron (Paudash 1905:7–8) and later, after the dispersal of the Huron-Wendat, carrying out coordinated attacks against the Haudenosaunee. Francis Assikinack, an Ojibwa of Manitoulin Island born in 1824, provides similar details on battles with the Haudenosaunee (Assikinack 1858:308–309).

Peace was achieved between the Haudenosaunee and the Anishinaabek Nations in August of 1701 when representatives of more than twenty Anishinaabek Nations assembled in Montreal to participate in peace negotiations (Johnston 2004:10). During these negotiations captives were exchanged and the Iroquois and Anishinaabek agreed to live together in peace. Peace between these nations was confirmed again at council held at Lake Superior when the Iroquois delivered a wampum belt to the Anishinaabek Nations.

From the beginning of the eighteenth century to the assertion of British sovereignty in 1763, there is no interruption to Anishinaabek control and use of southern Ontario. While hunting in the territory was shared, and subject to the permission of the various nations for access to their lands, its occupation was by Anishinaabek until the assertion of British sovereignty, the British thereafter negotiating treaties with them. Eventually, with British sovereignty, tribal designations changed (Smith 1975:221–222; Surtees 1985:20–21). According to Rogers (1978), by the twentieth century, the Department of Indian Affairs had divided the "Anishinaubag" into three different tribes, despite the fact that by the early eighteenth

century, this large Algonquian-speaking group, who shared the same cultural background, "stretched over a thousand miles from the St. Lawrence River to the Lake of the Woods." With British land purchases and treaties, the bands at Beausoleil Island, Cape Croker, Christian Island, Georgina and Snake Islands, Rama, Sarnia, Saugeen, the Thames, and Walpole, became known as "Chippewa" while the bands at Alderville, New Credit, Mud Lake, Rice Lake, and Scugog, became known as "Mississauga." The northern groups on Lakes Huron and Superior, who signed the Robinson Treaty in 1850, appeared and remained as "Ojibbewas" in historical documents.

In 1763, following the fall of Quebec, New France was transferred to British control at the Treaty of Paris. The British government began to pursue major land purchases throughout Ontario in the early nineteenth century and entered into negotiations with various Nations for additional tracts of land as the need arose to facilitate European settlement.

In 1805, the Mississaugas were granted one mile (approximately 1.6 km) on either side of the Credit River, Twelve Mile Creek and Sixteen Mile Creek. In 1818, the majority of the Mississauga Tract was acquired by the Crown excluding the lands tracts flanking the Credit River, Twelve Mile Creek and Sixteen Mile Creek. In 1820, the remainder of Mississauga land was surrendered except approximately 81 hectares (ha) along the Credit River (Heritage Mississauga 2012:18). In 1825-26 the Credit Indian Village was established as an agricultural community and Methodist mission near present day Port Credit (Heritage Mississauga 2009a; Mississaugas of the New Credit First Nation 2017a). By 1840 the village was under significant pressure from Euro-Canadian settlement that plans begun to relocate the settlement. In 1847 the Credit Mississaugas were made a land offer by the Six Nations Council to relocate at the Grand River. In 1847, 266 Mississaugas settled at New Credit, approximately 23 km southwest of Brantford. In 1848 a mission of the Methodist Church was established there by Rev. William Ryerson (Woodland Indian Cultural Education Centre 1985). Although the majority of the former Mississague Tract had been surrendered from the Mississauga by 1856 (Gould 1981), this does not exclude the likelihood that the Mississauga continued to utilise the landscape at large during travel (Ambrose 1982) and for resource extraction.

The eighteenth century saw the ethnogenesis in Ontario of the Métis, when Métis people began to identify as a separate group, rather than as extensions of their typically maternal First Nations and paternal European ancestry (Métis National Council n.d.). Métis populations were predominantly located north and west of Lake Superior, however, communities were located throughout Ontario (MNC n.d.; Stone and Chaput 1978:607,608). During the early nineteenth century, many Métis families moved towards locales around southern Lake Huron and Georgian Bay, including Kincardine, Owen Sound, Penetanguishene, and Parry Sound (MNC n.d.). Recent decisions by the Supreme Court of Canada (Supreme Court of Canada 2003, 2016) have reaffirmed that Métis people have full rights as one of the Indigenous people of Canada under subsection 91(24) of the Constitution Act, 1867.

The study area is within Treaty 13a, or the Toronto Purchase, signed on August 2, 1805 by the Mississaugas and the British Crown in Port Credit at the Government Inn. A provisional agreement was reached with the Crown on August 2, 1805, in which the Mississaugas ceded 70,784 acres of land bounded by the Toronto Purchase of 1787 in the east, the Brant Tract in the west, and a northern boundary that ran six miles back from the shoreline of Lake Ontario. The Mississaugas also reserved the sole right of fishing at the Credit River and were to retain a one mile strip of land on each of its banks, which became the Credit Indian Reserve. On September 5, 1806, the signing of Treaty 14 confirmed the

Head of the Lake Purchase between the Mississaugas of the Credit and the Crown (Mississaugas of the New Credit First Nation 2017b; Mississaugas of the New Credit First Nation 2001).

3.3 Historical Euro-Canadian Township Survey and Settlement

Historically, the study area is located in the former Township of Toronto, County of Peel on Lots 1-7, Concession V WCR; and Lots 2-7, Concession IV WCR.

3.3.1 Toronto Township

The Township of Toronto was original surveyed in 1806 by Mr. Wilmot, Deputy Surveyor. The first settler in this Township, and also the County of Peel, was Colonel Thomas Ingersoll. The whole population of the Township in 1808 consisted of seven families, scattered along Dundas Street. The number of inhabitants gradually increased until the war broke out in 1812, which gave considerable check to its progress. When the war was over, the Township's growth revived and the rear part of the Township was surveyed and called the "New Survey." The greater part of the New Survey was granted to a colony of Irish settlers from New York City, who suffered persecution during the war (Walker and Miles 1877).

The Hamilton and Toronto Railway was formed in 1852, and in 1855, completed its lake shore route across the south end of Lot 11. In 1871, the railway was amalgamated with the Great Western Railway, which in turn, was amalgamated in 1882, with the Grand Trunk Railway. The Grand Trunk Railway was amalgamated in 1923, with Canadian National Railway (Andreae 1997:126–127).

Streetsville

The settlement of Streetsville began in 1819 on the banks of the Credit River, just east of Queen Street South (Mississauga Road) in the City of Mississauga when the Crown acquired all lands north of present-day Eglinton Avenue and commenced a formal survey from Timothy Street and Richard Bristol. As partial payment for his services, Street was granted over 4500 acres of land throughout Peel and Halton, including land along the Credit River, much of which would become the future village site (Heritage Mississauga 2009c). The first settler to receive a land grant in the area was James Glendinning. On April 21st, 1819 he received land along Mullet Creek (Heritage Mississauga 2009c). Many early settlers were descended from United Empire Loyalists who left the United States during the War of Independence, including the Barnhart, Birdsall, Embleton, Glendinning, Leslie, Lewis, Lightheart, Row(e), Rutledge, and Switzer families, amongst others. In 1821, Timothy Street built a grist mill along the Credit River, followed by a lumber and saw mill in 1822 (Heritage Mississauga 2009c; Heritage Mississauga 2011). During this time, Street lived in the Niagara Peninsula with his family (Manning 2008).

In 1821 a general store and trading post was opened by John Barnhart at the southwest corner of Queen Street and Pearl Street, called the Montreal House (Heritage Mississauga 2012; Manning 2008; Streetsville Women's Institute 1965). The first general store to serve the community still stands today as the oldest building in the area (Streetsville Women's Institute 1965). The Montreal House, together with the mills, helped to attract many settlers and early businesses to the village, propelling early growth. As early as 1823, a bridge was built over the Credit River, making the community a key crossing and

stopping point. The village officially became known as Streetsville in 1829 when the first post office opened (Heritage Mississauga 2009c). By 1835, grist mills, sawmills, a tannery, and several inns were in operation, making Streetsville the political and economic hub of the surrounding township (Heritage Mississauga 2009c). By 1850 Streetsville had a population of 1000 and was the most prosperous and populated village in Peel County (Heritage Mississauga 2009c).

Early directories list several mills, a tannery, foundry, cooperage, pottery, brickyard, blacksmiths, shoemakers, carriage shops, tinsmith, brewery, telegraph office, physicians, tailors, gunsmith, watchmaker, broom and pail factory, millinery, carpenter, furniture manufacturer, stave factory, bobbin factory, four churches, an Orange Lodge, and two schools (Heritage Mississauga 2009d). Streetsville also had several inns and hotels, including the Telegraph House, Globe Hotel, Tyrone Inn, Franklin House, Pacific Hotel, and Royal Hotel. The Telegraph House and the Globe Hotel are noted to be the most popular (Manning 2008).

The first library in Toronto Township is believed to have been organized in Streetsville by 1826, however it was in the 1850s when the Farmer's and Mechanics' Association was established to promote reading and education (Hicks 2008). In 1895 the Farmers and Mechanics Institute Library became the Streetsville Public Library, because of the Libraries Act passed by Ontario Legislature in 1882 that gave municipalities power to tax themselves to establish free libraries (Hicks 2008). Toronto Township's first high school, the Grammar School opened in Streetsville in 1851 at 321 Queen Street South (Heritage Mississauga 2012). The building served as a school for a century. John Embleton, the community surveyor, built a store at 213 Queen Street South in the 1840s. From 1854 to 1877 it housed the Library of the Farmer's and Mechanic's Institute, and between 1931 and 1952 it was used as the Post Office (Mississauga Library System 2018). The intersection of Queen Street and Main Street became the commercial hub of the community, blossoming around Barnhart's Montreal House and John Embleton's Store.

By 1858 the population of Streetsville had grown to 1,500. The same year Streetsville incorporated as a village, with John Street, Timothy's son, serving as the first Reeve (Heritage Mississauga 2009c). In the 1880s the village had wooden sidewalks. By 1910, the wooden sidewalks had been replaced with cement sidewalks which lasted into the 1960s. The stretch of road between Streetsville and Erindale was paved with cement and opened on September 16, 1931 (Hicks 2008).

By the early twentieth century, Streetsville's mills began to close, and by the 1940s, the last of Streetsville's many hotels had also closed. The community gradually changed from an industrial mill-town into a small businesses and services centre. By 1959, as Streetsville celebrated its centennial anniversary of incorporation, the population had risen to 4,400 (Manning 2008). In 1962 Streetsville achieved Town status, however this status was short lived as Streetsville was amalgamated into the City of Mississauga in 1974 (Heritage Mississauga 2009c).

Barberton

Barberton was a settlement established along Mississauga Road, historically located to the north of Eglinton Avenue, along the Credit River and on the east side of Mississauga Road. Barberton, also known as Creditvale, had one of the approximately 60 mills along the Credit River established by 1851 (Wilkinson 2009). Following the purchase of William Comfort's small mill and farm in 1843, brothers

William and Robert Barber grew their business and built the Toronto Woolen Mills into one of the largest textile manufacturers in the area (Wilkinson 2009; Ontario Heritage Trust 2018). The community that grew around the mill came to be known as Barberton, after William Barber and his brother Robert. Barberton never achieved village status, however 43 buildings were constructed by the Barber brothers for their mill workers (Wilkinson 2009). Following the decline of the brothers' fortunes, the community of Barberton was deserted. Most of the original 43 workers' homes are now gone (Ontario Heritage Trust 2018). Remnants of the original settlement include Barberton Road, which extends east from Mississauga Road and terminates at the Credit River, the mill bridge constructed in 1898, and a small recreational area (Wilkinson 2009).

Mississauga Road

Mississauga Road is one of Mississauga's oldest northwest-southwest thoroughfares that follows the route of a former Indigenous hunting and fishing trail (Skeoch 2000). The Indigenous trail that eventually became Mississauga Road was surveyed by John Embleton in the 1820s (Hicks 2008). By 1831, Mississauga Road had become a significant route for stagecoach service, connecting Springfield (Erindale) and Streetsville with Port Credit (Hicks 2009; City of Mississauga 1983). In 1836, Dundas Street became a toll road. A toll stop was established at Dundas Street and Mississauga Road (then called Streetsville Road), with revenue used to improve the roads (Hicks 2006). Several communities developed along Mississauga Road throughout the nineteenth century, including Port Credit and Streetsville, and other settlements such as Harris' Corners and Barberton which are no longer extant.

Between 1954 and 1956, the development of the Mississauga Golf and Country Club resulted in the re-routing of Mississauga Road (Fitzgibbon 2009). When the City of Mississauga was incorporated in 1974, the Region of Peel became responsible for major roadways including Mississauga Road (Hicks 2006). With urbanization and significant development on either side, Mississauga Road has become a major arterial road through the heart of Mississauga.

Credit River

The study area is within the Credit River Watershed, which drains an area of approximately 860 square kilometres from its headwaters in Orangeville, Erin, and Mono, passing through part of the Niagara Escarpment and the Oak Ridges Moraine, and draining into Lake Ontario at the town of Port Credit (Credit Valley Conservation 2009). The river was named "*Mis.sin.ni.he*" or "*Mazinigae-zeebi*" by the Mississaugas, and surveyor Augustus Jones believed this signified "the trusting creek," or could also be translated as "to write or give and make credit," while the French name used when the river was first mapped in 1757 was "*Riviere au Credit.*" These names refer to the fur trading period, when French, British, and Indigenous traders would meet along this river (Smith 1987:255–257; Rayburn 1997:84; Scott 1997:182; Gibson 2002:177; Robb et al. 2003:6). The Credit River was historically considered to be one of the best potential power sources for milling in all of southern Ontario, which led to the development of early saw and grist mill industries, and later textile mills, distilleries, bottling plants, and hydro-electric plants spawned communities throughout the river valley, typically close to the Niagara Escarpment (Town of Caledon 2009:7.1).

Credit Valley Railway

The Credit Valley Railway (CVR) (now part of the Milton GO Rail Corridor, CP Galt Subdivision) bisects the study area and was constructed between 1877 and 1879 to improve trade opportunities in southern Ontario (Town of Caledon 2009). The project was backed by George Laidlaw and was intended to connect Toronto with Orangeville via Streetsville. Construction began in 1874 and over several subsequent years several branches were added to the proposed line. The first section of track from Parkdale (Toronto) to Milton was opened in 1877. In 1873, survey work was completed, and track was first laid in 1876. Construction on the railway reached the Forks of the Credit by 1879 with a station at the northern end of the longest curved timber trestle of the time, which spanned 1,146 feet through the river valley at a height of 85 feet (Town of Caledon 2009:7.30). The line was completed in 1881 but nearly bankrupted the company. It was established in direct competition with the Toronto, Grey and Bruce Railway in the hopes of stimulating trade and economic opportunities in the outlying areas. In 1883 the line was taken over by the Canadian Pacific (CP) Railway (Heritage Mississauga 2009b; Town of Caledon 2009).

3.4 Review of Historical Mapping

The 1859 *Tremaine's Map of the County of Peel* and the 1877 *Illustrated Historical Atlas of the County of Peel* were reviewed to examine the study area from the nineteenth century.

It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases. In addition, the use of historical map sources to reconstruct/predict the location of former features within the modern landscape generally proceeds by using common reference points between the various sources. These sources are then geo-referenced in order to provide the most accurate determination of the location of any property on historic mapping sources. The results of such exercises are often imprecise or even contradictory, as there are numerous potential sources of error inherent in such a process, including the vagaries of map production (both past and present), the need to resolve differences of scale and resolution, and distortions introduced by reproduction of the sources. To a large degree, the significance of such margins of error is dependent on the size of the feature one is attempting to plot, the constancy of reference points, the distances between them, and the consistency with which both they and the target feature are depicted on the period mapping.

Historically, the study area is located in the former Township of Toronto, County of Peel on Lots 1-7, Concession V WCR; and Lots 2-7, Concession IV WCR.

Details of historical property owners and historical features in the study area are listed in Table 1.

Table 1: Nineteenth-century property owner(s) and historical features(s) within the study area

		1859 Tremaine's Map		*1877 Illustrated Historical Atlas*	
Lot #	**Con #**	**Property Owner(s)**	**Historical Feature(s)**	**Property Owner(s)**	**Historical Feature(s)**
1	V WCR	Thos. Devine Dougs. Montgomery	Eglinton Avenue West Erin Mills Parkway Eglinton Avenue West Mississauga Road	Mich Devine James Montgomery	Eglinton Avenue West Mississauga Road Mullet Creek
2		James Patterson	Mississauga Road	Thomas Sibbald	Mississauga Road Credit Valley Railway Mullet Creek
3		Jno. Sterling	Streetsville	None	Streetsville
4		None	Streetsville	None	Streetsville
5		Henry Rutledge	Erin Mills Parkway Britannia Road West Mullet Creek	Donald Douglas Joseph Rutledge	Britannia Road West Britannia Road West Credit Valley Railway
6		John C. Hyde	Erin Mills Parkway Britannia Road West Mullet Creek	John Rutledge	Britannia Road West Credit Valley Railway
7		T.S. John Eakins Robt. Ramsay	Residence Mississauga Road Mississauga Road Mississauga Road	Jno Eakins Robt. Ramsay	Residence Orchard Mississauga Road Orchard Mississauga Road
2	IV WCR	None	Mississauga Road	None	Mississauga Road Credit Valley Railway
3		None	Streetsville	None	Streetsville
4		None	Streetsville	None	Streetsville
5		Henry Rutledge Richard Caslor	Streetsville Britannia Road West Credit River Residence Britannia Road West Credit River	None Solomon Caslor	Streetsville Britannia Road West Mississauga Road Residence Orchard Britannia Road West Credit River
6		Jos. J. Rutledge	Mississauga Road Britannia Road West Credit River	Jno. Rutledge	Mississauga Road Britannia Road West Credit Valley Railway
7		Chris Rowe Robt. Ramsay	Mississauga Road Mississauga Road	Wm. Hardy Robert Ramsay	Orchard Mississauga Road Mississauga Road

The 1859 *Tremaine's Map* (Figure 3) shows that the community of Streetsville is depicted as a densely populated village on either side of Queen Street South between Britannia Road West and Church Street. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway were all historically surveyed roads. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, and Britannia Road West are depicted following their present alignments and appear to be well-established roadways. Erin Mills Parkway on the map is depicted as a straight northwest to southeast road to the west of the community of Streetsville. The study area travels along the historically surveyed roadways, before traversing through Lot 1 and 2 Concession V, through subdivided properties and the lots owned by James Patterson and Thomas Devine.

The 1877 *Illustrated Historical Atlas* (Figure 4) illustrates that the Streetsville village core has expanded substantially by this period. The Credit Valley Railway is depicted on the map following a north-south alignment west of Queen Street South and intersecting with the study area along Queen Street South and Britannia Road West. Streetsville is surrounded by agricultural land, however development can be seen extending south as properties are already subdivided along the west side of Queen Street South and Mississauga Road. Clusters of structures are illustrated on the lot occupying the north corner of the intersection of present-day Mississauga Road and Eglinton Avenue West. Mullet Creek is depicted on the map as intersecting the study area along Britannia Road West and Eglinton Avenue West. The creek travels from the northwest to the southeast in the western part of Streetsville to the west of Mississauga Road, Queen Street North, and Queen Street South.

In addition to nineteenth-century mapping, historical topographic mapping and aerial photographs from the twentieth century were examined. This report presents maps and aerials photographs from 1909, 1954, 1973, and 1994. These do not represent the full range of maps consulted for the purpose of this study but were judged to cover the full range of land uses that occurred in the area during this period.

The 1909 topographic map (Figure 5) depicts that there had been some development along the study areas by this time with additional stone or brick and wooden houses being illustrated along the routes of the alignments. The former Credit Valley Railway is now the Canadian Pacific Railway (CPR), with Streetsville Junction located near the intersection of Britannia Road West and Queen Street North. Eglinton Avenue West, Mississauga Road, Queen Street South, Queen Street North, Britannia Road West, and Erin Mills Parkway are all depicted as unmetalled roads.

The 1954 aerial photograph (Figure 6) shows that the settlement area of Streetsville has retained its rural context into the mid-twentieth century. The areas outside of the village core remain largely agricultural, though development of residential subdivisions have begun southeast of the intersection of Queen Street South and Britannia Road West. The roadways follow the alignments previously described. Some additional development in Streetsville and the area around Streetsville Junction is depicted with some outward growth from Mississauga Road, Queen Street North, and Queen Street South.

The 1973 topographic map (Figure 7) illustrates that there was significant development both within and outside the Streetsville village core. This map labels Eglinton Avenue West as Base Line Road West and Erin Mills Parkway as Fifth Line West. The roadways are all depicted as two-lane hard surface, all weather roads. The area around Eglinton Avenue West remains mostly a rural agricultural context.

The 1994 topographic map (Figure 8) demonstrates that there had been growth and development of the Streetsville area in the late twentieth century which has now encompassed most of the land adjacent to the study areas, though the subdivision that contains the Alternative 4 Option has not yet been built but future roadways are shown. The areas north of Eglinton Avenue West between Erin Mills Parkway and Mississauga Road; and north of Britannia Road West between Erin Mills Parkway and Mississauga Road are more sparsely developed. Erin Mills Parkway is now illustrated in its present alignment travelling mostly northwest to southeast with a slight curve around the Vista Heights community.

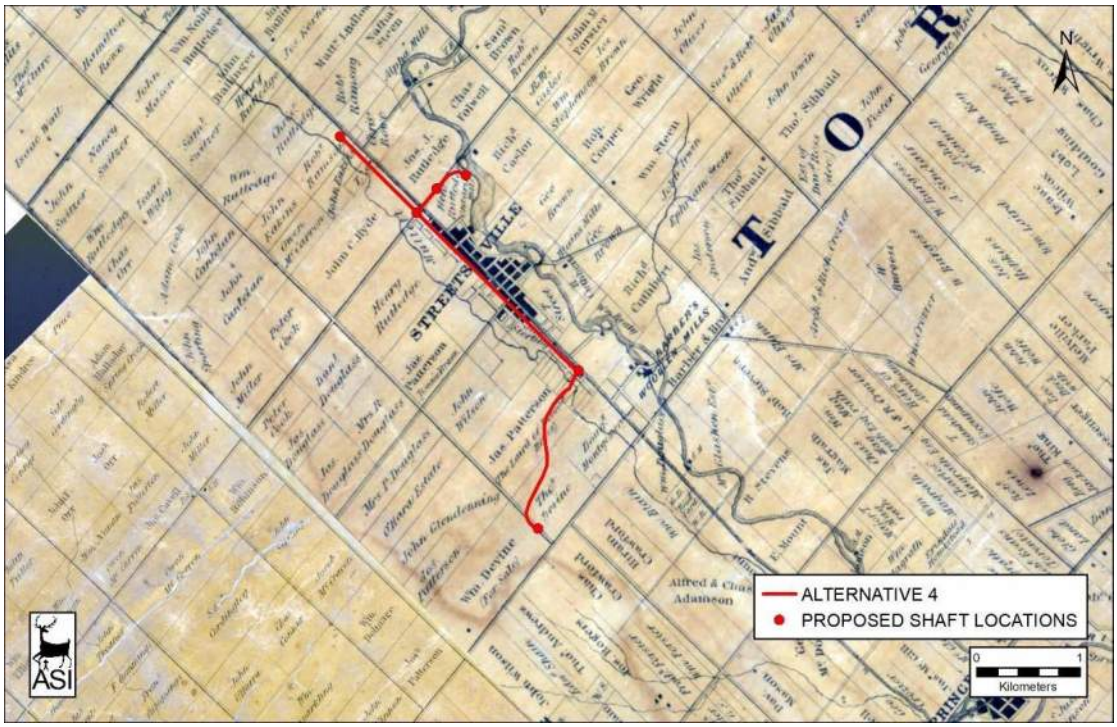


Figure 3: The study area overlaid on the 1859 *Tremaine's Map of the County of Peel*

Base Map: Tremaine 1859

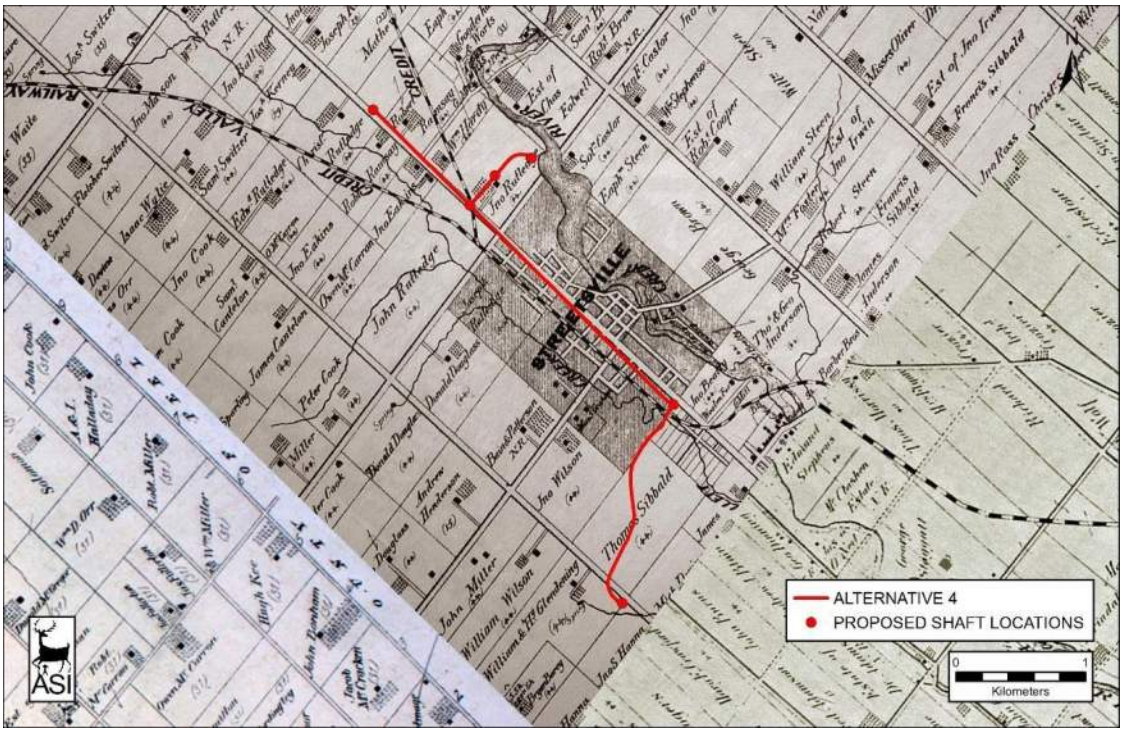


Figure 4: The study area overlaid on the 1877 Illustrated Historical Atlas of the County of Peel
Base Map: Walker and Miles 1877

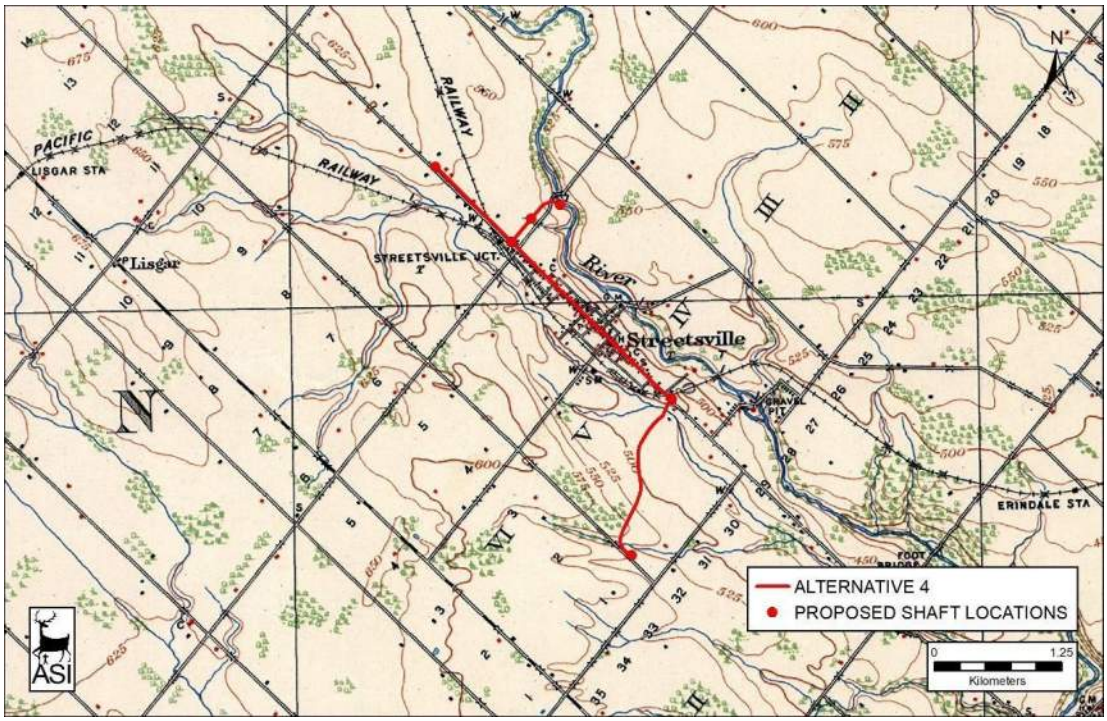


Figure 5: The study area overlaid on the 1909 Brampton NTS map
Base Map: NTS Sheet 35 (Department of Militia and Defence 1909)

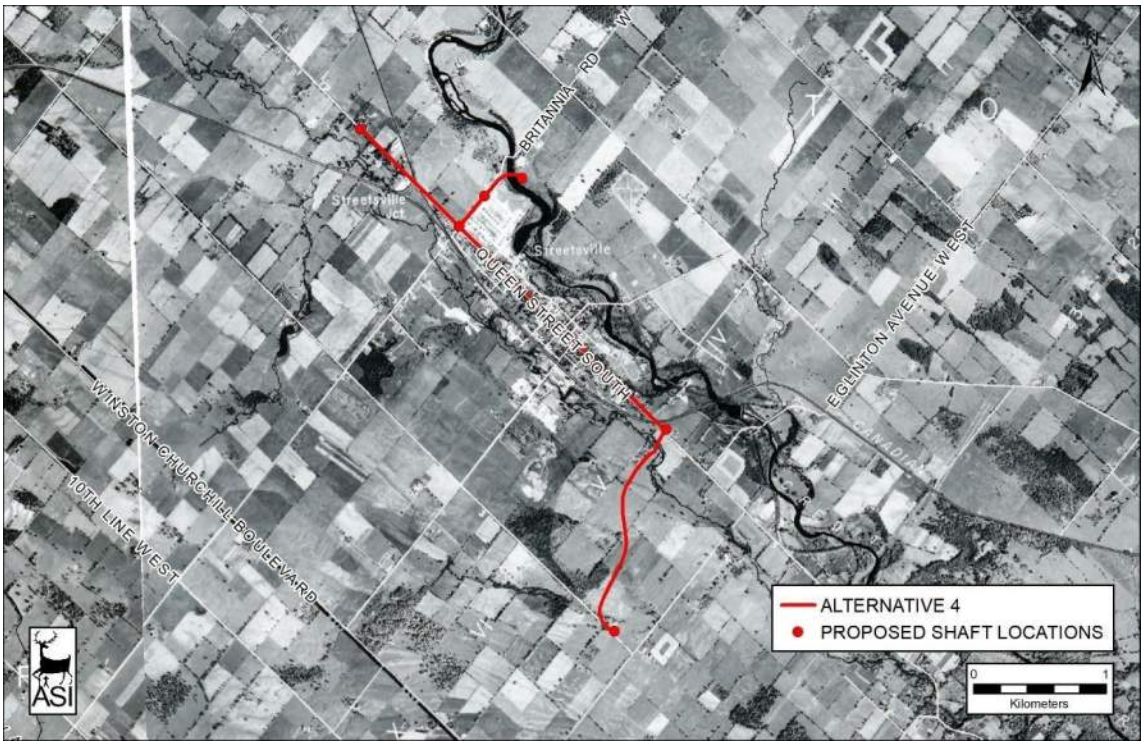


Figure 6: The study area overlaid on the 1954 aerial photograph
Reference: Plate 435.793 (Hunting Survey Corporation Limited 1954)

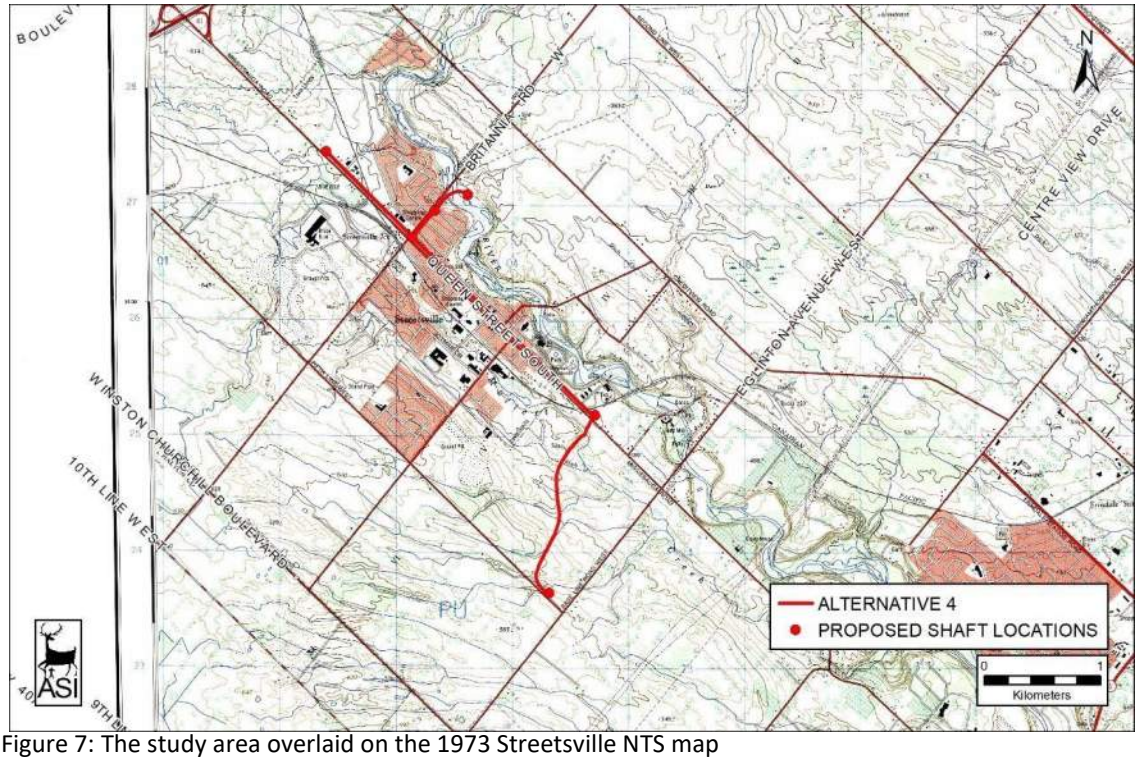


Figure 7: The study area overlaid on the 1973 Streetsville NTS map
Base Map: NTS Sheet No. 30 M/12B (Department of Energy, Mines and Resources 1973)

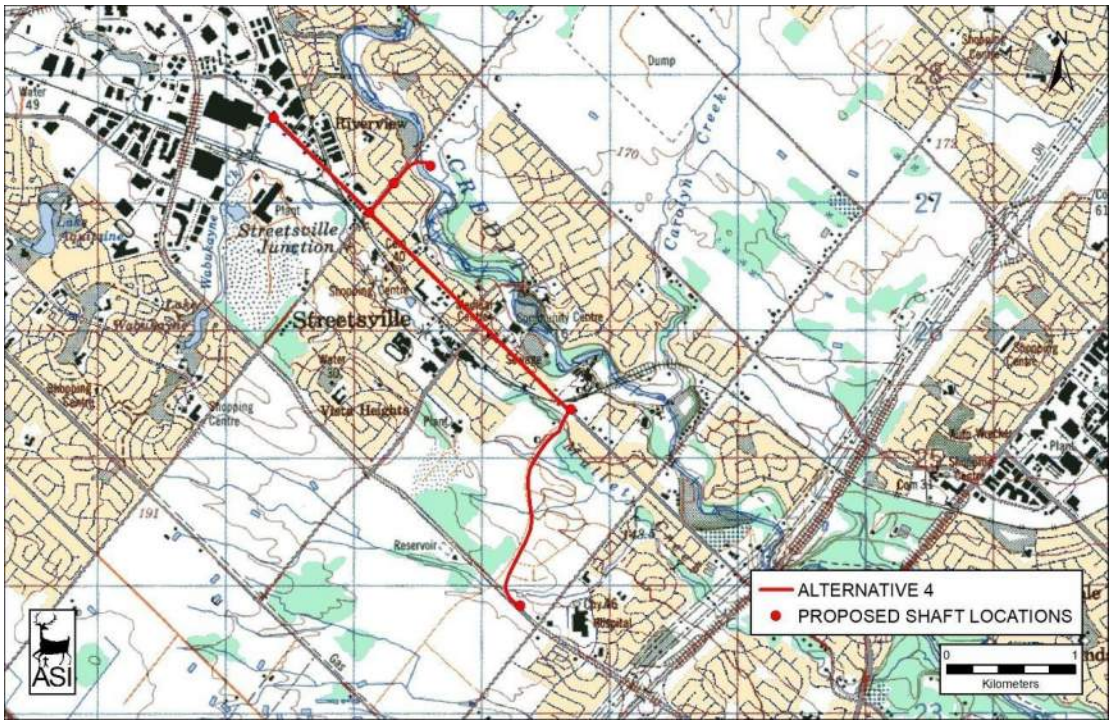


Figure 8: The study area overlaid on the 1994 Brampton NTS map
Base Map: NTS Sheet 30 M/12 (Department of Energy, Mines and Resources 1994)

4.0 EXISTING CONDITIONS

4.1 Description of Field Review

A field review of the study area was undertaken by Peter Carruthers of ASI, on 16 May 2019, and Kirstyn Allam of ASI on 17 June 2021 to document the existing conditions of the study area. The field review was preceded by a review of available current and historical aerial photographs and maps (including online sources such as Bing and Google maps). These large-scale maps were reviewed for any potential BHRs and CHLs which may be extant in the study area. The field review was conducted to confirm the location and condition of previously identified built heritage resources and cultural heritage landscapes, and identify any additional ones based on the criteria outlined in Section 2.3 The existing conditions of the study area are described below. Known and potential BHRs and CHLs are discussed and mapped in Section 4.2 of this report.

Alignment 4 is primarily focused on Mississauga Road, Queen Street North, and Queen Street South (a single road, for ease of understanding in this section, Mississauga Road will be used when discussing this roadway); with a branch along Britannia Road West, starting east of the intersection with Queen Street North and a branch along Erin Centre Boulevard. The alignment is approximately 3.35 kilometres in length along Mississauga Road. Mississauga Road is oriented in a northwest-southeast alignment and features two lanes of northwest and southeast-bound vehicular traffic. Mississauga Road also has sidewalks and curbs on both sides. The portion of the study area that travels along Britannia Road West is approximately 620 metres in length from its intersection with Mississauga Road. Britannia Road West

is oriented in a northeast to southwest alignment and features four lanes of northeast and southwest-bound vehicular traffic with curbs and sidewalks on both sides. The eastern end of the branch travels southeast to the Credit River. The portion of the study area that travels along Erin Centre Boulevard is approximately 1.5 kilometres in length from its intersection with Mississauga Road to Erin Mills Parkway. Erin Centre Boulevard is oriented in a northeast to southwest alignment and features two lanes of northeast and southwest-bound vehicular traffic with curbs and sidewalks on both sides.

Plate 1: Northern section of the study area, looking south on Mississauga Road towards Alpha Mills Road (2019).

Plate 2: Northern section of the study area, looking north on Mississauga Road from Alpha Mills Road (2019).

Plate 3: Commercial structures fronting on Mississauga Road, looking north from Britannia Road (2019).

Plate 4: Intersection of Queen Street and Britannia Road, looking southwest (2019).

Plate 5: Intersection of Queen Street and Britannia Road, looking southeast (2019).

Plate 6: View of Britannia Road west of the Credit River, looking southwest (2019).

Plate 7: View of the Credit River south of Britannia Road, looking south (2019).

Plate 8: Mississauga Road, looking southeast from Melody Drive (2019).

Plate 9: Queen Street, looking northwest from at-grade rail crossing on the GO Milton Rail Corridor (2019).

Plate 10: Residences on Queen Street in Streetsville, looking northwest from Reid Drive (2019).

Plate 11: Queen Street, looking northwest from south of Beech Street in Streetsville (2019).

Plate 12: Queen Street, looking northwest from Thomas Street in Streetsville (2019).

Plate 13: Queen Street, looking northeast from Ontario Street (2019).

Plate 14: Erin Centre Boulevard approaching Erin Mills Parkway (2021).

Plate 15: Erin Centre Boulevard, looking northwest towards Forest Hill Drive (2021).

Plate 16: Erin Centre Boulevard, looking southwest from Mississauga Road (2021).

4.2 Identification of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes

Based on the results of the background research and field review, thirteen cultural heritage resources (including 7 BHRs and 6 CHLs) were identified within and adjacent to the study area related to all four alternatives[2]. These built heritage resources and cultural heritage landscapes were all previously

[2] To maintain consistency and avoid confusion, all BHRs and CHLs identified as part of the initial report for Alternatives 1, 2a and 2b have been identified as part of this report.

identified in the background research, with no additional potential BHRs and CHLs identified during the field review. The BHRs and CHLs include: two streetscapes, a watercourse, seven residences, two natural areas, and one former farmscape. A detailed inventory of these BHRs and CHLs within and/or adjacent to the study area are presented in Table 2, followed by mapping of the features.

Table 2: Inventory of Known and Potential Built Heritage Resources and Cultural Heritage Landscapes within the study area

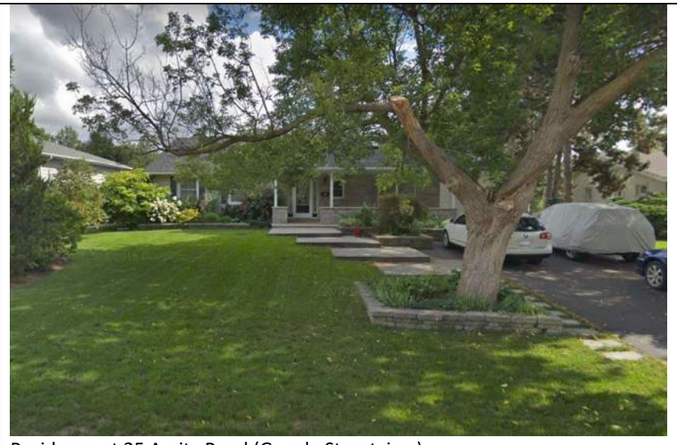
Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHL1	CHL	Streetsville Village Core	Streetscape	Identified in the 2005 *Cultural Heritage Landscape Inventory*	Historical: -Streets depicted in the 1859 *Tremaine Map.* -Residences depicted in the 1909 NTS map. Design: -Residences feature similar scale, massing, and setbacks off Queen Street South. -There is a mixed use between residences and commercial properties. -There are a variety of styles that demonstrates the continued mixed use of the Queen Street South and Streetsville neighbourhood from the late nineteenth century. Context: -Located on the northeast and southwest side of Queen Street South, an early transportation route in the community of Streetsville. -Reflects the nineteenth-century settlement along Queen Street South in Streetsville through their style, scale/massing, set back and landscape features. Properties within or in the vicinity of the study area that support or contribute to the heritage character of the streetscape include: 4 Caroline Street 3 Main Street (L) 6 Main Street (L) 7 Main Street* 7 Pearl Street* 42 Queen Street South (L) 44 Queen Street South (L) 45 Queen Street South 47 Queen Street South* 49 Queen Street South 52 Queen Street South 53 Queen Street South 56 Queen Street South 57 Queen Street South 58 Queen Street South 60 Queen Street South 62 Queen Street South* 63 Queen Street South 66 Queen Street South 69 Queen Street South (C) 70 Queen Street South 81 Queen Street South 82 Queen Street South 85 Queen Street South (L) 89 Queen Street South 93 Queen Street South (L) 95 Queen Street South 98 Queen Street South 182 Queen Street South 184 Queen Street South 186 Queen Street South 187 Queen Street South 188 Queen Street South 190 Queen Street South 194 Queen Street South 200 Queen Street South 201 Queen Street South (L) 204 Queen Street South 205 Queen Street South 206 Queen Street South 208 Queen Street South* 209 Queen Street South 210 Queen Street South* 212 Queen Street South 213 Queen Street South 214 Queen Street South (L) 220 Queen Street South 221 Queen Street South (L) 222 Queen Street South 223 Queen Street South* 224 Queen Street South 228 Queen Street South* 229 Queen Street South 232 Queen Street South* 233 Queen Street South* 234 Queen Street South* 288 Queen Street South (L) 291 Queen Street South 292 Queen Street South* 295 Queen Street South* (C) 296 Queen Street South (L) 299 Queen Street South* (T) (P) 300 Queen Street South* 302 Queen Street South (L) 306 Queen Street South 307 Queen Street South*(L) 308 Queen Street South 309 Queen Street South 311 Queen Street South 312 Queen Street South (L) 316 Queen Street South (L) 317 Queen Street South (L) 318 Queen Street South 319 Queen Street South (L) 322 Queen Street South (L) 323 Queen Street South 324 Queen Street South 326 Queen Street South 327 Queen Street South* 328 Queen Street South 330 Queen Street South 331 Queen Street South 332 Queen Street South 334 Queen Street South	 Queen Street in Streetville Village Core, loooking northwest from Mill Street. Queen Street in Streetville Village Core, loooking southwest from Main Street.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					99 Queen Street South 101 Queen Street South 104 Queen Street South 108 Queen Street South 110 Queen Street South 112 Queen Street South 113 Queen Street South 115 Queen Street South 125 Queen Street South 127 Queen Street South 128 Queen Street South 129 Queen Street South 131 Queen Street South 136 Queen Street South 137 Queen Street South 142 Queen Street South 147 Queen Street South 148 Queen Street South 151 Queen Street South (L) 154 Queen Street South (L) 157 Queen Street South* 158 Queen Street South 167 Queen Street South (L) 168 Queen Street South 175 Queen Street South 180 Queen Street South 181 Queen Street South 235 Queen Street South* 236 Queen Street South 237 Queen Street South 238 Queen Street South 241 Queen Street South 242 Queen Street South (L) 248 Queen Street South 249 Queen Street South 251 Queen Street South 252 Queen Street South (L) 254 Queen Street South 256 Queen Street South 257 Queen Street South 258 Queen Street South (L) 261 Queen Street South (L) 262 Queen Street South 263 Queen Street South* 264 Queen Street South* 265 Queen Street South* 271 Queen Street South* 274 Queen Street South* 275 Queen Street South 279 Queen Street South (L) 280 Queen Street South* 281 Queen Street South 283 Queen Street South 287 Queen Street South (L) 335 Queen Street South 336 Queen Street South 337 Queen Street South (L) 338 Queen Street South 339 Queen Street South 340 Queen Street South (L) 343 Queen Street South (L) 344 Queen Street South 345 Queen Street South (L) 347 Queen Street South 350 Queen Street South (L) 351 Queen Street South 353 Queen Street South 354 Queen Street South (L) 356 Queen Street South (L) 357 Queen Street South (L) 360 Queen Street South (L) 361 Queen Street South 362 Queen Street South 362-A Queen Street South 364 Queen Street South (L) 365 Queen Street South (L) 366 Queen Street South 370 Queen Street South 371 Queen Street South 27 Reid Mill (P) *Designated Part IV (L) Listed on the City of Mississauga Heritage Register prior to 2005 (C) Cemetery (T) Significant Tree (P) Plaque	 St. Andrew's Presbyterian Church and Cemetery in Streetville Village Core, loooking northwest (Google Streetview).
CHL2	CHL	Mississauga Road Scenic Route	Streetscape	Identified in the 2005 *Cultural Landscape Inventory*	Historical: -Streets depicted in the 1859 *Tremaine Map*. -Residences depicted in the 1909 NTS map. Design: -Residences feature similar scale, massing, and setbacks off Queen Street South. -There is a mixed use between residences and commercial properties. -There are a variety of styles, and demonstrate the continued residential occupation of the Queen Street South and Streetsville neighbourhood from the late nineteenth century. Context: -Located on the northeast and southwest side of Queen Street South, an early transportation route in the community of Streetsville.	

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					-Reflects the nineteenth-century settlement along Queen Street South in Streetsville through their style, scale/massing, set back and landscape features. Properties within or in the vicinity of the study area that support or contribute to the heritage character of the streetscape include: 4 Caroline Street 2125 Erin Centre Boulevard 8 Falconer Drive 1 James Street 2 James Street 3 Main Street (L) 6 Main Street (L) 7 Main Street* 1918 Melody Drive 5020 Mississauga Road 5021 Mississauga Road 5028 Mississauga Road 5029 Mississauga Road 5036 Mississauga Road 5037 Mississauga Road 5044 Mississauga Road 5045 Mississauga Road 5087 Mississauga Road 5090 Mississauga Road 5095 Mississauga Road 5098 Mississauga Road 5103 Mississauga Road 5106 Mississauga Road 5111 Mississauga Road 5114 Mississauga Road 5119 Mississauga Road 5127 Mississauga Road 5135 Mississauga Road 5155 Mississauga Road* 5158 Mississauga Road 5166 Mississauga Road 5174 Mississauga Road 5175 Mississauga Road 5182 Mississauga Road 5190 Mississauga Road 5198 Mississauga Road 5206 Mississauga Road 5214 Mississauga Road 5215 Mississauga Road 5222 Mississauga Road 5230 Mississauga Road 5235 Mississauga Road 29 Queen Street South 31 Queen Street South 32 Queen Street South 33 Queen Street South 34 Queen Street South 35 Queen Street South 36 Queen Street South 37 Queen Street South 38 Queen Street South 40 Queen Street South 41 Queen Street South (L) 42 Queen Street South (L) 44 Queen Street South (L) 45 Queen Street South 47 Queen Street South* 49 Queen Street South 52 Queen Street South 53 Queen Street South 56 Queen Street South 57 Queen Street South 58 Queen Street South 60 Queen Street South 62 Queen Street South* 63 Queen Street South 66 Queen Street South 69 Queen Street South (C) 70 Queen Street South 81 Queen Street South 82 Queen Street South 85 Queen Street South (L) 89 Queen Street South 93 Queen Street South (L) 95 Queen Street South 98 Queen Street South 99 Queen Street South 101 Queen Street South 104 Queen Street South 108 Queen Street South 110 Queen Street South 112 Queen Street South 113 Queen Street South 115 Queen Street South 234 Queen Street South* 235 Queen Street South* 236 Queen Street South 237 Queen Street South 238 Queen Street South 241 Queen Street South 242 Queen Street South (L) 248 Queen Street South 249 Queen Street South 251 Queen Street South 252 Queen Street South (L) 254 Queen Street South 256 Queen Street South 257 Queen Street South 258 Queen Street South (L) 261 Queen Street South (L) 262 Queen Street South 263 Queen Street South* 264 Queen Street South* 265 Queen Street South* 271 Queen Street South* 274 Queen Street South* 275 Queen Street South 279 Queen Street South (L) 280 Queen Street South* 281 Queen Street South 283 Queen Street South 287 Queen Street South (L) 288 Queen Street South (L) 291 Queen Street South 292 Queen Street South* 295 Queen Street South* (C) 296 Queen Street South (L) 299 Queen Street South* (T) (P) 300 Queen Street South* 302 Queen Street South (L) 306 Queen Street South 307 Queen Street South* (L) 308 Queen Street South 309 Queen Street South 311 Queen Street South 312 Queen Street South (L)	Residences within the Mississauga Road Scenic Route north of Reid Drive. Mississauga Scenic Route, looking northwest from south of Beech Street.

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					5238 Mississauga Road 5246 Mississauga Road 5267 Mississauga Road 5306 Mississauga Road (L) 6190 Mississauga Road 6216 Mississauga Road 6226 Mississauga Road 6300 Mississauga Road 2006 Montcrest Court 2023 Montcrest Court 7 Pearl Street* 2 Queen Street North 3 Queen Street North 4 Queen Street North 14 Queen Street North 17 Queen Street North 20 Queen Street North 21 Queen Street North 26 Queen Street North 40 Queen Street North 53 Queen Street North 57 Queen Street North 61 Queen Street North 133 Queen Street North 135 Queen Street North 1 Queen Street South 5 Queen Street South 6 Queen Street South 7 Queen Street South 9 Queen Street South 10 Queen Street South 11 Queen Street South 12 Queen Street South 13 Queen Street South 14 Queen Street South 15 Queen Street South 17 Queen Street South 18 Queen Street South 19 Queen Street South 20 Queen Street South 21 Queen Street South 23 Queen Street South 25 Queen Street South 26 Queen Street South 27 Queen Street South 28 Queen Street South (L) 233 Queen Street South* *Designated Part IV	125 Queen Street South 127 Queen Street South 128 Queen Street South 129 Queen Street South 131 Queen Street South 136 Queen Street South 137 Queen Street South 142 Queen Street South 147 Queen Street South 148 Queen Street South 151 Queen Street South (L) 154 Queen Street South (L) 157 Queen Street South* 158 Queen Street South 167 Queen Street South (L) 168 Queen Street South 175 Queen Street South 180 Queen Street South 181 Queen Street South 182 Queen Street South 184 Queen Street South 186 Queen Street South 187 Queen Street South 188 Queen Street South 190 Queen Street South 194 Queen Street South 200 Queen Street South 201 Queen Street South (L) 204 Queen Street South 205 Queen Street South 206 Queen Street South 208 Queen Street South* 209 Queen Street South 210 Queen Street South* 212 Queen Street South 213 Queen Street South 214 Queen Street South (L) 220 Queen Street South 221 Queen Street South (L) 222 Queen Street South 223 Queen Street South* 224 Queen Street South 228 Queen Street South* 229 Queen Street South 232 Queen Street South*	316 Queen Street South (L) 317 Queen Street South (L) 318 Queen Street South 319 Queen Street South (L) 322 Queen Street South (L) 323 Queen Street South 324 Queen Street South 326 Queen Street South 327 Queen Street South* 328 Queen Street South 330 Queen Street South 331 Queen Street South 332 Queen Street South 334 Queen Street South 335 Queen Street South 336 Queen Street South 337 Queen Street South (L) 338 Queen Street South 339 Queen Street South 340 Queen Street South (L) 343 Queen Street South (L) 344 Queen Street South 345 Queen Street South (L) 347 Queen Street South 350 Queen Street South (L) 351 Queen Street South 353 Queen Street South 354 Queen Street South (L) 356 Queen Street South (L) 357 Queen Street South (L) 360 Queen Street South (L) 361 Queen Street South 362 Queen Street South 362-A Queen Street South 364 Queen Street South (L) 365 Queen Street South (L) 366 Queen Street South 370 Queen Street South 371 Queen Street South 27 Reid Mill (P) 5091 Rothesay Court 5092 Rothesay Court 1988 Royal Credit Boulevard 1989 Royal Credit Boulevard 1775 Thorny Brae Place	

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
					(L) Listed on the City of Mississauga Heritage Register prior to 2005 (C) Cemetery (T) Significant Tree (P) Plaque	
CHL3	CHL	Credit River Corridor	Watercourse	Identified in the 2005 *Cultural Landscape Inventory*	Historical: -Surveyed by Augustus Jones, named "Mis.sin.ni.he" or "Mazinigae-zeebiy by the Mississaugas, which translates to either "the trusting creek" or "to write or give and make credit" -Historically considered to be one of the best potential power sources for milling in all of southern Ontario, which led to the development of early saw and grist mill industries, and later textile mills, distilleries, bottling plants, and hydro-electric plans spawned communities throughout the river valley. Design: -The river is almost 90 kilometres long, beginning in Orangeville, flowing through nine municipalities before draining into Lake Ontario at Port Credit. -Within Mississauga, the Credit River flows for approximately 24 kilometres, meandering from the northwest to southeast. Context: -The Credit River played a significant role in the development of the City of Mississauga, from shaping the landscape to providing a life line for Indigenous people, European settlers, and modern communities.	 Credit River south of Britannia Road.
BHR1	BHR	21 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map -Previous bungalow was demolished between 2009 and 2011 and present structure was built after (according to Google Streetview) Design: -One-and-a-half storey bungalow with two-car garage below the bungalow -Covered front entrance with pillars Context: -Located on the northeast side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 21 Amity Road (Google Streetview)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
BHR2	BHR	23 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey brick bungalow with vinyl-cladding on the southern part of the front elevation -Hipped roof with a chimney on the north end -Two car garage below the bungalow Context: -Located on the northeast side of Amity Road	 Residence at 23 Amity Road (Google Streetview)
BHR3	BHR	25 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey brick bungalow with attached one-car garage -Covered front porch Context: -Located on the northwest side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 25 Amity Road (Google Streetview)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
BHR4	BHR	27 Amity Road	Residence	Listed in the *Heritage Register for Mississauga*	Historical: - Located in Lot 5, Concession IV WCR; was occupied by Henry Rutledge in nineteenth century mapping -A developed area and Amity Road is depicted in the 1973 NTS map Design: -One-storey bungalow -Roof overhangs the southwest elevation Context: -Located on the northwest side of Amity Road, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 27 Amity Road (Google Streetview)
BHR5	BHR	24 Ardsley Street	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 6, Concession IV WCR; was occupied by Jos. J. Rutledge in nineteenth century mapping -A house is depicted in the vicinity on the 1954 aerial photograph Design: -One-and-a-half storey T-plan house -One-storey addition to southwest elevation and attached garage Context: -Located on the northwest side of Ardsley Street, a residential road in the community of Streetsville -Reflects twentieth century settlement practices in the community of Streetsville	 Residence at 24 Ardsley Street (Google Streetview)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
BHR6	BHR	4695 Beaufort Terrace	Residence	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 3, Range V NDS; was occupied by Wm. Douglass and Geo. Dunning in nineteenth century mapping -Beaufort Terrace and a developed area is depicted in the 1994 NTS map Design: -Two-storey brick house with attached two-car garage Context: -Located on the northwest side of Beaufort Terrace, a residential road in the community of Streetsville -Reflects mid- to late-twentieth century residential development in the community of Streetsville	 Residence at 4695 Beaufort Terrace (Google Streetview)
CHL4	CHL	1700 Britannia Road West	Former Farmscape	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 5, Concession IV WCR; was occupied by Richard Caslor and Solomon Caslor in nineteenth century mapping -A residence is depicted on 1859 *Tremaine Map* in vicinity of the parcel near the intersection of the Credit River and Britannia Road West Design: -At the time of field review, there was no house present Context: -Located on the south side of Britannia Road West, an early transportation route north of Streetsville NOTE- At the time of field review there was no residence or any extant historical agricultural features visible from the adjacent ROW.	 Satelite imagery of the former farmscape at 1700 Britannia Road West (Google Maps)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
BHR7	BHR	2275 - 2285 Britannia Road West	Residence	Designated Part IV	Historical: -Located in Lot 6, Concession V WCR; was occupied by John C. Hyde and John Rutledge in nineteenth century mapping -A house is depicted in the vicinity on the 1909 NTS map -House moved to its present location between 2012 and 2014 Design: -One-and-a-half storey house -Re-clad in vinyl after the house was moved -Gable roof with two chimneys -Door to property on the southeast elevation Context: -Located on the northwest side of Britannia Road West, an early transportation route north of Streetsville -Reflects nineteenth-century settlement practices in the former Toronto Township	 North elevation of residence at 2275 Britania Road.
CHL5	CHL	1760 The Chase	Natural Area	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 2. Range V NDS; was occupied by Wm. Blair and Andrew A. Blair in nineteenth century mapping -A residence and orchard are depicted in the 1877 *Illustrated Historical Atlas* in the vicinity of the parcel near the northern edge of the property at Eglinton Avenue West Design: -At the time of field review there were no structures present Context: - Located on the northeast side of The Chase, south of Eglinton Avenue West, an early transportation route south of Streetsville NOTE- At the time of field review there was no residence, structures, or any extant historical agricultural features visible from the adjacent ROWs.	 Satelite imagery of the natural area at 1760 The Chase (Google Maps)

Feature ID	Feature Type	Location/Address	Resource Type	Heritage Recognition	Description	Photos
CHL6	CHL	1745 Thorny Brae Place	Natural Area	Listed in the *Heritage Register for Mississauga*	Historical: -Located in Lot 3, Range V NDS; was occupied by Wm Douglass and Geo. Dunning in nineteenth century mapping -A house is depicted in the vicinity of the parcel on the 1954 aerial photograph Design: -At the time of field review there were no structures present Context: -Located on the northeast side of Thorny Brace Place, a residential road in the community of Streetsville NOTE- At the time of field review there was no residence or any extant historical residential features visible from the adjacent ROWs.	 Satelite imagery of the natural area at 1745 Thorny Brae Place (Google Maps)

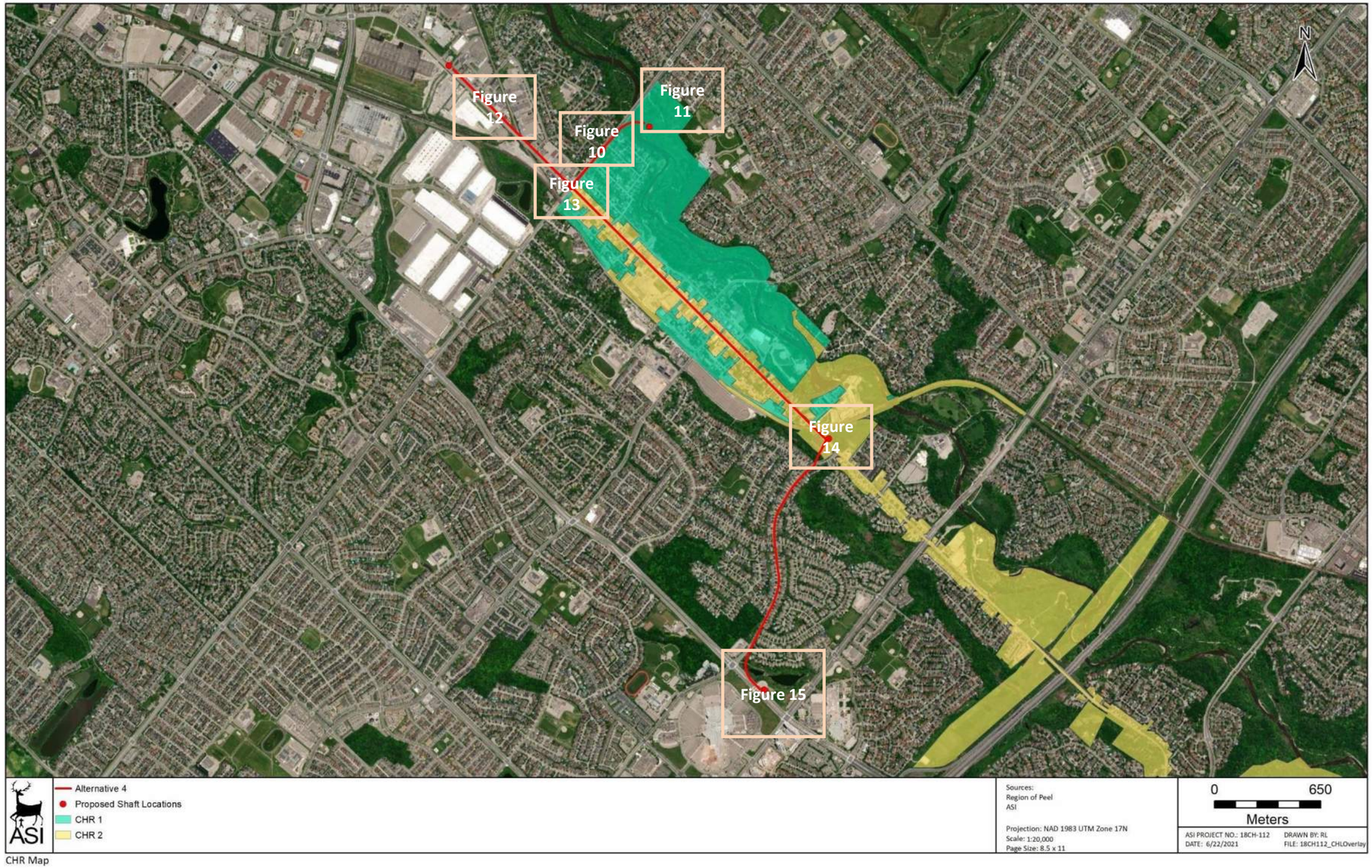


Figure 9: Overview of BHRs and CHLs and Alternative 4

CHL Overlay (SA 0)

Figure 10: Location of BHRs and CHLs adjacent to SA0

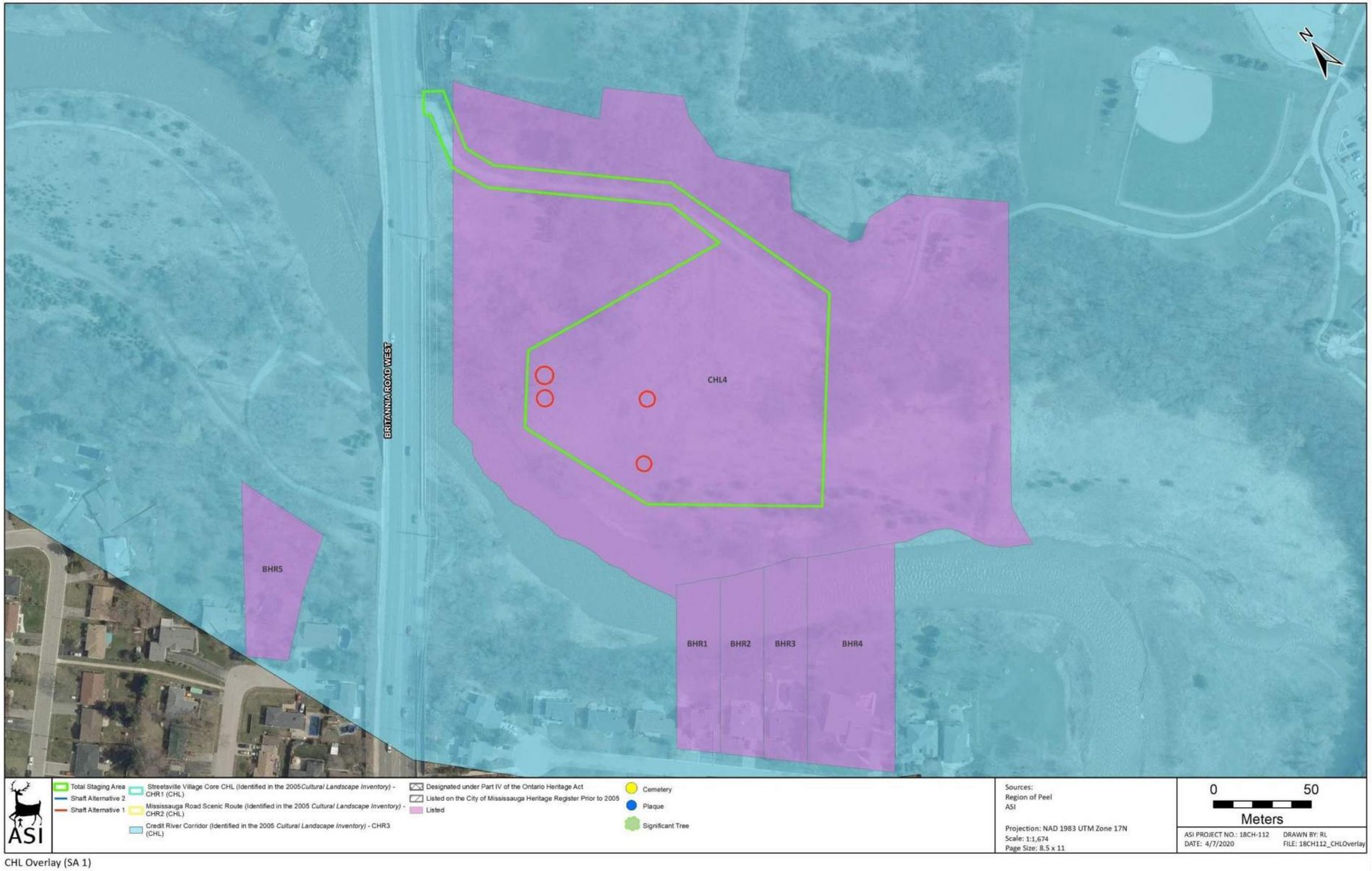
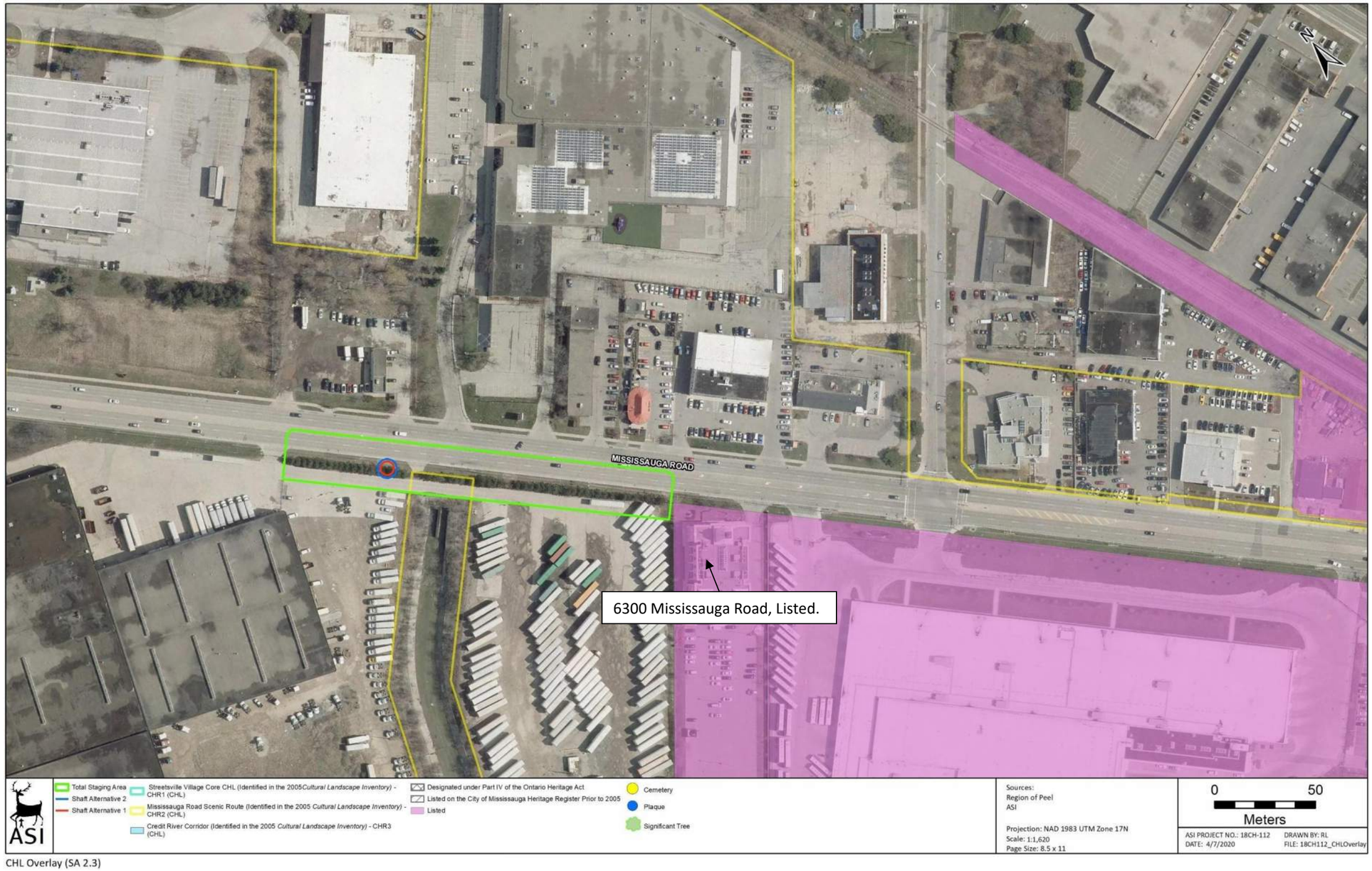
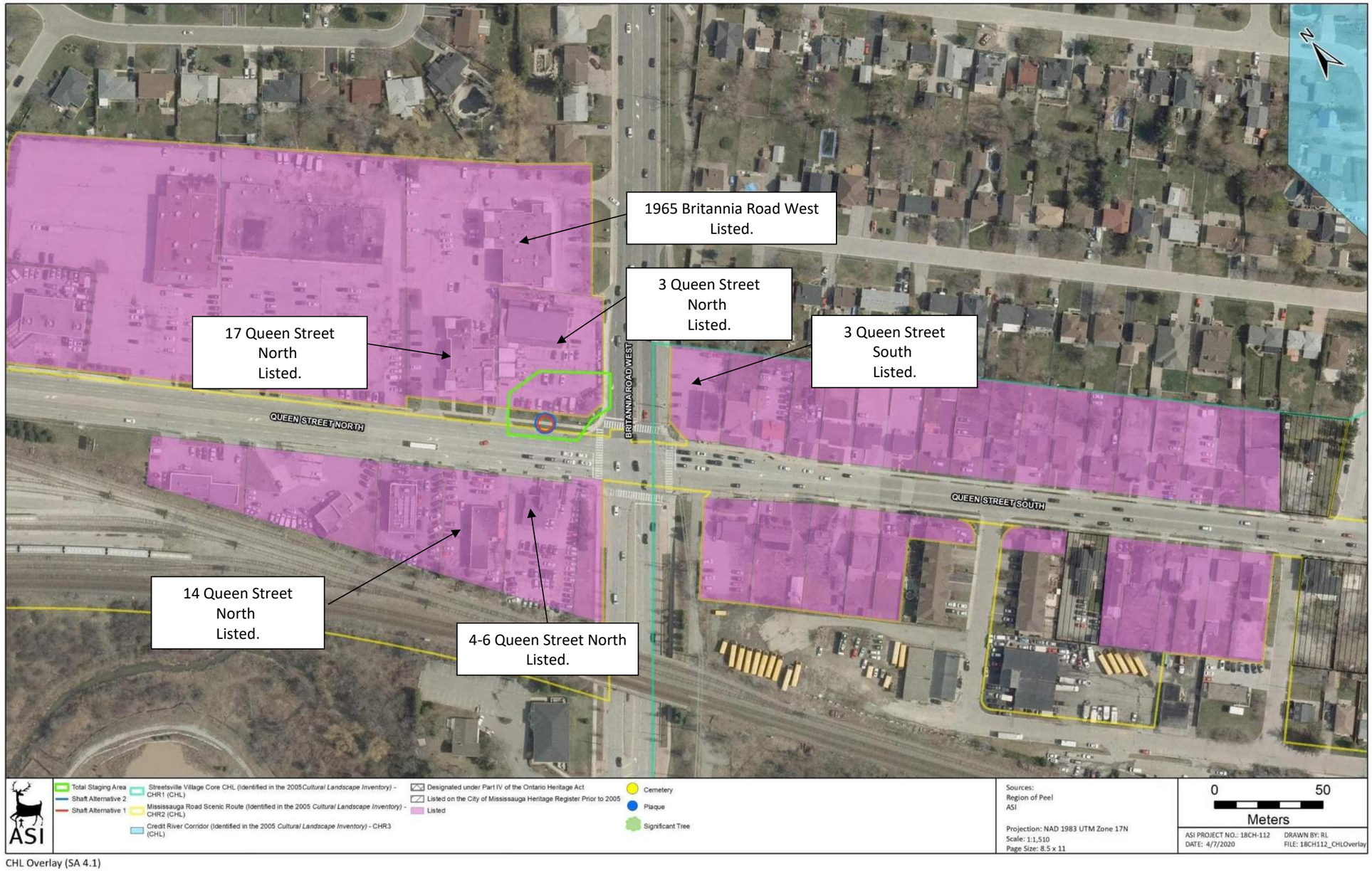


Figure 11: Location of BHRs and CHLs within and adjacent to SA1



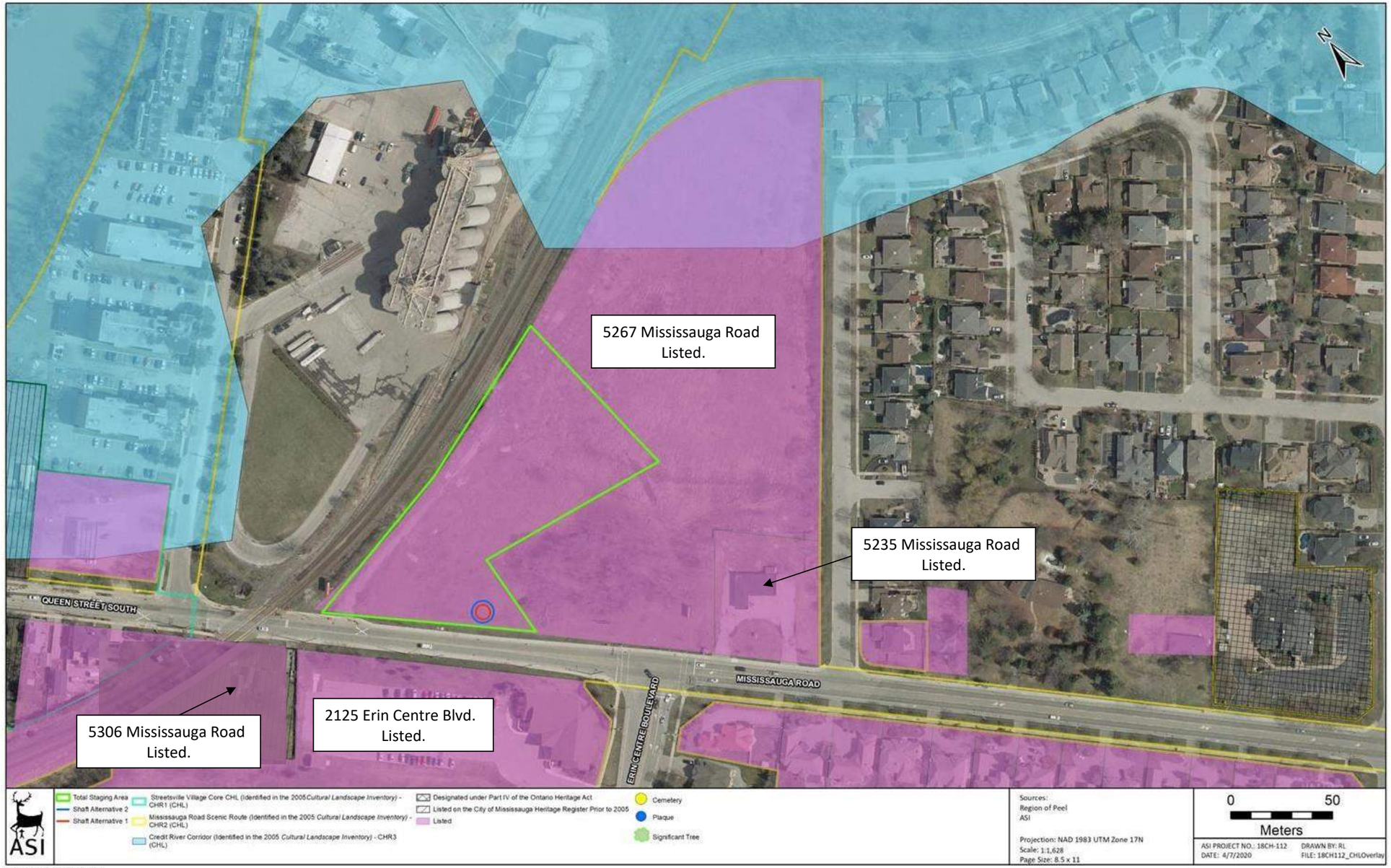
CHL Overlay (SA 2.3)

Figure 12: Location of BHRs and CHLs adjacent to SA 2.3



CHL Overlay (SA 4.1)

Figure 13: Location of BHRs and CHLs within and adjacent to SA 4.1



CHL Overlay (SA 10)

Figure 14: Location of BHRs and CHLs within and adjacent to SA 10

CHL Overlay (SA 17)

Figure 15: Location of BHRs and CHLs adjacent to SA 17

5.0 SUMMARY OF COMMUNITY DATA COLLECTION

A previous round of consultation with the community was undertaken in 2019 to address Alternatives 1, 2a and 2b. Further consultation for Alternative 4 will be undertaken through submission of this draft report for review and comment to municipal heritage staff, the MHSTCI, and any other relevant stakeholder with an interest in this project. Consultation for Alternative 4 was also undertaken through a Public Information Centre (PIC) which was placed online for three weeks, concluding 19 October 2021 as part of the EA project. No comments have been received to date as part of the PIC.

6.0 PRELIMINARY IMPACT ASSESSMENT

6.1 Description of Proposed Undertaking

The proposed undertaking for the Peel West Trunk Sewer Diversions Municipal Class EA involves the construction of a trunk sewer to be built along one of four alternatives. Alternative 4 has not been addressed as part of previous reporting and its potential impacts are described below. Alternative 4 is located Mississauga Road (including Queen Street North and Queen Street South); with a branch along Britannia Road West, starting east of the intersection with Queen Street North; and a second branch along Erin Centre Boulevard from Mississauga Road to Erin Mills Parkway. Mapping of Alternative 4 is provided in Figure 2, and study area mapping with photographic plate locations and the location of the identified BHRs and CHLs is provided in Section 4.2. The staging area boundaries depicted represents the proposed limit of physical impact and of all permanent and temporary easements.

6.2 Analysis of Potential Impacts

Table 3 outlines the potential impacts on all identified BHRs and CHLs within and adjacent to the overall study area. Table 4 outlines the impacts to identified BHRs and CHLs for each staging area.

Table 3: Alternative 4 - Potential Impacts to Known and Potential Built Heritage Resources and Cultural Heritage Landscapes

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
CHL1	• Alternative 4 is immediately adjacent to CHL1. No direct impacts are anticipated as a result of tunneling under this CHL. • Indirect impacts related to SA4.1 include temporary construction disturbances adjacent to CHL1. No direct impacts to CHL1 are anticipated as a result of SA4.1.	• Suitable mitigation measures include establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources. • Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
		the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.
CHL2	• Alternative 4 is immediately adjacent to CHL2. No direct impacts are anticipated as a result of tunneling under this CHL.	• Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.
	• Direct impacts to CHL2 are anticipated as a result of staging areas SA2.3 and 4.1.	• Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.
	• Indirect impacts to CHL2 related to SA2.3 include construction-related disturbance in the staging area directly adjacent to the listed property at 6300 Mississauga Road. Indirect impacts include soil disturbance and excavation of a tunneling shaft adjacent to the listed property, however no direct impacts to the listed property at 6300 Mississauga Road are anticipated.	• As the property at 6300 Mississauga Road is Listed in the *Heritage Register for Mississauga* and there are indirect impacts anticipated, a resource-specific Heritage Impact Assessment (HIA) may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, given that there will be no direct impacts and construction will be adjacent to the listed property, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case.
	• Direct impacts to CHL2 related to SA4.1 include a temporary staging area outside the Queen Street North ROW on the listed property at 3 Queen Street North. Direct but temporary construction impacts are anticipated to be confined to the parking lot, with no permanent impacts to the structure anticipated. • Direct temporary impacts are also anticipated in the Queen Street North ROW adjacent to 3 Queen Street North through the excavation of a tunneling shaft as part of SA4.1.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to the listed property at 3 Queen Street North. • As the property at 3 Queen Street North is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, given that there will be no direct impacts to the structure and is anticipated to be confined to the parking lot adjacent to the ROW and temporary in duration, it is recommended

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
		that the City of Mississauga consider waiving the requirement for a HIA in this case.
	• Indirect impacts to CHL2 related to SA4.1 include a temporary staging area adjacent to listed properties at 4, 6, and 14, and 17 Queen Street North and 1965 Britannia Road West. No direct impacts to these properties are anticipated.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to these adjacent cultural heritage resources. • Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these adjacent cultural heritage resources.
	• Direct impacts to CHL2 related to SA10 are anticipated with the staging area within the listed property at 5267 Mississauga Road. No structure is visible on the property, and direct impacts are anticipated to include grading, vegetation removal, and excavation of shaft location within the staging area.	• As the property at 5267 Mississauga Road is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, given that there are no structures or identifiable cultural heritage attributes on the property, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts.
CHL3	• Alternative 4 is will result in tunneling within CHL3. Direct impacts such as soil excavation and the installation of sewer pipe are anticipated. However, these impacts are anticipated to be located underground and not visible to the public, and as such, are considered minimally impactful from a cultural heritage perspective. • Direct impacts to CHL3 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area SA1. • Indirect impacts to CHL3 are anticipated at SA1 due to property acquisitions in the form of permanent easements. • Indirect impacts to CHL3 are anticipated at SA10 as it is adjacent to	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL3. • Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these adjacent cultural heritage resources. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts.

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
	CHL3. No direct impacts to CHL3 are anticipated at SA10.	
BHR1	• No impacts to BHR1 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to BHR1.	• n/a
BHR2	• No impacts to BHR2 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to BHR2.	• n/a
BHR3	• No impacts to BHR3 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to BHR3.	• n/a
BHR4	• No impacts to BHR4 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to BHR4.	• n/a
BHR5	• No impacts to BHR5 are anticipated as Alternative 4 nor any staging areas are adjacent to BHR5.	• n/a
BHR6	• No direct impacts to BHR6 are anticipated as a result of Alternative 4 tunneling or any staging areas as neither Alternative 4 or any staging areas are adjacent to BHR6.	• n/a
CHL4	• Direct impacts to CHL4 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area SA1. • Indirect impacts to CHL4 are anticipated at SA1 due to property acquisitions in the form of permanent easements.	• Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL4. • Post construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any impacts. • As the property at 1700 Britannia Road West (CHL4) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. • Given there are no structures or apparent landscape features of significant cultural heritage value on CHL4, it is recommended that the City of Mississauga consider waiving the requirement for a HIA in this case.
BHR7	• No impacts to BHR7 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to BHR7.	• n/a
CHL5	• No impacts to CHL5 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to CHL5.	• n/a

Feature ID	Potential Impact(s)	Proposed Mitigation Measures
CHL6	• No impacts to CHL6 are anticipated as neither Alternative 4 tunneling or any staging areas are adjacent to CHL6.	• n/a

Table 4: Potential Impacts to BHRs and CHLs for Staging Areas (SA)

Staging Area (SA)	Potential Impact(s)
SA0	No impacts
SA1	Direct impacts to CHL4 are anticipated as a result of tunneling shafts, grading, and vegetative removals within staging area. Indirect impacts to CHL4 are anticipated at SA1 due to property acquisitions in the form of permanent easements.
SA2.3	SA2.3 is within CHL 2, with impacts anticipated directly adjacent to listed property at 6300 Mississauga Road. No direct or indirect impacts anticipated to this listed property.
SA4.1	SA4.1 is within CHL 2, within ROW to the northeast of Britannia Road West and Queen Street North and is anticipated to directly impact the listed property at 3 Queen Street North. Temporary construction impacts are anticipated to the parking lot of the listed property, with no permanent impacts to the structure anticipated. Direct impacts are anticipated in the Queen Street North ROW adjacent to 3 Queen Street North with tunneling shaft excavation. SA4.1 is also adjacent to listed properties at 17 Queen Street North and 1965 Britannia Road West, with indirect impacts to both anticipated. SA4.1 is also adjacent to listed properties at 4, 6, and 14 Queen Street North on the southwest side of Queen Street North, with indirect impacts anticipated. SA4.1 is adjacent to CHL1, but not anticipated to result in permanent impacts and only subject to temporary construction-related disturbances.
SA10	SA10 is within CHL 2, with the staging area within the listed property at 5267 Mississauga Road. No structure is visible on the property, and direct impacts are anticipated to include grading, vegetation removal, and excavation of shaft location within the staging area. SA10 is adjacent to listed properties at 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard, with no direct or indirect impacts anticipated. SA10 is also adjacent to CHL3, the Credit River, with no direct or indirect impacts anticipated.
SA17	No impacts

Direct impacts to CHLs 2, 3 and 4 are anticipated as a result of Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHL that are anticipated to be directly impacted include:

CHL2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
CHL4: 1700 Britannia Road West (SA1)

As the property at 3 Queen Street North (part of CHL2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the

parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

As the properties at 5267 Mississauga Road (part of CHL2), and 1700 Britannia Road West (CHL4) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHL2) and 1700 Britannia Road (CHL4), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

Direct impacts to CHL3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHL3.

Indirect impacts to CHLs 1, 2 and 3 are anticipated as a result of their location adjacent to Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHLs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:

- CHL1: 3 Queen Street South (listed, adjacent to SA4.1)
- CHL2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
- CHL3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West,5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

Excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure the identified cultural heritage resources adjacent to the trunk sewer are not adversely impacted during construction, a qualified engineer should undertake a condition assessment of the structures within the vibration zone of

influence. Further, the proponent must make a commitment to repair any damages caused by vibrations.

7.0 RESULTS AND MITIGATION RECOMMENDATIONS

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating to the early nineteenth century. A review of federal registers and municipal and provincial inventories revealed that there are thirteen previously identified features of cultural heritage value (including 7 BHRs and 6 CHLs) within and/or adjacent to the four alternatives proposed. No additional BHRs or CHLs were identified during field review.

Key Findings

- A field review of the study area confirmed that there are thirteen cultural heritage resources within and/ or adjacent to the four alternatives proposed, including three identified in the 2005 *Cultural Landscape Inventory*¸ nine listed in the *Heritage Register for Mississauga*, and one designated under Part IV of the *Ontario Heritage Act*.

- The identified cultural heritage resources include: two streetscapes (CHL1, CHL2); one watercourse and associated lands (CHL3); seven residences (BHR1-7); two natural areas (CHL5 and 13); and one former farmscape (CHL4).

- The identified cultural heritage resources are historically and contextually associated with early-nineteenth to mid-twentieth century land use patterns in Streetsville and the former Toronto Township.

Impact Assessment

- Direct impacts to CHLs 2,3 and 4 are anticipated as a result of Alternative 4 and required staging areas. Specific properties within these CHLs that are anticipated to be directly impacted include:
  - CHL2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
  - CHL4: 1700 Britannia Road West (SA1)
- Indirect impacts to CHLs 1, 2,3 are anticipated as a result of their location adjacent to Alternative 4 and required staging areas. Specific properties within these CHLs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
  - CHL1: 3 Queen Street South (listed, adjacent to SA4.1)
  - CHL2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
  - CHL3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)
- Where impacts to properties or adjacent to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. Properties that may require a HIA include:
  - 1700 Britannia Road West (listed, within SA1);

- 3 Queen Street South (listed, adjacent to SA4.1);
- 6300 Mississauga Road (listed, adjacent to SA2.3);
- 3 Queen Street North (listed, within SA4.1);
- 4 Queen Street North (listed, adjacent to SA4.1);
- 6 Queen Street North (listed, adjacent to SA4.1);
- 14 Queen Street North (listed, adjacent to SA4.1);
- 17 Queen Street North (listed, adjacent to SA4.1);
- 1965 Britannia Road West (listed, adjacent to SA4.1);
- 5267 Mississauga Road (listed, within SA10);
- 5235 Mississauga Road (listed, adjacent to SA10);
- 5306 Mississauga Road (listed, adjacent to SA10); and
- 2125 Erin Centre Boulevard (listed, adjacent to SA10).

7.1 Recommendations

Background research, data collection, and field review was conducted for the study area and it was determined that thirteen potential cultural heritage resources (including 7 BHRs and 6 CHLs) are located within and/or adjacent to the four alternatives. Based on the results of the assessment, the following recommendations have been developed:

1. Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

2. No direct impacts to any properties with identified cultural heritage value are anticipated as a result of tunnelling activities for Alternative 4. However, excavation of tunneling shafts and trunk sewer tunneling may result in limited and temporary adverse vibration impacts to identified cultural heritage resources. To ensure that all BHRs and CHLs are not adversely impacted during construction, a baseline vibration assessment should be undertaken during detailed design. Should this vibration assessment determine that the structures or landscape features within the BHRs or CHLs will be subject to adverse impacts due to vibration, a vibration monitoring plan should be prepared and implemented as part of the detailed design phase of the project to lessen vibration impacts related to construction.

3. Direct impacts to CHLs 2,3 and 4 are anticipated as a result of Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties with potential cultural heritage value within these CHLs that are anticipated to be directly impacted include:
   CHL2: 3 Queen Street North (SA4.1); 5267 Mississauga Road (SA10)
   CHL4: 1700 Britannia Road West (SA1)

4. As the property at 3 Queen Street North (part of CHL2) is Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as the impacts are anticipated to be confined to the parking lot adjacent to the Queen Street ROW, are anticipated to be temporary in duration, and are not anticipated to result in direct impacts to

the structure on the property, it is recommended that the City of Mississauga consider waiving the requirement for an HIA in this case. Suitable mitigation measures could include the establishment of no-go zones with fencing to ensure that there are no unintended impacts to the structure and post-construction landscaping to return the parking lot to its pre-construction condition.

5. As the properties at 5267 Mississauga Road (part of CHL2), and 1700 Britannia Road West (CHL4) are Listed in the *Heritage Register for Mississauga* and there are direct impacts anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, as there are no structures or apparent landscape features of significant cultural heritage value on the properties at 5267 Mississauga Road (included in CHL2) and 1700 Britannia Road (CHL4), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these case. As impacts are anticipated to be temporary, a suitable mitigation strategy including post-construction landscaping with sympathetic plant species should be considered to mitigate any impacts.

6. Direct impacts to CHL3, the Credit River Corridor, are considered to be minor and temporary if construction and staging activities are suitably planned and executed. Where feasible, excavation, tunneling, and staging activities should be planned and executed to limit impacts to CHL3. Post-construction rehabilitation including planting with sympathetic plant species should be considered to mitigate any permanent impacts to CHL3.

7. Indirect impacts to CHLs 1, 2 and 3 are anticipated as a result of their location adjacent to Alternative 4 and required staging areas. Where feasible, staging area locations should be revised in order to prevent impacts to identified cultural heritage resources. Specific properties within these CHLs that are adjacent to the staging areas and are anticipated to be indirectly impacted include:
   - CHL1: 3 Queen Street South (listed, adjacent to SA4.1)
   - CHL2: 6300 Mississauga Road (listed, adjacent to SA2.3); 3, 4, 6, 14, and 17 Queen Street North and 1965 Britannia Road West (listed, adjacent to SA4.1); 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard (listed, adjacent to SA10)
   - CHL3: Vegetation removals southwest of Britannia Road West adjacent to the Credit River (SA1)

8. Where indirect impacts to properties that are Listed in the *Heritage Register for Mississauga* are anticipated, a resource-specific HIA may be required as per *City of Mississauga Official Plan* clause 7.4.1.12. However, where indirect impacts are anticipated to be temporary and adjacent to identified cultural heritage resources (3 Queen Street South, 6300 Mississauga Road, 3, 4, 6, 14, and 17 Queen Street North, 1965 Britannia Road West, 5235 Mississauga Road, 5306 Mississauga Road, and 2125 Erin Centre Boulevard), it is recommended that the City of Mississauga consider waiving the requirement for HIAs in these cases. Suitable mitigation including establishing no-go zones with fencing and issuing instructions to construction crews to avoid the cultural heritage resources should be considered to mitigate any impacts to these cultural heritage resources.

9. Should future work require an expansion of the study area, a qualified heritage consultant should be contacted to confirm the impacts of the proposed work on potential heritage resources.

10. This report should be submitted to heritage planning staff at the City of Mississauga, the Ministry of Heritage, Sport, Tourism and Culture Industry, and any other relevant heritage stakeholders that have an interest in this project.

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APPENDIX F

Traffic Impact Assessment Report

Classification Details Report

Location: QUEEN ST S btwn BRITANNIA RD W / QUEEN ST N & JAMES ST

Municipality: Mississauga

Northbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
6/27/2018 12:00 AM	28	15	2	0	0	0	0	0	45
6/27/2018 1:00 AM	13	10	0	2	0	1	0	0	26
6/27/2018 2:00 AM	12	8	0	0	0	0	0	0	20
6/27/2018 3:00 AM	6	1	0	0	0	0	0	0	7
6/27/2018 4:00 AM	8	10	0	0	0	0	0	0	18
6/27/2018 5:00 AM	31	21	0	1	0	1	0	0	54
6/27/2018 6:00 AM	87	44	1	4	1	0	0	1	138
6/27/2018 7:00 AM	195	109	2	2	2	1	0	0	311
6/27/2018 8:00 AM	328	212	4	11	3	2	0	0	560
6/27/2018 9:00 AM	245	156	2	5	2	2	0	0	412
6/27/2018 10:00 AM	183	137	1	6	4	2	0	0	333
6/27/2018 11:00 AM	247	187	2	11	3	0	1	1	452
6/27/2018 12:00 PM	288	188	2	5	5	1	0	0	489
6/27/2018 1:00 PM	270	167	2	10	3	2	1	1	456
6/27/2018 2:00 PM	287	199	2	7	5	2	2	0	504

6/27/2018 3:00 PM	287	184	1	10	4	1	3	0	490
6/27/2018 4:00 PM	307	179	1	5	3	1	0	0	496
6/27/2018 5:00 PM	339	180	3	4	5	2	1	0	534
6/27/2018 6:00 PM	326	189	2	6	0	1	0	0	524
6/27/2018 7:00 PM	300	158	2	5	4	0	0	0	469
6/27/2018 8:00 PM	241	158	1	2	1	0	0	0	403
6/27/2018 9:00 PM	189	124	2	4	3	1	0	0	323
6/27/2018 10:00 PM	115	71	0	2	0	2	0	0	190
6/27/2018 11:00 PM	57	44	0	2	1	1	0	1	106
Grand Total	4389	2751	32	104	49	23	8	4	7360
	1	2	3	4	5	6	7	8	Grand Total
Total %	59.63%	37.38%	0.43%	1.41%	0.67%	0.31%	0.11%	0.05%	100.00%

Classification Details Report

Location: QUEEN ST S btwn BRITANNIA RD W / QUEEN ST N & JAMES ST

Municipality: Mississauga

Southbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
6/27/2018 12:00 AM	28	18	0	1	2	0	0	0	49
6/27/2018 1:00 AM	12	14	1	0	0	0	0	0	27
6/27/2018 2:00 AM	9	6	0	0	2	0	0	0	17
6/27/2018 3:00 AM	3	3	0	0	0	0	0	0	6
6/27/2018 4:00 AM	6	3	0	0	0	0	0	0	9
6/27/2018 5:00 AM	23	21	0	2	1	0	0	0	47
6/27/2018 6:00 AM	89	69	0	3	0	0	0	0	161
6/27/2018 7:00 AM	147	132	1	3	2	3	0	0	288
6/27/2018 8:00 AM	219	160	1	8	4	1	0	0	393
6/27/2018 9:00 AM	236	168	0	5	2	0	3	1	415
6/27/2018 10:00 AM	202	177	2	4	3	0	0	0	388
6/27/2018 11:00 AM	250	200	2	9	1	1	0	0	463
6/27/2018 12:00 PM	263	226	0	6	1	3	0	0	499
6/27/2018 1:00 PM	284	194	2	5	3	1	1	0	490
6/27/2018 2:00 PM	277	203	1	8	1	1	0	0	491

6/27/2018 3:00 PM	280	217	0	7	0	0	0	0	504
6/27/2018 4:00 PM	364	233	2	1	3	0	0	1	604
6/27/2018 5:00 PM	429	268	1	2	3	3	0	0	706
6/27/2018 6:00 PM	335	228	0	3	3	0	0	0	569
6/27/2018 7:00 PM	253	169	0	5	3	0	0	0	430
6/27/2018 8:00 PM	169	132	0	3	0	0	0	0	304
6/27/2018 9:00 PM	155	85	0	4	0	0	0	0	244
6/27/2018 10:00 PM	84	67	1	2	1	1	0	0	156
6/27/2018 11:00 PM	52	36	0	3	1	0	0	0	92
Grand Total	4169	3029	14	84	36	14	4	2	7352
	1	2	3	4	5	6	7	8	Grand Total
Total %	56.71%	41.20%	0.19%	1.14%	0.49%	0.19%	0.05%	0.03%	100.00%

Classification Details Report

Location: EGLINTON AVE W btwn UNNAMED UHOS / UNNAMED UREC & ERIN MILLS PKY

Municipality: Mississauga

Eastbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
3/29/2018 12:00 AM	33	49	0	1	4	0	0	0	87
3/29/2018 1:00 AM	22	25	0	2	1	0	0	0	50
3/29/2018 2:00 AM	9	14	0	0	0	0	0	0	23
3/29/2018 3:00 AM	14	13	0	0	0	0	0	0	27
3/29/2018 4:00 AM	14	20	0	0	1	1	0	0	36
3/29/2018 5:00 AM	77	80	1	5	1	1	1	1	167
3/29/2018 6:00 AM	288	333	3	9	4	2	3	0	642
3/29/2018 7:00 AM	770	892	12	23	14	5	9	1	1726
3/29/2018 8:00 AM	915	1034	6	23	26	8	2	2	2016
3/29/2018 9:00 AM	545	661	9	23	14	0	2	2	1256
3/29/2018 10:00 AM	419	582	13	16	7	2	5	1	1045
3/29/2018 11:00 AM	399	489	6	10	4	3	2	1	914
3/29/2018 12:00 PM	442	512	6	10	9	1	0	1	981
3/29/2018 1:00 PM	409	476	6	15	7	2	1	1	917
3/29/2018 2:00 PM	409	481	4	12	13	3	4	0	926

3/29/2018 3:00 PM	411	537	4	8	6	3	2	0	971
3/29/2018 4:00 PM	465	547	3	8	11	3	1	0	1038
3/29/2018 5:00 PM	444	516	2	15	12	3	2	0	994
3/29/2018 6:00 PM	424	562	4	8	6	2	2	1	1009
3/29/2018 7:00 PM	393	448	3	14	4	4	0	0	866
3/29/2018 8:00 PM	312	376	2	14	6	2	3	0	715
3/29/2018 9:00 PM	278	279	1	6	3	1	1	0	569
3/29/2018 10:00 PM	192	160	1	3	5	2	2	0	365
3/29/2018 11:00 PM	117	124	2	3	4	2	0	0	252
Grand Total	7801	9210	88	228	162	50	42	11	17592
	1	2	3	4	5	6	7	8	Grand Total
Total %	44.34%	52.35%	0.50%	1.30%	0.92%	0.28%	0.24%	0.06%	100.00%

Classification Details Report

Location: EGLINTON AVE W btwn UNNAMED UHOS / UNNAMED UREC & ERIN MILLS PKY

Municipality: Mississauga

Westbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
3/29/2018 12:00 AM	43	53	0	2	3	1	0	0	102
3/29/2018 1:00 AM	25	28	0	1	3	0	0	0	57
3/29/2018 2:00 AM	7	15	0	0	0	0	0	0	22
3/29/2018 3:00 AM	7	15	1	0	1	0	1	0	25
3/29/2018 4:00 AM	16	16	1	3	5	0	1	0	42
3/29/2018 5:00 AM	35	58	0	7	14	0	1	0	115
3/29/2018 6:00 AM	123	157	1	10	4	0	1	0	296
3/29/2018 7:00 AM	279	342	2	9	10	1	4	0	647
3/29/2018 8:00 AM	356	509	1	7	10	4	2	1	890
3/29/2018 9:00 AM	336	460	3	8	7	1	3	0	818
3/29/2018 10:00 AM	313	433	2	10	9	3	3	0	773
3/29/2018 11:00 AM	383	535	4	9	9	2	2	0	944
3/29/2018 12:00 PM	425	550	0	8	10	1	4	1	999
3/29/2018 1:00 PM	438	571	3	8	12	3	3	0	1038
3/29/2018 2:00 PM	515	748	4	9	15	3	4	2	1300

3/29/2018 3:00 PM	652	839	4	11	15	1	1	1	1524
3/29/2018 4:00 PM	754	1009	4	10	12	3	0	0	1792
3/29/2018 5:00 PM	838	1101	4	10	13	3	2	0	1971
3/29/2018 6:00 PM	689	952	3	4	10	0	2	1	1661
3/29/2018 7:00 PM	552	699	5	6	8	1	1	0	1272
3/29/2018 8:00 PM	405	517	2	1	7	0	2	0	934
3/29/2018 9:00 PM	271	413	2	4	11	2	0	0	703
3/29/2018 10:00 PM	207	275	2	4	9	1	2	0	500
3/29/2018 11:00 PM	133	203	1	1	5	1	1	0	345
Grand Total	7802	10498	49	142	202	31	40	6	18770
	1	2	3	4	5	6	7	8	Grand Total
Total %	41.57%	55.93%	0.26%	0.76%	1.08%	0.17%	0.21%	0.03%	100.00%

Turning Movement Count (22 . (ATR) BRITANNIA RD & BETWEEN QUEEN ST & ERIN MILLS RD)

Start Time	W Approach		E Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru W:E	Approach Total	Thru E:W	Approach Total		
00:00:00	29	29	36	36	65	
00:15:00	17	17	37	37	54	
00:30:00	18	18	27	27	45	
00:45:00	16	16	30	30	46	210
01:00:00	15	15	14	14	29	174
01:15:00	12	12	22	22	34	154
01:30:00	7	7	12	12	19	128
01:45:00	12	12	13	13	25	107
02:00:00	12	12	9	9	21	99
02:15:00	6	6	7	7	13	78
02:30:00	6	6	23	23	29	88
02:45:00	6	6	8	8	14	77
03:00:00	7	7	7	7	14	70
03:15:00	3	3	5	5	8	65
03:30:00	14	14	5	5	19	55
03:45:00	11	11	9	9	20	61
04:00:00	17	17	6	6	23	70
04:15:00	18	18	5	5	23	85
04:30:00	26	26	17	17	43	109
04:45:00	24	24	10	10	34	123

05:00:00	38	38	10	10	48	148
05:15:00	41	41	31	31	72	197
05:30:00	96	96	22	22	118	272
05:45:00	120	120	26	26	146	384
06:00:00	155	155	46	46	201	537
06:15:00	200	200	39	39	239	704
06:30:00	318	318	49	49	367	953
06:45:00	339	339	71	71	410	1217
07:00:00	379	379	101	101	480	1496
07:15:00	393	393	112	112	505	1762
07:30:00	403	403	111	111	514	1909
07:45:00	369	369	160	160	529	2028
08:00:00	412	412	149	149	561	2109
08:15:00	428	428	151	151	579	2183
08:30:00	407	407	147	147	554	2223
08:45:00	393	393	137	137	530	2224
09:00:00	297	297	147	147	444	2107
09:15:00	305	305	126	126	431	1959
09:30:00	259	259	113	113	372	1777
09:45:00	268	268	121	121	389	1636
10:00:00	186	186	117	117	303	1495
10:15:00	189	189	149	149	338	1402
10:30:00	200	200	159	159	359	1389

10:45:00	199	199	149	149	348	1348
11:00:00	168	168	145	145	313	1358
11:15:00	180	180	122	122	302	1322
11:30:00	206	206	188	188	394	1357
11:45:00	173	173	183	183	356	1365
12:00:00	198	198	179	179	377	1429
12:15:00	221	221	198	198	419	1546
12:30:00	177	177	196	196	373	1525
12:45:00	186	186	207	207	393	1562
13:00:00	189	189	216	216	405	1590
13:15:00	178	178	176	176	354	1525
13:30:00	166	166	211	211	377	1529
13:45:00	182	182	228	228	410	1546
14:00:00	201	201	213	213	414	1555
14:15:00	200	200	242	242	442	1643
14:30:00	208	208	237	237	445	1711
14:45:00	199	199	273	273	472	1773
15:00:00	159	159	290	290	449	1808
15:15:00	209	209	286	286	495	1861
15:30:00	196	196	360	360	556	1972
15:45:00	240	240	325	325	565	2065
16:00:00	187	187	332	332	519	2135
16:15:00	207	207	365	365	572	2212

16:30:00	201	201	390	390	591	2247
16:45:00	249	249	351	351	600	2282
17:00:00	215	215	428	428	643	2406
17:15:00	203	203	414	414	617	2451
17:30:00	220	220	418	418	638	2498
17:45:00	230	230	386	386	616	2514
18:00:00	219	219	347	347	566	2437
18:15:00	261	261	327	327	588	2408
18:30:00	232	232	341	341	573	2343
18:45:00	211	211	344	344	555	2282
19:00:00	214	214	308	308	522	2238
19:15:00	198	198	273	273	471	2121
19:30:00	178	178	205	205	383	1931
19:45:00	184	184	209	209	393	1769
20:00:00	160	160	236	236	396	1643
20:15:00	169	169	244	244	413	1585
20:30:00	154	154	252	252	406	1608
20:45:00	180	180	228	228	408	1623
21:00:00	100	100	239	239	339	1566
21:15:00	116	116	199	199	315	1468
21:30:00	113	113	150	150	263	1325
21:45:00	96	96	107	107	203	1120
22:00:00	91	91	117	117	208	989

22:15:00	69	69	117	117	186	860
22:30:00	58	58	88	88	146	743
22:45:00	76	76	65	65	141	681
23:00:00	76	76	86	86	162	635
23:15:00	36	36	82	82	118	567
23:30:00	35	35	59	59	94	515
23:45:00	38	38	40	40	78	452
Grand Total	15482	15482	14967	14967	**30449**	-
Approach%	100%	-	100%	-	**-**	-
Totals %	50.8%	50.8%	49.2%	49.2%	**-**	-
Heavy	673	-	661	-	**-**	-
Heavy %	4.3%	-	4.4%	-	**-**	-
Bicycles	-	-	-	-	**-**	-
Bicycle %	-	-	-	-	**-**	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Start Time	W Approach		E Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
17:00:00	215	215	428	428	643
17:15:00	203	203	414	414	617
17:30:00	220	220	418	418	638
17:45:00	230	230	386	386	616
Grand Total	868	868	1646	1646	**2514**
Approach%	100%	-	100%	-	-
Totals %	34.5%	34.5%	65.5%	65.5%	-
PHF	0.94	0.94	0.96	0.96	-
Heavy	31	31	18	18	-
Heavy %	3.6%	3.6%	1.1%	1.1%	-
Lights	834	834	1621	1621	-
Lights %	96.1%	96.1%	98.5%	98.5%	-
Single-Unit Trucks	8	8	8	8	-
Single-Unit Trucks %	0.9%	0.9%	0.5%	0.5%	-
Buses	10	10	8	8	-
Buses %	1.2%	1.2%	0.5%	0.5%	-
Articulated Trucks	13	13	2	2	-
Articulated Trucks %	1.5%	1.5%	0.1%	0.1%	-
Pedal Bike (Road)	3	3	7	7	-
Pedal Bike (Road) %	0.3%	0.3%	0.4%	0.4%	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Turning Movement Count (22 . (ATR) BRITANNIA RD & BETWEEN QUEEN ST & ERIN MILLS RD)

Start Time	W Approach		E Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru W:E	Approach Total	Thru E:W	Approach Total		
00:00:00	23	23	48	48	71	
00:15:00	19	19	33	33	52	
00:30:00	25	25	35	35	60	
00:45:00	13	13	34	34	47	230
01:00:00	6	6	18	18	24	183
01:15:00	7	7	20	20	27	158
01:30:00	16	16	14	14	30	128
01:45:00	15	15	14	14	29	110
02:00:00	8	8	15	15	23	109
02:15:00	7	7	11	11	18	100
02:30:00	10	10	7	7	17	87
02:45:00	5	5	10	10	15	73
03:00:00	5	5	11	11	16	66
03:15:00	4	4	9	9	13	61
03:30:00	11	11	8	8	19	63
03:45:00	10	10	7	7	17	65
04:00:00	23	23	10	10	33	82
04:15:00	16	16	8	8	24	93
04:30:00	27	27	10	10	37	111
04:45:00	23	23	13	13	36	130

05:00:00	24	24	9	9	33	130
05:15:00	53	53	22	22	75	181
05:30:00	96	96	22	22	118	262
05:45:00	110	110	27	27	137	363
06:00:00	162	162	51	51	213	543
06:15:00	194	194	31	31	225	693
06:30:00	302	302	50	50	352	927
06:45:00	316	316	63	63	379	1169
07:00:00	330	330	82	82	412	1368
07:15:00	358	358	99	99	457	1600
07:30:00	414	414	104	104	518	1766
07:45:00	404	404	165	165	569	1956
08:00:00	375	375	156	156	531	2075
08:15:00	396	396	124	124	520	2138
08:30:00	410	410	147	147	557	2177
08:45:00	377	377	131	131	508	2116
09:00:00	306	306	141	141	447	2032
09:15:00	325	325	138	138	463	1975
09:30:00	283	283	114	114	397	1815
09:45:00	196	196	132	132	328	1635
10:00:00	230	230	131	131	361	1549
10:15:00	223	223	111	111	334	1420
10:30:00	213	213	148	148	361	1384

10:45:00	204	204	147	147	351	1407
11:00:00	195	195	164	164	359	1405
11:15:00	195	195	159	159	354	1425
11:30:00	218	218	150	150	368	1432
11:45:00	202	202	183	183	385	1466
12:00:00	201	201	187	187	388	1495
12:15:00	192	192	207	207	399	1540
12:30:00	211	211	198	198	409	1581
12:45:00	186	186	208	208	394	1590
13:00:00	157	157	198	198	355	1557
13:15:00	180	180	181	181	361	1519
13:30:00	211	211	216	216	427	1537
13:45:00	166	166	244	244	410	1553
14:00:00	195	195	200	200	395	1593
14:15:00	180	180	229	229	409	1641
14:30:00	171	171	252	252	423	1637
14:45:00	208	208	256	256	464	1691
15:00:00	163	163	308	308	471	1767
15:15:00	203	203	287	287	490	1848
15:30:00	169	169	336	336	505	1930
15:45:00	206	206	373	373	579	2045
16:00:00	218	218	347	347	565	2139
16:15:00	201	201	371	371	572	2221

16:30:00	216	216	369	369	585	2301
16:45:00	199	199	360	360	559	2281
17:00:00	244	244	438	438	682	2398
17:15:00	242	242	359	359	601	2427
17:30:00	253	253	412	412	665	2507
17:45:00	231	231	419	419	650	2598
18:00:00	232	232	374	374	606	2522
18:15:00	269	269	352	352	621	2542
18:30:00	232	232	341	341	573	2450
18:45:00	226	226	277	277	503	2303
19:00:00	217	217	279	279	496	2193
19:15:00	210	210	262	262	472	2044
19:30:00	200	200	206	206	406	1877
19:45:00	178	178	210	210	388	1762
20:00:00	157	157	251	251	408	1674
20:15:00	149	149	211	211	360	1562
20:30:00	153	153	213	213	366	1522
20:45:00	143	143	193	193	336	1470
21:00:00	126	126	234	234	360	1422
21:15:00	109	109	175	175	284	1346
21:30:00	90	90	148	148	238	1218
21:45:00	91	91	137	137	228	1110
22:00:00	67	67	122	122	189	939

22:15:00	73	73	84	84	157	812
22:30:00	78	78	108	108	186	760
22:45:00	66	66	79	79	145	677
23:00:00	73	73	90	90	163	651
23:15:00	45	45	80	80	125	619
23:30:00	37	37	52	52	89	522
23:45:00	24	24	47	47	71	448
Grand Total	15432	15432	14816	14816	**30248**	-
Approach%	100%	-	100%	-	-	-
Totals %	51%	51%	49%	49%	-	-
Heavy	477	-	479	-	-	-
Heavy %	3.1%	-	3.2%	-	-	-
Bicycles	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Start Time	W Approach		E Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
17:00:00	244	244	438	438	682
17:15:00	242	242	359	359	601
17:30:00	253	253	412	412	665
17:45:00	231	231	419	419	650
Grand Total	970	970	1628	1628	**2598**
Approach%	100%	-	100%	-	-
Totals %	37.3%	37.3%	62.7%	62.7%	-
PHF	0.96	0.96	0.93	0.93	-
Heavy	17	17	15	15	-
Heavy %	1.8%	1.8%	0.9%	0.9%	-
Lights	951	951	1611	1611	-
Lights %	98%	98%	99%	99%	-
Single-Unit Trucks	7	7	2	2	-
Single-Unit Trucks %	0.7%	0.7%	0.1%	0.1%	-
Buses	8	8	11	11	-
Buses %	0.8%	0.8%	0.7%	0.7%	-
Articulated Trucks	2	2	2	2	-
Articulated Trucks %	0.2%	0.2%	0.1%	0.1%	-
Bicycles on Road	2	2	2	2	-
Bicycles on Road %	0.2%	0.2%	0.1%	0.1%	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Turning Movement Count (22 . (ATR) BRITANNIA RD & BETWEEN QUEEN ST & ERIN MILLS RD)

Start Time	W Approach		E Approach		Int. Total (15 min)	Int. Total (1 hr)
	Thru W:E	Approach Total	Thru E:W	Approach Total		
00:00:00	23	23	50	50	73	
00:15:00	25	25	37	37	62	
00:30:00	14	14	33	33	47	
00:45:00	21	21	28	28	49	231
01:00:00	15	15	29	29	44	202
01:15:00	16	16	23	23	39	179
01:30:00	12	12	13	13	25	157
01:45:00	4	4	15	15	19	127
02:00:00	7	7	11	11	18	101
02:15:00	5	5	15	15	20	82
02:30:00	14	14	15	15	29	86
02:45:00	4	4	12	12	16	83
03:00:00	5	5	9	9	14	79
03:15:00	11	11	5	5	16	75
03:30:00	14	14	9	9	23	69
03:45:00	3	3	9	9	12	65
04:00:00	21	21	8	8	29	80
04:15:00	19	19	5	5	24	88
04:30:00	18	18	8	8	26	91
04:45:00	33	33	8	8	41	120

05:00:00	28	28	16	16	44	135
05:15:00	47	47	29	29	76	187
05:30:00	76	76	28	28	104	265
05:45:00	108	108	22	22	130	354
06:00:00	134	134	45	45	179	489
06:15:00	180	180	45	45	225	638
06:30:00	257	257	44	44	301	835
06:45:00	280	280	86	86	366	1071
07:00:00	367	367	65	65	432	1324
07:15:00	392	392	98	98	490	1589
07:30:00	403	403	106	106	509	1797
07:45:00	414	414	173	173	587	2018
08:00:00	369	369	174	174	543	2129
08:15:00	401	401	149	149	550	2189
08:30:00	408	408	126	126	534	2214
08:45:00	387	387	119	119	506	2133
09:00:00	384	384	127	127	511	2101
09:15:00	333	333	142	142	475	2026
09:30:00	326	326	110	110	436	1928
09:45:00	263	263	117	117	380	1802
10:00:00	259	259	101	101	360	1651
10:15:00	221	221	113	113	334	1510
10:30:00	236	236	142	142	378	1452

10:45:00	236	236	155	155	391	1463
11:00:00	193	193	180	180	373	1476
11:15:00	204	204	156	156	360	1502
11:30:00	214	214	174	174	388	1512
11:45:00	218	218	182	182	400	1521
12:00:00	223	223	188	188	411	1559
12:15:00	220	220	216	216	436	1635
12:30:00	209	209	179	179	388	1635
12:45:00	213	213	241	241	454	1689
13:00:00	182	182	230	230	412	1690
13:15:00	208	208	203	203	411	1665
13:30:00	170	170	218	218	388	1665
13:45:00	172	172	257	257	429	1640
14:00:00	194	194	204	204	398	1626
14:15:00	168	168	260	260	428	1643
14:30:00	236	236	292	292	528	1783
14:45:00	203	203	261	261	464	1818
15:00:00	172	172	334	334	506	1926
15:15:00	205	205	291	291	496	1994
15:30:00	209	209	353	353	562	2028
15:45:00	221	221	377	377	598	2162
16:00:00	187	187	388	388	575	2231
16:15:00	223	223	364	364	587	2322

16:30:00	236	236	375	375	611	2371
16:45:00	229	229	364	364	593	2366
17:00:00	198	198	473	473	671	2462
17:15:00	203	203	436	436	639	2514
17:30:00	214	214	413	413	627	2530
17:45:00	238	238	392	392	630	2567
18:00:00	191	191	367	367	558	2454
18:15:00	260	260	371	371	631	2446
18:30:00	205	205	347	347	552	2371
18:45:00	214	214	346	346	560	2301
19:00:00	194	194	375	375	569	2312
19:15:00	194	194	312	312	506	2187
19:30:00	202	202	224	224	426	2061
19:45:00	159	159	233	233	392	1893
20:00:00	166	166	225	225	391	1715
20:15:00	132	132	245	245	377	1586
20:30:00	109	109	216	216	325	1485
20:45:00	140	140	194	194	334	1427
21:00:00	94	94	145	145	239	1275
21:15:00	95	95	191	191	286	1184
21:30:00	102	102	112	112	214	1073
21:45:00	70	70	125	125	195	934
22:00:00	73	73	98	98	171	866

22:15:00	80	80	113	113	193	773
22:30:00	72	72	86	86	158	717
22:45:00	76	76	70	70	146	668
23:00:00	43	43	81	81	124	621
23:15:00	40	40	91	91	131	559
23:30:00	42	42	69	69	111	512
23:45:00	36	36	36	36	72	438
Grand Total	15544	15544	15347	15347	**30891**	-
Approach%	100%	-	100%	-	**-**	-
Totals %	50.3%	50.3%	49.7%	49.7%	**-**	-
Heavy	489	-	481	-	**-**	-
Heavy %	3.1%	-	3.1%	-	**-**	-
Bicycles	-	-	-	-	**-**	-
Bicycle %	-	-	-	-	**-**	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Start Time	W Approach		E Approach		Int. Total (15 min)
	Thru	Approach Total	Thru	Approach Total	
17:00:00	198	198	473	473	671
17:15:00	203	203	436	436	639
17:30:00	214	214	413	413	627
17:45:00	238	238	392	392	630
Grand Total	853	853	1714	1714	**2567**
Approach%	100%	-	100%	-	-
Totals %	33.2%	33.2%	66.8%	66.8%	-
PHF	0.9	0.9	0.91	0.91	-
Heavy	21	21	21	21	-
Heavy %	2.5%	2.5%	1.2%	1.2%	-
Lights	832	832	1691	1691	-
Lights %	97.5%	97.5%	98.7%	98.7%	-
Single-Unit Trucks	5	5	7	7	-
Single-Unit Trucks %	0.6%	0.6%	0.4%	0.4%	-
Buses	11	11	12	12	-
Buses %	1.3%	1.3%	0.7%	0.7%	-
Articulated Trucks	5	5	2	2	-
Articulated Trucks %	0.6%	0.6%	0.1%	0.1%	-
Bicycles on Road	0	0	2	2	-
Bicycles on Road %	0%	0%	0.1%	0.1%	-

Peak Hour: 05:00 PM - 06:00 PM Weather:

Classification Details Report

Location: QUEEN ST S btwn BRITANNIA RD W / QUEEN ST N & JAMES ST

Municipality: Mississauga

Northbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
6/27/2018 12:00 AM	28	15	2	0	0	0	0	0	45
6/27/2018 1:00 AM	13	10	0	2	0	1	0	0	26
6/27/2018 2:00 AM	12	8	0	0	0	0	0	0	20
6/27/2018 3:00 AM	6	1	0	0	0	0	0	0	7
6/27/2018 4:00 AM	8	10	0	0	0	0	0	0	18
6/27/2018 5:00 AM	31	21	0	1	0	1	0	0	54
6/27/2018 6:00 AM	87	44	1	4	1	0	0	1	138
6/27/2018 7:00 AM	195	109	2	2	2	1	0	0	311
6/27/2018 8:00 AM	328	212	4	11	3	2	0	0	560
6/27/2018 9:00 AM	245	156	2	5	2	2	0	0	412
6/27/2018 10:00 AM	183	137	1	6	4	2	0	0	333
6/27/2018 11:00 AM	247	187	2	11	3	0	1	1	452
6/27/2018 12:00 PM	288	188	2	5	5	1	0	0	489
6/27/2018 1:00 PM	270	167	2	10	3	2	1	1	456
6/27/2018 2:00 PM	287	199	2	7	5	2	2	0	504

6/27/2018 3:00 PM	287	184	1	10	4	1	3	0	490
6/27/2018 4:00 PM	307	179	1	5	3	1	0	0	496
6/27/2018 5:00 PM	339	180	3	4	5	2	1	0	534
6/27/2018 6:00 PM	326	189	2	6	0	1	0	0	524
6/27/2018 7:00 PM	300	158	2	5	4	0	0	0	469
6/27/2018 8:00 PM	241	158	1	2	1	0	0	0	403
6/27/2018 9:00 PM	189	124	2	4	3	1	0	0	323
6/27/2018 10:00 PM	115	71	0	2	0	2	0	0	190
6/27/2018 11:00 PM	57	44	0	2	1	1	0	1	106
Grand Total	4389	2751	32	104	49	23	8	4	7360
	1	2	3	4	5	6	7	8	Grand Total
Total %	59.63%	37.38%	0.43%	1.41%	0.67%	0.31%	0.11%	0.05%	100.00%

Classification Details Report

Location: QUEEN ST S btwn BRITANNIA RD W / QUEEN ST N & JAMES ST

Municipality: Mississauga

Southbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
6/27/2018 12:00 AM	28	18	0	1	2	0	0	0	49
6/27/2018 1:00 AM	12	14	1	0	0	0	0	0	27
6/27/2018 2:00 AM	9	6	0	0	2	0	0	0	17
6/27/2018 3:00 AM	3	3	0	0	0	0	0	0	6
6/27/2018 4:00 AM	6	3	0	0	0	0	0	0	9
6/27/2018 5:00 AM	23	21	0	2	1	0	0	0	47
6/27/2018 6:00 AM	89	69	0	3	0	0	0	0	161
6/27/2018 7:00 AM	147	132	1	3	2	3	0	0	288
6/27/2018 8:00 AM	219	160	1	8	4	1	0	0	393
6/27/2018 9:00 AM	236	168	0	5	2	0	3	1	415
6/27/2018 10:00 AM	202	177	2	4	3	0	0	0	388
6/27/2018 11:00 AM	250	200	2	9	1	1	0	0	463
6/27/2018 12:00 PM	263	226	0	6	1	3	0	0	499
6/27/2018 1:00 PM	284	194	2	5	3	1	1	0	490
6/27/2018 2:00 PM	277	203	1	8	1	1	0	0	491

6/27/2018 3:00 PM	280	217	0	7	0	0	0	0	504
6/27/2018 4:00 PM	364	233	2	1	3	0	0	1	604
6/27/2018 5:00 PM	429	268	1	2	3	3	0	0	706
6/27/2018 6:00 PM	335	228	0	3	3	0	0	0	569
6/27/2018 7:00 PM	253	169	0	5	3	0	0	0	430
6/27/2018 8:00 PM	169	132	0	3	0	0	0	0	304
6/27/2018 9:00 PM	155	85	0	4	0	0	0	0	244
6/27/2018 10:00 PM	84	67	1	2	1	1	0	0	156
6/27/2018 11:00 PM	52	36	0	3	1	0	0	0	92
Grand Total	4169	3029	14	84	36	14	4	2	7352
	1	2	3	4	5	6	7	8	Grand Total
Total %	56.71%	41.20%	0.19%	1.14%	0.49%	0.19%	0.05%	0.03%	100.00%

Classification Details Report

Location: EGLINTON AVE W btwn UNNAMED UHOS / UNNAMED UREC & ERIN MILLS PKY

Municipality: Mississauga

Eastbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
3/29/2018 12:00 AM	33	49	0	1	4	0	0	0	87
3/29/2018 1:00 AM	22	25	0	2	1	0	0	0	50
3/29/2018 2:00 AM	9	14	0	0	0	0	0	0	23
3/29/2018 3:00 AM	14	13	0	0	0	0	0	0	27
3/29/2018 4:00 AM	14	20	0	0	1	1	0	0	36
3/29/2018 5:00 AM	77	80	1	5	1	1	1	1	167
3/29/2018 6:00 AM	288	333	3	9	4	2	3	0	642
3/29/2018 7:00 AM	770	892	12	23	14	5	9	1	1726
3/29/2018 8:00 AM	915	1034	6	23	26	8	2	2	2016
3/29/2018 9:00 AM	545	661	9	23	14	0	2	2	1256
3/29/2018 10:00 AM	419	582	13	16	7	2	5	1	1045
3/29/2018 11:00 AM	399	489	6	10	4	3	2	1	914
3/29/2018 12:00 PM	442	512	6	10	9	1	0	1	981
3/29/2018 1:00 PM	409	476	6	15	7	2	1	1	917
3/29/2018 2:00 PM	409	481	4	12	13	3	4	0	926

3/29/2018 3:00 PM	411	537	4	8	6	3	2	0	971
3/29/2018 4:00 PM	465	547	3	8	11	3	1	0	1038
3/29/2018 5:00 PM	444	516	2	15	12	3	2	0	994
3/29/2018 6:00 PM	424	562	4	8	6	2	2	1	1009
3/29/2018 7:00 PM	393	448	3	14	4	4	0	0	866
3/29/2018 8:00 PM	312	376	2	14	6	2	3	0	715
3/29/2018 9:00 PM	278	279	1	6	3	1	1	0	569
3/29/2018 10:00 PM	192	160	1	3	5	2	2	0	365
3/29/2018 11:00 PM	117	124	2	3	4	2	0	0	252
Grand Total	7801	9210	88	228	162	50	42	11	17592
	1	2	3	4	5	6	7	8	Grand Total
Total %	44.34%	52.35%	0.50%	1.30%	0.92%	0.28%	0.24%	0.06%	100.00%

Classification Details Report

Location: EGLINTON AVE W btwn UNNAMED UHOS / UNNAMED UREC & ERIN MILLS PKY

Municipality: Mississauga

Westbound

	1	2	3	4	5	6	7	8	Grand Total
StartTime	0-4.8	4.9-9	9.1-10	10.1-13	13.1-15.8	15.9-18.8	18.9-22.5	22.6-40	
3/29/2018 12:00 AM	43	53	0	2	3	1	0	0	102
3/29/2018 1:00 AM	25	28	0	1	3	0	0	0	57
3/29/2018 2:00 AM	7	15	0	0	0	0	0	0	22
3/29/2018 3:00 AM	7	15	1	0	1	0	1	0	25
3/29/2018 4:00 AM	16	16	1	3	5	0	1	0	42
3/29/2018 5:00 AM	35	58	0	7	14	0	1	0	115
3/29/2018 6:00 AM	123	157	1	10	4	0	1	0	296
3/29/2018 7:00 AM	279	342	2	9	10	1	4	0	647
3/29/2018 8:00 AM	356	509	1	7	10	4	2	1	890
3/29/2018 9:00 AM	336	460	3	8	7	1	3	0	818
3/29/2018 10:00 AM	313	433	2	10	9	3	3	0	773
3/29/2018 11:00 AM	383	535	4	9	9	2	2	0	944
3/29/2018 12:00 PM	425	550	0	8	10	1	4	1	999
3/29/2018 1:00 PM	438	571	3	8	12	3	3	0	1038
3/29/2018 2:00 PM	515	748	4	9	15	3	4	2	1300

3/29/2018 3:00 PM	652	839	4	11	15	1	1	1	1524
3/29/2018 4:00 PM	754	1009	4	10	12	3	0	0	1792
3/29/2018 5:00 PM	838	1101	4	10	13	3	2	0	1971
3/29/2018 6:00 PM	689	952	3	4	10	0	2	1	1661
3/29/2018 7:00 PM	552	699	5	6	8	1	1	0	1272
3/29/2018 8:00 PM	405	517	2	1	7	0	2	0	934
3/29/2018 9:00 PM	271	413	2	4	11	2	0	0	703
3/29/2018 10:00 PM	207	275	2	4	9	1	2	0	500
3/29/2018 11:00 PM	133	203	1	1	5	1	1	0	345
Grand Total	7802	10498	49	142	202	31	40	6	18770
	1	2	3	4	5	6	7	8	Grand Total
Total %	41.57%	55.93%	0.26%	0.76%	1.08%	0.17%	0.21%	0.03%	100.00%

Turning Movement Count (13 . BRITANNIA RD & CREDITVIEW RD) CustID: 00304130 MioID: 390842

Start Time	Southbound CREDITVIEW RD						Westbound BRITANNIA RD						Northbound CREDITVIEW RD						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	85	114	10	0	4	209	23	69	30	1	1	123	17	97	64	0	1	178	18	379	22	0	1	419	929
07:15:00	99	123	16	0	0	238	21	84	40	2	0	147	30	99	60	0	0	189	15	394	25	0	3	434	1008
07:30:00	117	156	12	0	2	285	24	103	48	0	2	175	38	161	79	0	1	278	16	495	21	0	2	532	1270
07:45:00	118	185	22	0	2	325	32	129	71	0	4	232	42	174	104	0	4	320	20	465	10	0	1	495	1372
Hourly	419	578	60	0	8	1057	100	385	189	3	7	677	127	531	307	0	6	965	69	1733	78	0	7	1880	4579
08:00:00	122	182	28	0	5	332	42	143	59	1	4	245	36	169	98	0	3	303	36	470	26	0	4	532	1412
08:15:00	132	193	9	0	8	334	26	124	97	0	4	247	69	211	113	0	5	393	40	441	20	0	2	501	1475
08:30:00	101	145	24	0	5	270	43	156	72	0	2	271	58	192	101	0	1	351	26	453	16	0	0	495	1387
08:45:00	108	124	27	0	0	259	21	116	76	1	0	214	61	195	98	1	1	355	36	459	26	0	3	521	1349
Hourly	463	644	88	0	18	1195	132	539	304	2	10	977	224	767	410	1	10	1402	138	1823	88	0	9	2049	5623
BREAK																									
11:00:00	78	84	18	0	2	180	18	127	24	0	2	169	24	71	35	0	1	130	38	180	15	0	1	233	712
11:15:00	63	68	29	0	4	160	22	168	47	1	3	238	25	75	34	0	2	134	28	213	32	1	1	274	806
11:30:00	53	75	22	0	5	150	32	164	29	0	3	225	32	64	49	0	1	145	26	191	34	0	0	251	771
11:45:00	75	85	18	0	0	178	39	178	37	1	7	255	31	84	43	0	2	158	23	164	18	0	0	205	796
Hourly	269	312	87	0	11	668	111	637	137	2	15	887	112	294	161	0	6	567	115	748	99	1	2	963	3085
12:00:00	82	102	21	0	6	205	31	148	37	1	0	217	30	76	28	0	0	134	25	220	21	0	3	266	822
12:15:00	63	69	29	2	2	163	39	161	56	1	3	257	28	74	46	0	4	148	30	190	27	0	1	247	815
12:30:00	40	103	18	0	0	161	35	142	46	2	2	225	36	83	39	1	1	159	22	168	29	0	1	219	764
12:45:00	54	76	21	0	2	151	43	168	64	0	6	275	29	77	33	0	3	139	24	182	32	0	1	238	803
Hourly	239	350	89	2	10	680	148	619	203	4	11	974	123	310	146	1	8	580	101	760	109	0	6	970	3204
13:00:00	51	78	21	0	1	150	26	170	43	0	4	239	16	90	46	0	3	152	37	147	18	1	0	203	744
13:15:00	36	72	19	0	1	127	26	132	60	2	2	220	32	102	41	0	2	175	19	129	17	0	2	165	687
13:30:00	29	76	24	0	3	129	36	173	62	0	6	271	35	99	36	0	2	170	24	143	29	0	3	196	766
13:45:00	32	66	25	0	4	123	43	161	52	0	0	256	24	77	36	0	0	137	25	135	24	0	2	184	700
Hourly	148	292	89	0	9	529	131	636	217	2	12	986	107	368	159	0	7	634	105	554	88	1	7	748	2897
BREAK																									
15:00:00	44	109	30	0	5	183	30	209	55	1	8	295	43	127	53	0	8	223	30	153	43	0	9	226	927
15:15:00	38	96	17	0	11	151	43	255	62	0	1	360	53	119	40	0	1	212	35	178	33	0	7	246	969
15:30:00	47	150	26	0	2	223	40	261	62	3	6	366	42	135	35	1	2	213	27	190	52	0	0	269	1071
15:45:00	43	125	29	0	2	197	58	319	53	1	5	431	37	158	28	0	1	223	31	188	41	0	0	260	1111
Hourly	172	480	102	0	20	754	171	1044	232	5	20	1452	175	539	156	1	12	871	123	709	169	0	16	1001	4078

16:00:00	52	175	23	0	6	250	48	298	64	0	3	410	39	122	40	0	2	201	30	180	42	0	2	252	1113
16:15:00	48	183	26	0	1	257	57	329	67	1	5	454	31	180	54	0	0	265	29	151	33	1	0	214	1190
16:30:00	61	147	23	0	6	231	60	378	100	1	4	539	36	142	30	0	4	208	27	193	52	0	3	272	1250
16:45:00	75	225	28	0	2	328	75	358	75	0	2	508	34	203	38	0	1	275	26	150	55	0	1	231	1342
Hourly	236	730	100	0	15	1066	240	1363	306	2	14	1911	140	647	162	0	7	949	112	674	182	1	6	969	4895
17:00:00	60	205	27	0	2	292	84	417	110	0	1	611	35	156	34	0	1	225	30	175	67	0	1	272	1400
17:15:00	59	248	31	0	1	338	63	361	90	2	6	516	35	174	46	0	3	255	33	192	78	0	0	303	1412
17:30:00	62	182	31	0	9	275	71	384	94	2	2	551	41	163	45	0	0	249	27	161	51	0	3	239	1314
17:45:00	69	203	33	0	2	305	66	374	78	2	5	520	37	152	35	0	6	224	32	214	54	0	0	300	1349
Hourly	250	838	122	0	14	1210	284	1536	372	6	14	2198	148	645	160	0	10	953	122	742	250	0	4	1114	5475
Grand Total	2196	4224	737	2	105	7159	1317	6759	1960	26	103	10062	1156	4101	1661	3	66	6921	885	7743	1063	3	57	9694	**33836**
Approach%	30.7%	59%	10.3%	0%		-	13.1%	67.2%	19.5%	0.3%		-	16.7%	59.3%	24%	0%		-	9.1%	79.9%	11%	0%		-	**-**
Totals %	6.5%	12.5%	2.2%	0%		21.2%	3.9%	20%	5.8%	0.1%		29.7%	3.4%	12.1%	4.9%	0%		20.5%	2.6%	22.9%	3.1%	0%		28.6%	**-**
Heavy	35	76	16	0		-	51	190	35	0		-	58	80	46	0		-	21	198	46	0		-	**-**
Heavy %	1.6%	1.8%	2.2%	0%		-	3.9%	2.8%	1.8%	0%		-	5%	2%	2.8%	0%		-	2.4%	2.6%	4.3%	0%		-	**-**
Bicycles	0	1	0	0		-	0	2	1	0		-	0	0	0	0		-	0	1	0	0		-	**-**
Bicycle %	0%	0%	0%	0%		-	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	**-**

Peak Hour: 08:00 AM - 09:00 AM Weather: Clear (2.2 °C)

Start Time	Southbound CREDITVIEW RD						Westbound BRITANNIA RD						Northbound CREDITVIEW RD						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
08:00:00	122	182	28	0	5	332	42	143	59	1	4	245	36	169	98	0	3	303	36	470	26	0	4	532	1412
08:15:00	132	193	9	0	8	334	26	124	97	0	4	247	69	211	113	0	5	393	40	441	20	0	2	501	1475
08:30:00	101	145	24	0	5	270	43	156	72	0	2	271	58	192	101	0	1	351	26	453	16	0	0	495	1387
08:45:00	108	124	27	0	0	259	21	116	76	1	0	214	61	195	98	1	1	355	36	459	26	0	3	521	1349
Grand Total	463	644	88	0	18	1195	132	539	304	2	10	977	224	767	410	1	10	1402	138	1823	88	0	9	2049	**5623**
Approach%	38.7%	53.9%	7.4%	0%		-	13.5%	55.2%	31.1%	0.2%		-	16%	54.7%	29.2%	0.1%		-	6.7%	89%	4.3%	0%		-	-
Totals %	8.2%	11.5%	1.6%	0%		21.3%	2.3%	9.6%	5.4%	0%		17.4%	4%	13.6%	7.3%	0%		24.9%	2.5%	32.4%	1.6%	0%		36.4%	-
PHF	0.88	0.83	0.79	0		0.89	0.77	0.86	0.78	0.5		0.9	0.81	0.91	0.91	0.25		0.89	0.86	0.97	0.85	0		0.96	-
Heavy	4	27	5	0		36	10	31	6	0		47	13	13	9	0		35	6	29	8	0		43	-
Heavy %	0.9%	4.2%	5.7%	0%		3%	7.6%	5.8%	2%	0%		4.8%	5.8%	1.7%	2.2%	0%		2.5%	4.3%	1.6%	9.1%	0%		2.1%	-
Lights	459	617	83	0		1159	122	508	298	2		930	211	754	401	1		1367	132	1794	80	0		2006	-
Lights %	99.1%	95.8%	94.3%	0%		97%	92.4%	94.2%	98%	100%		95.2%	94.2%	98.3%	97.8%	100%		97.5%	95.7%	98.4%	90.9%	0%		97.9%	-
Single-Unit Trucks	2	7	1	0		10	1	14	3	0		18	3	1	0	0		4	2	15	3	0		20	-
Single-Unit Trucks %	0.4%	1.1%	1.1%	0%		0.8%	0.8%	2.6%	1%	0%		1.8%	1.3%	0.1%	0%	0%		0.3%	1.4%	0.8%	3.4%	0%		1%	-
Buses	2	20	4	0		26	9	14	3	0		26	10	12	9	0		31	4	12	5	0		21	-
Buses %	0.4%	3.1%	4.5%	0%		2.2%	6.8%	2.6%	1%	0%		2.7%	4.5%	1.6%	2.2%	0%		2.2%	2.9%	0.7%	5.7%	0%		1%	-
Articulated Trucks	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	10	-	-	-	-	-	10	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	36.2%		-	-	-	-	21.3%		-	-	-	-	21.3%		-	-	-	-	17%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	2.1%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	2.1%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

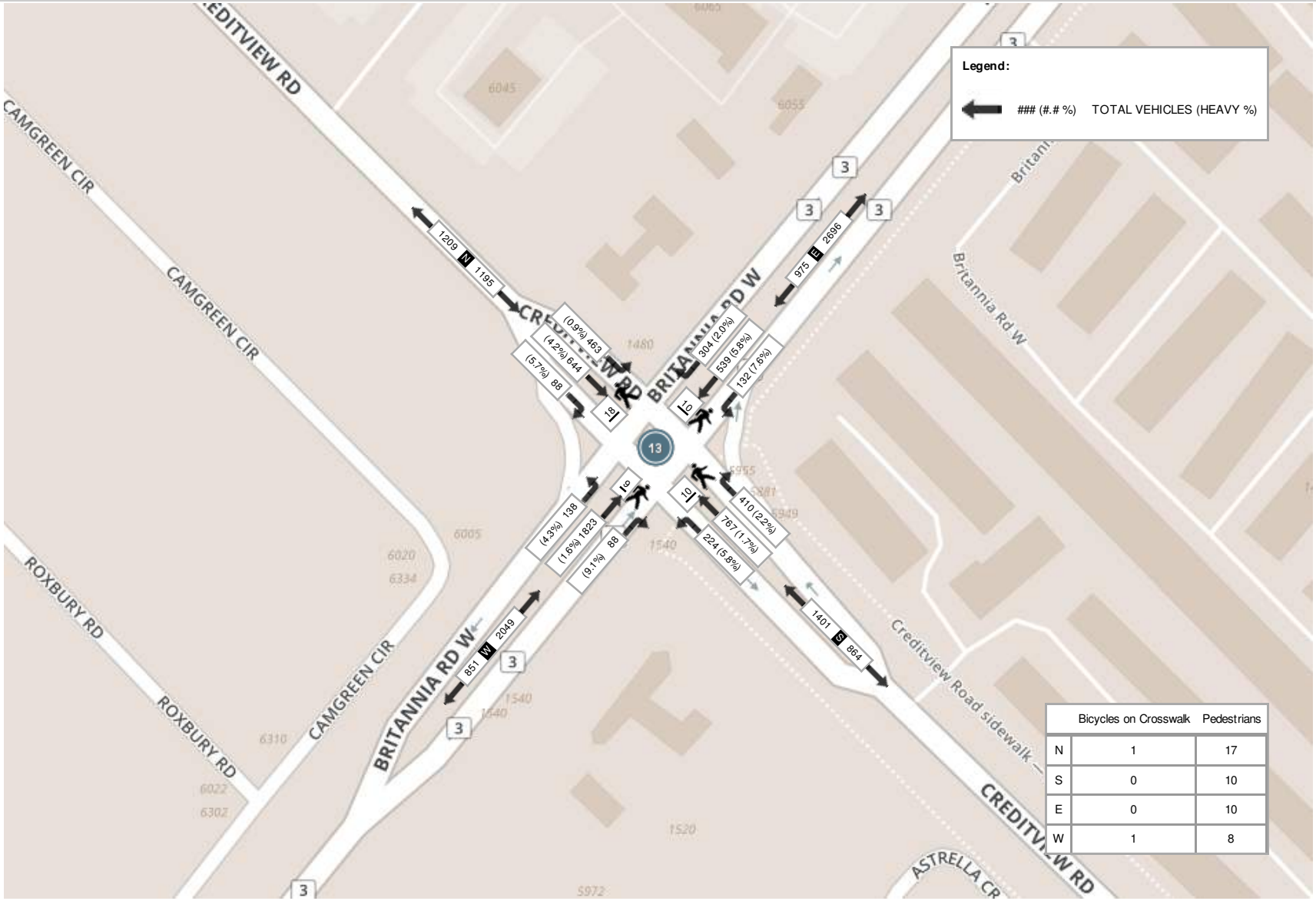
Peak Hour: 12:00 PM - 01:00 PM Weather: Clear (7.3 °C)

Start Time	Southbound CREDITVIEW RD						Westbound BRITANNIA RD						Northbound CREDITVIEW RD						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:00:00	82	102	21	0	6	205	31	148	37	1	0	217	30	76	28	0	0	134	25	220	21	0	3	266	822
12:15:00	63	69	29	2	2	163	39	161	56	1	3	257	28	74	46	0	4	148	30	190	27	0	1	247	815
12:30:00	40	103	18	0	0	161	35	142	46	2	2	225	36	83	39	1	1	159	22	168	29	0	1	219	764
12:45:00	54	76	21	0	2	151	43	168	64	0	6	275	29	77	33	0	3	139	24	182	32	0	1	238	803
Grand Total	239	350	89	2	10	680	148	619	203	4	11	974	123	310	146	1	8	580	101	760	109	0	6	970	**3204**
Approach%	35.1%	51.5%	13.1%	0.3%		-	15.2%	63.6%	20.8%	0.4%		-	21.2%	53.4%	25.2%	0.2%		-	10.4%	78.4%	11.2%	0%		-	-
Totals %	7.5%	10.9%	2.8%	0.1%		21.2%	4.6%	19.3%	6.3%	0.1%		30.4%	3.8%	9.7%	4.6%	0%		18.1%	3.2%	23.7%	3.4%	0%		30.3%	-
PHF	0.73	0.85	0.77	0.25		0.83	0.86	0.92	0.79	0.5		0.89	0.85	0.93	0.79	0.25		0.91	0.84	0.86	0.85	0		0.91	-
Heavy	6	4	1	0		11	5	14	4	0		23	4	3	2	0		9	2	20	4	0		26	-
Heavy %	2.5%	1.1%	1.1%	0%		1.6%	3.4%	2.3%	2%	0%		2.4%	3.3%	1%	1.4%	0%		1.6%	2%	2.6%	3.7%	0%		2.7%	-
Lights	233	346	88	2		669	143	605	199	4		951	119	307	144	1		571	99	740	105	0		944	-
Lights %	97.5%	98.9%	98.9%	100%		98.4%	96.6%	97.7%	98%	100%		97.6%	96.7%	99%	98.6%	100%		98.4%	98%	97.4%	96.3%	0%		97.3%	-
Single-Unit Trucks	5	3	1	0		9	3	8	3	0		14	1	1	0	0		2	1	17	2	0		20	-
Single-Unit Trucks %	2.1%	0.9%	1.1%	0%		1.3%	2%	1.3%	1.5%	0%		1.4%	0.8%	0.3%	0%	0%		0.3%	1%	2.2%	1.8%	0%		2.1%	-
Buses	0	1	0	0		1	2	2	1	0		5	3	2	2	0		7	0	2	2	0		4	-
Buses %	0%	0.3%	0%	0%		0.1%	1.4%	0.3%	0.5%	0%		0.5%	2.4%	0.6%	1.4%	0%		1.2%	0%	0.3%	1.8%	0%		0.4%	-
Articulated Trucks	1	0	0	0		1	0	4	0	0		4	0	0	0	0		0	1	1	0	0		2	-
Articulated Trucks %	0.4%	0%	0%	0%		0.1%	0%	0.6%	0%	0%		0.4%	0%	0%	0%	0%		0%	1%	0.1%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	11	-	-	-	-	-	8	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	28.6%		-	-	-	-	31.4%		-	-	-	-	22.9%		-	-	-	-	17.1%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast (8.4 °C)

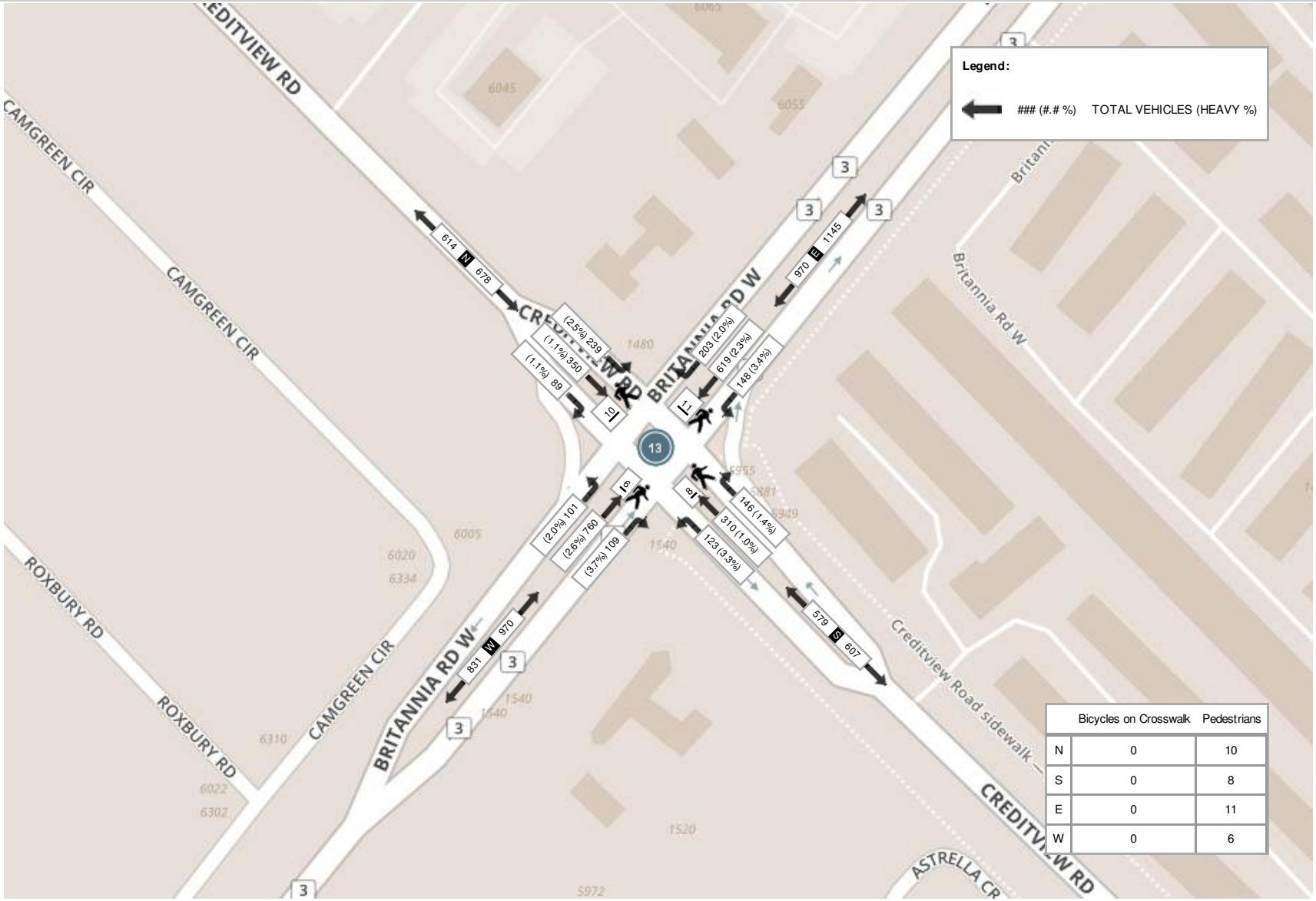
Start Time	Southbound CREDITVIEW RD						Westbound BRITANNIA RD						Northbound CREDITVIEW RD						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	60	205	27	0	2	292	84	417	110	0	1	611	35	156	34	0	1	225	30	175	67	0	1	272	1400
17:15:00	59	248	31	0	1	338	63	361	90	2	6	516	35	174	46	0	3	255	33	192	78	0	0	303	1412
17:30:00	62	182	31	0	9	275	71	384	94	2	2	551	41	163	45	0	0	249	27	161	51	0	3	239	1314
17:45:00	69	203	33	0	2	305	66	374	78	2	5	520	37	152	35	0	6	224	32	214	54	0	0	300	1349
Grand Total	250	838	122	0	14	1210	284	1536	372	6	14	2198	148	645	160	0	10	953	122	742	250	0	4	1114	**5475**
Approach%	20.7%	69.3%	10.1%	0%		-	12.9%	69.9%	16.9%	0.3%		-	15.5%	67.7%	16.8%	0%		-	11%	66.6%	22.4%	0%		-	-
Totals %	4.6%	15.3%	2.2%	0%		22.1%	5.2%	28.1%	6.8%	0.1%		40.1%	2.7%	11.8%	2.9%	0%		17.4%	2.2%	13.6%	4.6%	0%		20.3%	-
PHF	0.91	0.84	0.92	0		0.89	0.85	0.92	0.85	0.75		0.9	0.9	0.93	0.87	0		0.93	0.92	0.87	0.8	0		0.92	-
Heavy	0	1	0	0		1	7	16	2	0		25	7	9	3	0		19	1	20	1	0		22	-
Heavy %	0%	0.1%	0%	0%		0.1%	2.5%	1%	0.5%	0%		1.1%	4.7%	1.4%	1.9%	0%		2%	0.8%	2.7%	0.4%	0%		2%	-
Lights	250	837	122	0		1209	277	1520	370	6		2173	141	636	157	0		934	121	722	249	0		1092	-
Lights %	100%	99.9%	100%	0%		99.9%	97.5%	99%	99.5%	100%		98.9%	95.3%	98.6%	98.1%	0%		98%	99.2%	97.3%	99.6%	0%		98%	-
Single-Unit Trucks	0	0	0	0		0	0	7	1	0		8	3	4	0	0		7	0	6	0	0		6	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.5%	0.3%	0%		0.4%	2%	0.6%	0%	0%		0.7%	0%	0.8%	0%	0%		0.5%	-
Buses	0	1	0	0		1	7	7	0	0		14	4	5	3	0		12	1	12	1	0		14	-
Buses %	0%	0.1%	0%	0%		0.1%	2.5%	0.5%	0%	0%		0.6%	2.7%	0.8%	1.9%	0%		1.3%	0.8%	1.6%	0.4%	0%		1.3%	-
Articulated Trucks	0	0	0	0		0	0	2	1	0		3	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0.3%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	14	-	-	-	-	-	10	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	33.3%		-	-	-	-	23.8%		-	-	-	-	9.5%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Clear (2.2 °C)



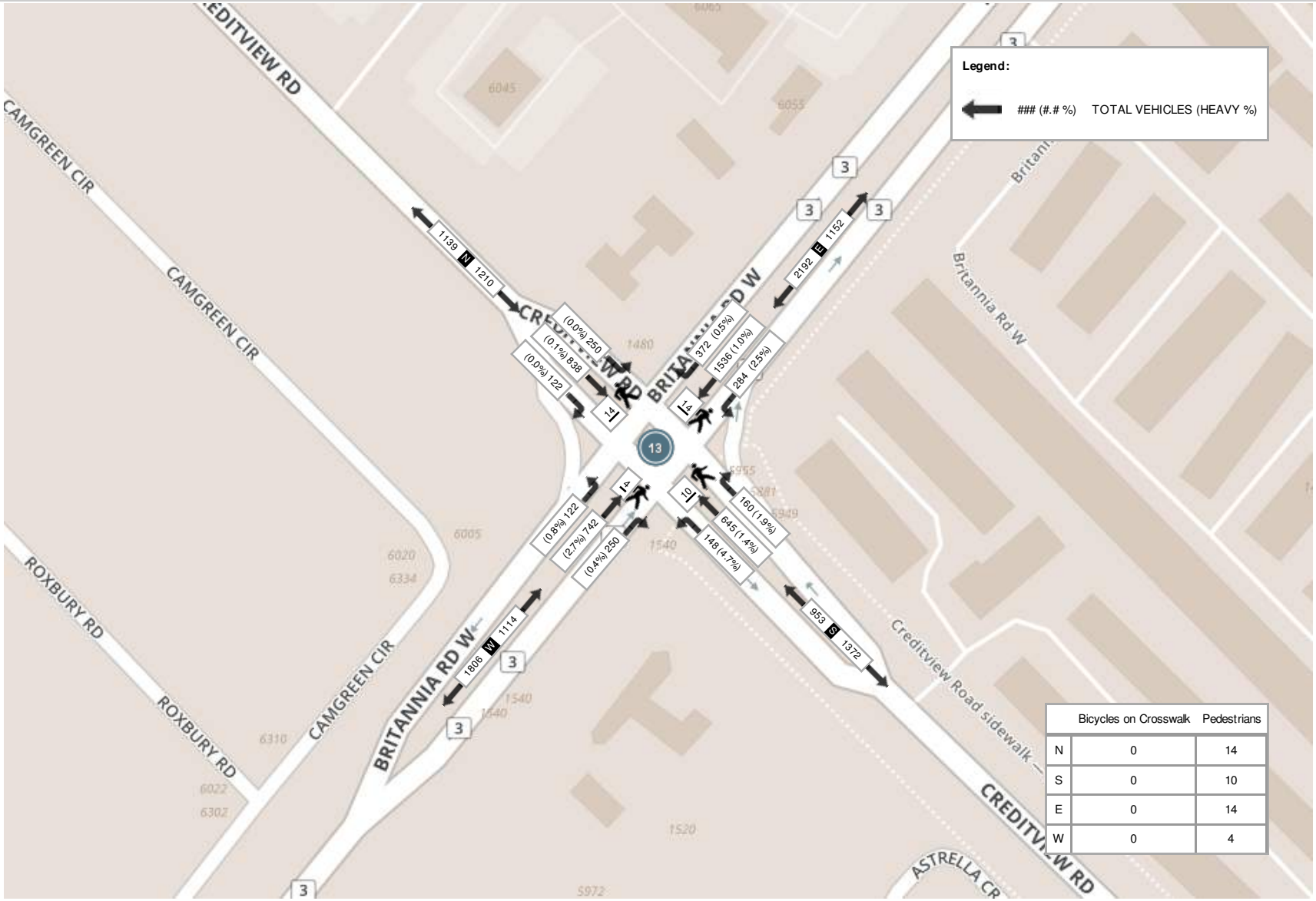
	Bicycles on Crosswalk	Pedestrians
N	1	17
S	0	10
E	0	10
W	1	8

Peak Hour: 12:00 PM - 01:00 PM Weather: Clear (7.3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	10
S	0	8
E	0	11
W	0	6

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast (8.4 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	14
S	0	10
E	0	14
W	0	4

Turning Movement Count (1 . CREDITVIEW RD & ARGENTIA RD)

Start Time	N Approach CREDITVIEW RD						E Approach EAST ACCESS						S Approach CREDITVIEW RD						W Approach ARGENTIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	36	104	0	0	0	140	0	0	1	0	0	1	0	65	48	0	0	113	38	0	33	0	0	71	325	
07:15:00	41	113	0	0	0	154	0	0	0	0	0	0	0	90	56	0	0	146	53	0	26	0	0	79	379	
07:30:00	62	172	0	0	0	234	0	0	0	0	0	0	0	133	63	0	0	196	51	0	34	0	2	85	515	
07:45:00	83	128	0	0	0	211	0	0	0	0	0	0	0	169	104	0	0	273	68	0	58	0	0	126	610	1829
08:00:00	100	176	0	0	0	276	0	0	0	0	0	0	0	145	79	0	0	224	56	0	52	0	0	108	608	2112
08:15:00	91	159	0	0	1	250	0	0	0	0	0	0	0	175	107	0	0	282	40	0	39	0	0	79	611	2344
08:30:00	114	162	0	0	0	276	0	0	0	0	0	0	0	188	104	0	0	292	33	0	56	0	0	89	657	2486
08:45:00	127	131	0	0	0	258	0	0	0	0	0	0	0	199	86	0	0	285	41	0	41	0	0	82	625	2501
09:00:00	89	100	0	0	0	189	0	0	0	0	0	0	0	179	109	0	0	288	33	0	47	0	0	80	557	2450
09:15:00	81	112	0	0	0	193	0	0	0	0	0	0	0	108	62	0	0	170	47	0	30	0	0	77	440	2279
09:30:00	58	90	0	0	0	148	0	0	0	0	0	0	0	88	65	0	0	153	46	0	27	0	0	73	374	1996
09:45:00	41	90	0	0	0	131	0	0	0	0	0	0	0	58	51	0	0	109	45	0	16	0	0	61	301	1672
BREAK																										
11:00:00	18	69	0	0	0	87	0	0	0	0	0	0	0	60	27	0	0	87	35	0	19	0	1	54	228	
11:15:00	20	88	0	0	0	108	0	0	0	0	0	0	0	76	40	0	0	116	36	0	23	0	0	59	283	
11:30:00	38	65	0	0	0	103	0	0	0	0	0	0	0	60	55	0	0	115	48	0	14	0	0	62	280	
11:45:00	42	106	3	0	0	151	0	0	0	0	6	0	0	71	51	0	0	122	50	0	16	0	0	66	339	1130
12:00:00	45	123	0	0	0	168	1	0	0	0	0	1	0	69	41	0	0	110	62	0	36	0	0	98	377	1279
12:15:00	38	80	0	0	1	118	0	0	0	0	5	0	0	82	59	0	0	141	70	0	30	0	1	100	359	1355
12:30:00	31	78	0	0	2	109	0	2	0	0	0	2	0	89	74	0	0	163	56	0	22	1	3	79	353	1428
12:45:00	40	95	0	0	0	135	0	0	0	0	0	0	0	90	67	0	0	157	49	0	28	0	0	77	369	1458
13:00:00	39	80	0	0	0	119	0	0	0	0	0	0	0	92	46	0	0	138	48	0	30	0	1	78	335	1416
13:15:00	26	60	0	0	1	86	0	0	0	0	3	0	1	113	58	0	1	172	51	0	29	0	0	80	338	1395
13:30:00	42	72	0	0	0	114	0	0	0	0	0	0	0	92	43	0	0	135	52	0	21	0	0	73	322	1364
13:45:00	38	63	0	0	0	101	0	0	0	1	0	1	0	118	39	0	0	157	48	0	26	0	2	74	333	1328
BREAK																										
16:00:00	70	179	0	0	0	249	0	0	1	0	0	1	0	145	56	0	0	201	84	0	67	0	1	151	602	
16:15:00	43	173	0	0	0	216	0	0	0	0	0	0	0	174	61	0	0	235	92	0	53	0	0	145	596	
16:30:00	53	176	0	0	0	229	0	0	0	0	0	0	0	153	60	0	0	213	101	0	97	0	0	198	640	
16:45:00	59	163	0	0	0	222	0	0	0	0	0	0	0	189	67	0	0	256	102	0	60	0	1	162	640	2478
17:00:00	65	171	0	0	0	236	0	0	0	0	0	0	0	176	62	0	0	238	92	0	106	0	1	198	672	2548

17:15:00	56	166	0	0	0	222	0	0	0	0	0	0	0	185	71	0	1	256	106	0	103	0	0	209	687	2639
17:30:00	74	149	0	0	0	223	0	0	0	0	0	0	0	200	63	0	0	263	99	0	79	0	1	178	664	2663
17:45:00	56	160	0	0	0	216	0	0	0	0	0	0	0	184	69	0	0	253	88	0	75	0	0	163	632	2655
18:00:00	56	174	0	0	0	230	0	0	0	0	0	0	0	158	55	0	0	213	66	0	67	0	0	133	576	2559
18:15:00	38	123	0	0	0	161	0	0	0	0	0	0	0	147	71	0	0	218	95	0	50	0	0	145	524	2396
18:30:00	30	110	0	0	1	140	0	0	0	0	0	0	0	172	60	0	0	232	59	0	35	0	1	94	466	2198
18:45:00	42	122	0	0	0	164	0	0	0	0	0	0	0	143	60	0	0	203	55	0	28	0	0	83	450	2016
Grand Total	1982	4382	3	0	6	6367	1	2	2	1	14	6	1	4635	2289	0	2	6925	2195	0	1573	1	15	3769	**17067**	-
Approach%	31.1%	68.8%	0%	0%		-	16.7%	33.3%	33.3%	16.7%		-	0%	66.9%	33.1%	0%		-	58.2%	0%	41.7%	0%		-	-	-
Totals %	11.6%	25.7%	0%	0%		37.3%	0%	0%	0%	0%		0%	0%	27.2%	13.4%	0%		40.6%	12.9%	0%	9.2%	0%		22.1%	-	-
Heavy	35	98	0	0		-	0	0	0	1		-	0	73	47	0		-	55	0	31	0		-	-	-
Heavy %	1.8%	2.2%	0%	0%		-	0%	0%	0%	100%		-	0%	1.6%	2.1%	0%		-	2.5%	0%	2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (17.06 °C)

Start Time	N Approach CREDITVIEW RD						E Approach EAST ACCESS						S Approach CREDITVIEW RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	100	176	0	0	0	276	0	0	0	0	0	0	0	145	79	0	0	224	56	0	52	0	0	108	608
08:15:00	91	159	0	0	1	250	0	0	0	0	0	0	0	175	107	0	0	282	40	0	39	0	0	79	611
08:30:00	114	162	0	0	0	276	0	0	0	0	0	0	0	188	104	0	0	292	33	0	56	0	0	89	657
08:45:00	127	131	0	0	0	258	0	0	0	0	0	0	0	199	86	0	0	285	41	0	41	0	0	82	625
Grand Total	432	628	0	0	1	1060	0	0	0	0	0	0	0	707	376	0	0	1083	170	0	188	0	0	358	**2501**
Approach%	40.8%	59.2%	0%	0%		-	0%	0%	0%	0%		-	0%	65.3%	34.7%	0%		-	47.5%	0%	52.5%	0%		-	-
Totals %	17.3%	25.1%	0%	0%		42.4%	0%	0%	0%	0%		0%	0%	28.3%	15%	0%		43.3%	6.8%	0%	7.5%	0%		14.3%	-
PHF	0.85	0.89	0	0		0.96	0	0	0	0		0	0	0.89	0.88	0		0.93	0.76	0	0.84	0		0.83	-
Heavy	3	25	0	0		28	0	0	0	0		0	0	12	4	0		16	6	0	4	0		10	-
Heavy %	0.7%	4%	0%	0%		2.6%	0%	0%	0%	0%		0%	0%	1.7%	1.1%	0%		1.5%	3.5%	0%	2.1%	0%		2.8%	-
Lights	429	603	0	0		1032	0	0	0	0		0	0	694	372	0		1066	164	0	184	0		348	-
Lights %	99.3%	96%	0%	0%		97.4%	0%	0%	0%	0%		0%	0%	98.2%	98.9%	0%		98.4%	96.5%	0%	97.9%	0%		97.2%	-
Single-Unit Trucks	2	14	0	0		16	0	0	0	0		0	0	4	1	0		5	3	0	2	0		5	-
Single-Unit Trucks %	0.5%	2.2%	0%	0%		1.5%	0%	0%	0%	0%		0%	0%	0.6%	0.3%	0%		0.5%	1.8%	0%	1.1%	0%		1.4%	-
Buses	0	10	0	0		10	0	0	0	0		0	0	8	3	0		11	3	0	1	0		4	-
Buses %	0%	1.6%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1.1%	0.8%	0%		1%	1.8%	0%	0.5%	0%		1.1%	-
Articulated Trucks	1	1	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	1	0		1	-
Articulated Trucks %	0.2%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0.5%	0%		0.3%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

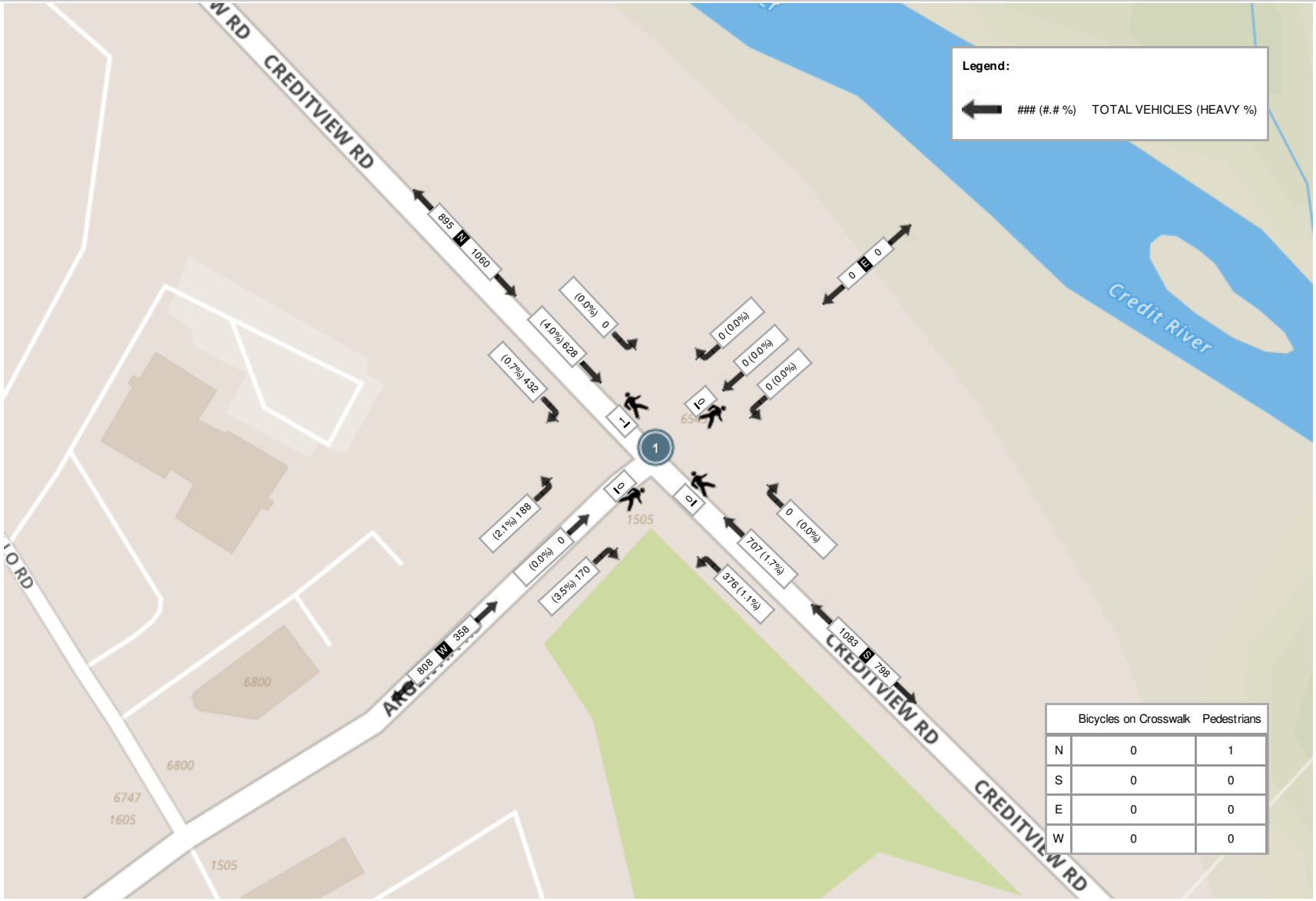
Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	N Approach CREDITVIEW RD						E Approach EAST ACCESS						S Approach CREDITVIEW RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	45	123	0	0	0	168	1	0	0	0	0	1	0	69	41	0	0	110	62	0	36	0	0	98	377
12:15:00	38	80	0	0	1	118	0	0	0	0	5	0	0	82	59	0	0	141	70	0	30	0	1	100	359
12:30:00	31	78	0	0	2	109	0	2	0	0	0	2	0	89	74	0	0	163	56	0	22	1	3	79	353
12:45:00	40	95	0	0	0	135	0	0	0	0	0	0	0	90	67	0	0	157	49	0	28	0	0	77	369
Grand Total	154	376	0	0	3	530	1	2	0	0	5	3	0	330	241	0	0	571	237	0	116	1	4	354	**1458**
Approach%	29.1%	70.9%	0%	0%		-	33.3%	66.7%	0%	0%		-	0%	57.8%	42.2%	0%		-	66.9%	0%	32.8%	0.3%		-	-
Totals %	10.6%	25.8%	0%	0%		36.4%	0.1%	0.1%	0%	0%		0.2%	0%	22.6%	16.5%	0%		39.2%	16.3%	0%	8%	0.1%		24.3%	-
PHF	0.86	0.76	0	0		0.79	0.25	0.25	0	0		0.38	0	0.92	0.81	0		0.88	0.85	0	0.81	0.25		0.89	-
Heavy	2	3	0	0		5	0	0	0	0		0	0	8	2	0		10	2	0	5	0		7	-
Heavy %	1.3%	0.8%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2.4%	0.8%	0%		1.8%	0.8%	0%	4.3%	0%		2%	-
Lights	152	373	0	0		525	1	2	0	0		3	0	322	239	0		561	235	0	111	1		347	-
Lights %	98.7%	99.2%	0%	0%		99.1%	100%	100%	0%	0%		100%	0%	97.6%	99.2%	0%		98.2%	99.2%	0%	95.7%	100%		98%	-
Single-Unit Trucks	2	1	0	0		3	0	0	0	0		0	0	5	1	0		6	1	0	1	0		2	-
Single-Unit Trucks %	1.3%	0.3%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	1.5%	0.4%	0%		1.1%	0.4%	0%	0.9%	0%		0.6%	-
Buses	0	2	0	0		2	0	0	0	0		0	0	3	1	0		4	1	0	2	0		3	-
Buses %	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.9%	0.4%	0%		0.7%	0.4%	0%	1.7%	0%		0.8%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	2	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	1.7%	0%		0.6%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	25%		-	-	-	-	41.7%		-	-	-	-	0%		-	-	-	-	33.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather:

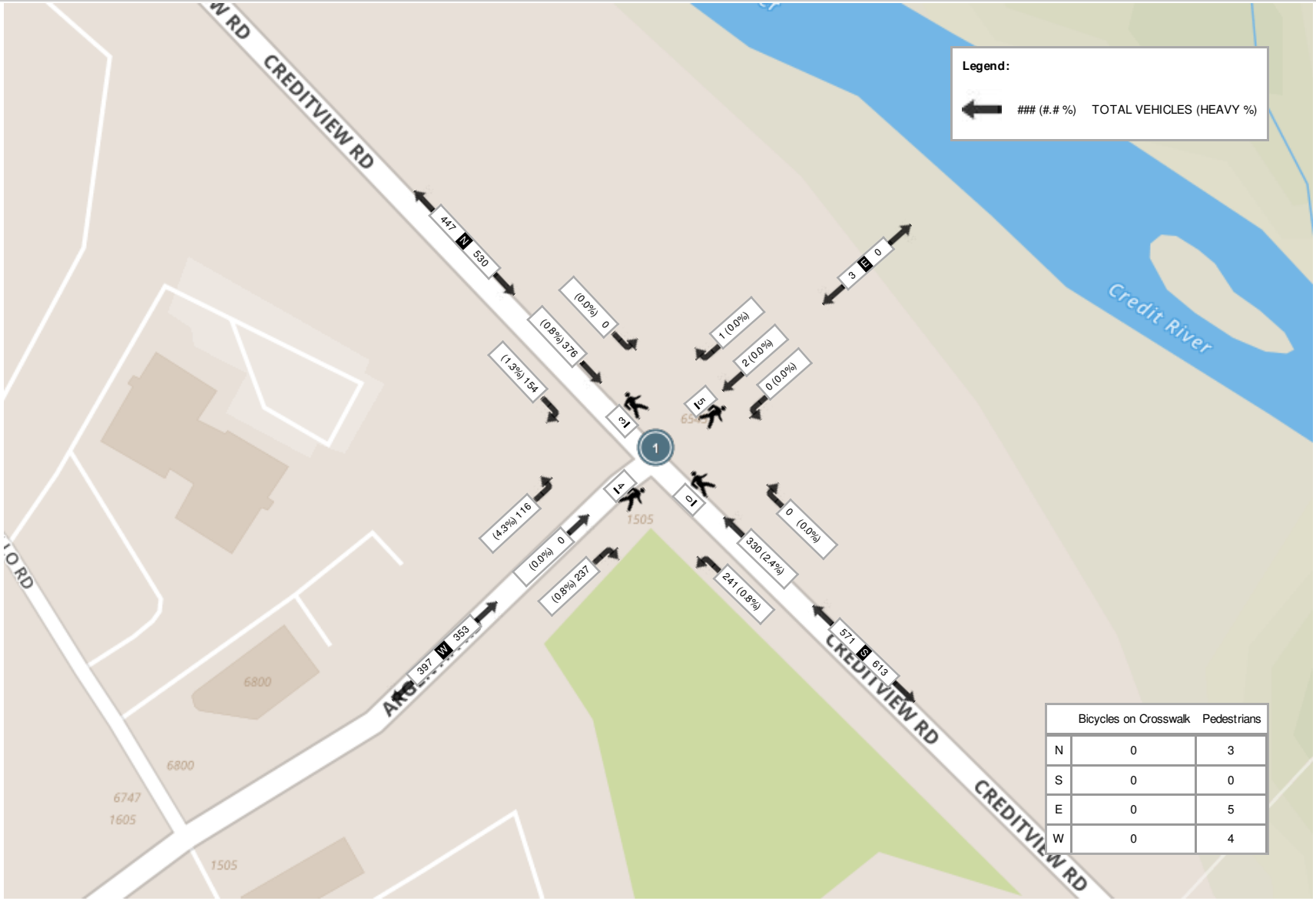
Start Time	N Approach CREDITVIEW RD						E Approach EAST ACCESS						S Approach CREDITVIEW RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	59	163	0	0	0	222	0	0	0	0	0	0	0	189	67	0	0	256	102	0	60	0	1	162	640
17:00:00	65	171	0	0	0	236	0	0	0	0	0	0	0	176	62	0	0	238	92	0	106	0	1	198	672
17:15:00	56	166	0	0	0	222	0	0	0	0	0	0	0	185	71	0	1	256	106	0	103	0	0	209	687
17:30:00	74	149	0	0	0	223	0	0	0	0	0	0	0	200	63	0	0	263	99	0	79	0	1	178	664
Grand Total	254	649	0	0	0	903	0	0	0	0	0	0	0	750	263	0	1	1013	399	0	348	0	3	747	**2663**
Approach%	28.1%	71.9%	0%	0%		-	0%	0%	0%	0%		-	0%	74%	26%	0%		-	53.4%	0%	46.6%	0%		-	-
Totals %	9.5%	24.4%	0%	0%		33.9%	0%	0%	0%	0%		0%	0%	28.2%	9.9%	0%		38%	15%	0%	13.1%	0%		28.1%	-
PHF	0.86	0.95	0	0		0.96	0	0	0	0		0	0	0.94	0.93	0		0.96	0.94	0	0.82	0		0.89	-
Heavy	5	3	0	0		8	0	0	0	0		0	0	7	8	0		15	6	0	3	0		9	-
Heavy %	2%	0.5%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.9%	3%	0%		1.5%	1.5%	0%	0.9%	0%		1.2%	-
Lights	249	646	0	0		895	0	0	0	0		0	0	743	255	0		998	393	0	345	0		738	-
Lights %	98%	99.5%	0%	0%		99.1%	0%	0%	0%	0%		0%	0%	99.1%	97%	0%		98.5%	98.5%	0%	99.1%	0%		98.8%	-
Single-Unit Trucks	3	1	0	0		4	0	0	0	0		0	0	6	1	0		7	3	0	3	0		6	-
Single-Unit Trucks %	1.2%	0.2%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.8%	0.4%	0%		0.7%	0.8%	0%	0.9%	0%		0.8%	-
Buses	2	2	0	0		4	0	0	0	0		0	0	1	7	0		8	3	0	0	0		3	-
Buses %	0.8%	0.3%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.1%	2.7%	0%		0.8%	0.8%	0%	0%	0%		0.4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	25%		-	-	-	-	75%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (17.06 °C)



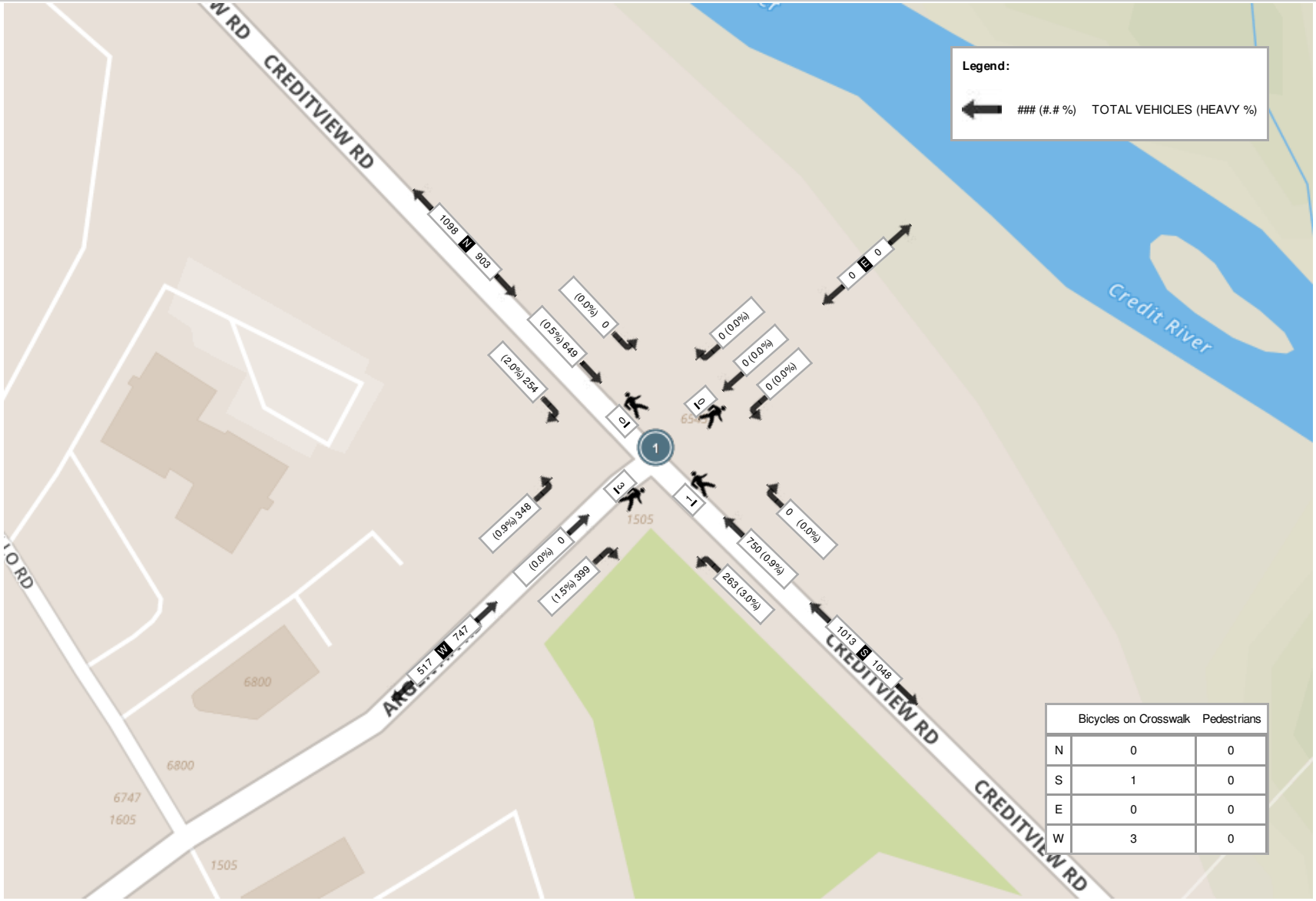
	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	0
E	0	0
W	0	0

Peak Hour: 12:00 PM - 01:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	0
E	0	5
W	0	4

Peak Hour: 04:45 PM - 05:45 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	1	0
E	0	0
W	3	0

Turning Movement Count (2 . CREDITVIEW RD & BRISTOL RD)

Start Time	N Approach CREDITVIEW RD						E Approach BRISTOL RD						S Approach CREDITVIEW RD						W Approach BRISTOL RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	4	121	27	0	5	152	16	30	35	0	3	81	20	105	6	0	0	131	12	58	7	0	5	77	441	
07:15:00	7	181	34	0	3	222	35	40	38	0	4	113	15	153	23	0	0	191	20	70	9	0	3	99	625	
07:30:00	8	200	53	0	5	261	53	63	45	0	5	161	24	187	25	0	2	236	18	106	15	0	4	139	797	
07:45:00	10	242	55	0	14	307	99	66	38	0	13	203	25	250	25	0	4	300	29	130	21	0	12	180	990	2853
08:00:00	12	231	69	0	4	312	159	66	51	0	16	276	16	246	36	0	9	298	33	122	48	0	8	203	1089	3501
08:15:00	14	223	59	0	2	296	67	69	42	0	5	178	23	222	31	0	3	276	42	155	15	0	5	212	962	3838
08:30:00	13	211	53	0	4	277	60	64	47	0	7	171	31	215	32	0	2	278	33	130	18	0	6	181	907	3948
08:45:00	4	157	49	0	3	210	65	56	25	0	4	146	33	211	38	0	4	282	32	121	15	0	4	168	806	3764
09:00:00	7	138	39	0	5	184	47	77	28	1	4	153	18	163	32	0	1	213	31	85	23	0	3	139	689	3364
09:15:00	12	130	31	0	6	173	34	40	26	0	3	100	22	124	20	0	3	166	22	70	8	0	2	100	539	2941
09:30:00	23	131	29	0	7	183	46	50	28	0	3	124	19	137	29	0	1	185	30	48	15	0	2	93	585	2619
09:45:00	14	119	21	0	3	154	29	55	14	0	6	98	17	109	27	0	1	153	23	47	12	0	0	82	487	2300
BREAK																										
11:00:00	14	113	36	1	8	164	30	52	26	0	15	108	26	95	23	0	6	144	33	54	30	0	8	117	533	
11:15:00	14	117	23	0	15	154	30	50	32	1	9	113	19	108	29	0	3	156	24	51	9	0	7	84	507	
11:30:00	11	134	37	0	5	182	20	39	28	0	4	87	21	104	32	0	1	157	22	66	11	0	5	99	525	
11:45:00	6	115	26	0	7	147	40	58	26	0	6	124	23	104	30	0	4	157	20	47	15	0	3	82	510	2075
12:00:00	9	127	28	0	14	164	28	49	40	0	7	117	17	120	22	0	2	159	33	53	8	0	6	94	534	2076
12:15:00	8	131	40	0	10	179	30	55	30	0	6	115	29	148	37	0	0	214	28	50	13	0	5	91	599	2168
12:30:00	14	123	35	0	11	172	20	71	24	0	9	115	19	131	30	0	2	180	19	63	17	0	4	99	566	2209
12:45:00	6	143	34	0	6	183	34	71	29	0	4	134	24	120	29	0	0	173	27	41	11	0	1	79	569	2268
13:00:00	14	113	20	0	3	147	31	49	20	0	5	100	22	135	36	0	2	193	25	51	15	0	5	91	531	2265
13:15:00	11	110	28	0	4	149	28	52	32	0	4	112	20	127	37	0	3	184	28	48	10	2	5	88	533	2199
13:30:00	11	103	35	0	5	149	29	49	27	0	8	105	19	138	37	0	4	194	27	48	11	0	1	86	534	2167
13:45:00	6	115	28	0	7	149	27	58	23	0	3	108	20	117	44	0	0	181	37	56	10	0	2	103	541	2139
BREAK																										
16:00:00	10	208	40	1	5	259	36	122	51	0	6	209	22	185	37	0	1	244	44	43	13	0	4	100	812	
16:15:00	19	236	50	0	4	305	45	149	84	0	6	278	37	205	45	0	1	287	27	63	18	0	4	108	978	
16:30:00	23	218	58	1	11	300	58	192	104	0	1	354	17	200	60	0	2	277	38	63	13	1	0	115	1046	
16:45:00	21	307	63	0	6	391	49	171	75	0	8	295	35	201	47	0	1	283	47	49	19	0	4	115	1084	3920
17:00:00	15	258	45	0	4	318	47	172	102	0	2	321	23	182	47	0	3	252	37	88	19	0	3	144	1035	4143

17:15:00	21	320	57	0	6	398	52	162	84	0	5	298	24	239	43	0	4	306	65	58	16	0	5	139	1141	4306
17:30:00	23	263	65	0	7	351	47	159	87	0	6	293	30	203	38	0	5	271	57	90	28	0	9	175	1090	4350
17:45:00	15	324	62	0	11	401	49	164	67	0	6	280	46	230	43	0	2	319	41	74	14	0	9	129	1129	4395
18:00:00	10	209	63	0	3	282	39	133	69	0	7	241	32	181	45	0	7	258	35	95	20	0	6	150	931	4291
18:15:00	19	239	55	0	5	313	41	133	63	0	5	237	46	220	47	0	3	313	30	80	13	0	6	123	986	4136
18:30:00	21	203	48	1	8	273	44	102	45	0	6	191	34	163	47	0	5	244	35	79	12	0	2	126	834	3880
18:45:00	16	187	40	0	8	243	29	89	49	0	2	167	28	164	42	0	5	234	31	85	15	0	4	131	775	3526
Grand Total	465	6500	1535	4	234	8504	1593	3077	1634	2	213	6306	896	5942	1251	0	96	8089	1135	2637	566	3	162	4341	**27240**	-
Approach%	5.5%	76.4%	18.1%	0%		-	25.3%	48.8%	25.9%	0%		-	11.1%	73.5%	15.5%	0%		-	26.1%	60.7%	13%	0.1%		-	-	-
Totals %	1.7%	23.9%	5.6%	0%		31.2%	5.8%	11.3%	6%	0%		23.1%	3.3%	21.8%	4.6%	0%		29.7%	4.2%	9.7%	2.1%	0%		15.9%	-	-
Heavy	6	151	34	0		-	38	71	16	0		-	17	159	28	0		-	26	62	15	0		-	-	-
Heavy %	1.3%	2.3%	2.2%	0%		-	2.4%	2.3%	1%	0%		-	1.9%	2.7%	2.2%	0%		-	2.3%	2.4%	2.7%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)

Start Time	N Approach CREDITVIEW RD						E Approach BRISTOL RD						S Approach CREDITVIEW RD						W Approach BRISTOL RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	10	242	55	0	14	307	99	66	38	0	13	203	25	250	25	0	4	300	29	130	21	0	12	180	990
08:00:00	12	231	69	0	4	312	159	66	51	0	16	276	16	246	36	0	9	298	33	122	48	0	8	203	1089
08:15:00	14	223	59	0	2	296	67	69	42	0	5	178	23	222	31	0	3	276	42	155	15	0	5	212	962
08:30:00	13	211	53	0	4	277	60	64	47	0	7	171	31	215	32	0	2	278	33	130	18	0	6	181	907
Grand Total	49	907	236	0	24	1192	385	265	178	0	41	828	95	933	124	0	18	1152	137	537	102	0	31	776	**3948**
Approach%	4.1%	76.1%	19.8%	0%		-	46.5%	32%	21.5%	0%		-	8.2%	81%	10.8%	0%		-	17.7%	69.2%	13.1%	0%		-	-
Totals %	1.2%	23%	6%	0%		30.2%	9.8%	6.7%	4.5%	0%		21%	2.4%	23.6%	3.1%	0%		29.2%	3.5%	13.6%	2.6%	0%		19.7%	-
PHF	0.88	0.94	0.86	0		0.96	0.61	0.96	0.87	0		0.75	0.77	0.93	0.86	0		0.96	0.82	0.87	0.53	0		0.92	-
Heavy	0	30	7	0		37	13	13	5	0		31	2	20	5	0		27	5	14	1	0		20	-
Heavy %	0%	3.3%	3%	0%		3.1%	3.4%	4.9%	2.8%	0%		3.7%	2.1%	2.1%	4%	0%		2.3%	3.6%	2.6%	1%	0%		2.6%	-
Lights	49	877	229	0		1155	372	252	173	0		797	93	913	119	0		1125	132	521	101	0		754	-
Lights %	100%	96.7%	97%	0%		96.9%	96.6%	95.1%	97.2%	0%		96.3%	97.9%	97.9%	96%	0%		97.7%	96.4%	97%	99%	0%		97.2%	-
Single-Unit Trucks	0	9	1	0		10	1	1	1	0		3	0	5	2	0		7	0	0	0	0		0	-
Single-Unit Trucks %	0%	1%	0.4%	0%		0.8%	0.3%	0.4%	0.6%	0%		0.4%	0%	0.5%	1.6%	0%		0.6%	0%	0%	0%	0%		0%	-
Buses	0	21	6	0		27	11	12	4	0		27	2	14	3	0		19	5	14	1	0		20	-
Buses %	0%	2.3%	2.5%	0%		2.3%	2.9%	4.5%	2.2%	0%		3.3%	2.1%	1.5%	2.4%	0%		1.6%	3.6%	2.6%	1%	0%		2.6%	-
Articulated Trucks	0	0	0	0		0	1	0	0	0		1	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0.3%	0%	0%	0%		0.1%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	-
Pedestrians	-	-	-	-	24	-	-	-	-	-	32	-	-	-	-	-	16	-	-	-	-	-	27	-	-
Pedestrians%	-	-	-	-	21.1%		-	-	-	-	28.1%		-	-	-	-	14%		-	-	-	-	23.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	2	-	-	-	-	-	4	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	7.9%		-	-	-	-	1.8%		-	-	-	-	3.5%		-

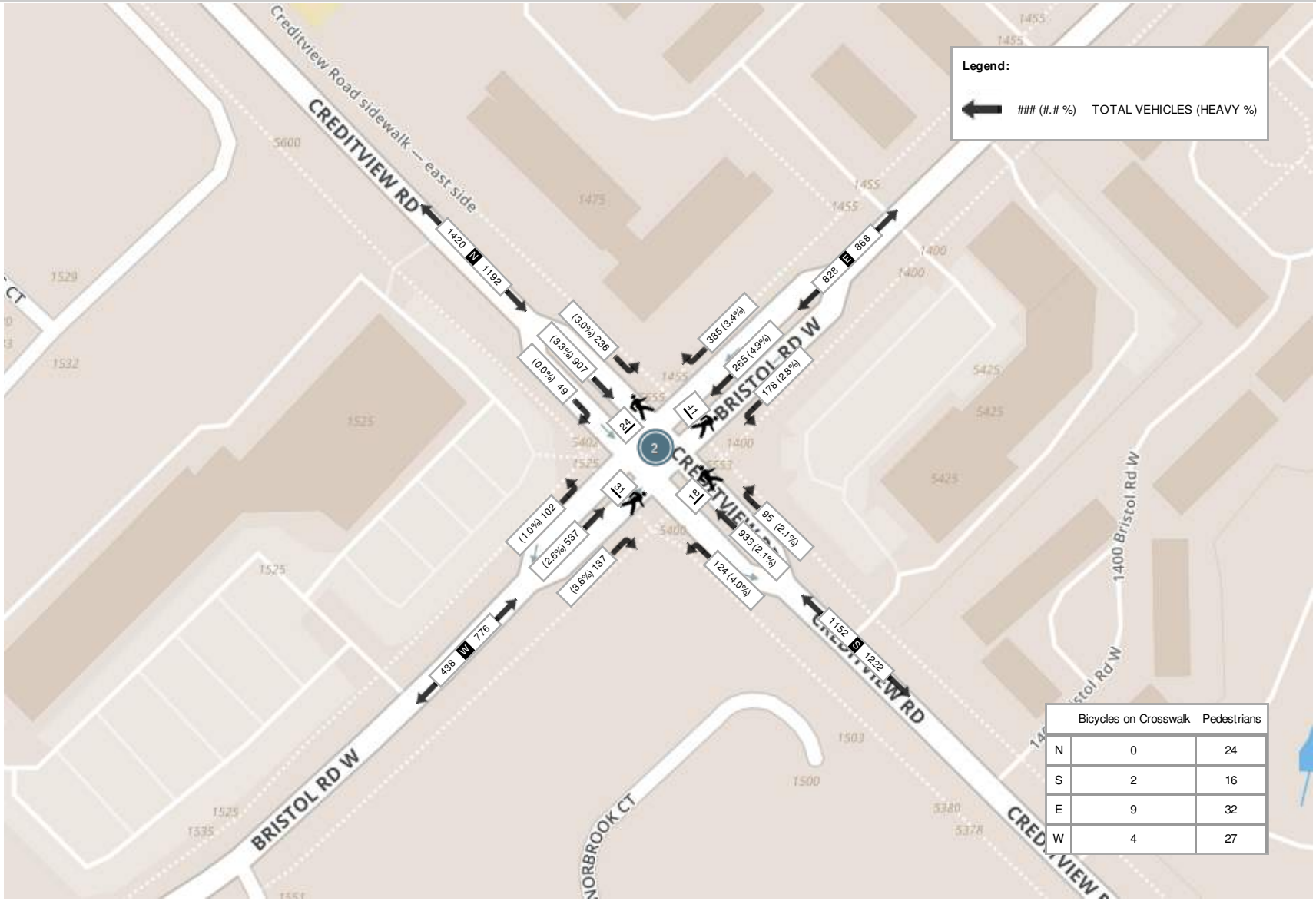
Peak Hour: 12:00 PM - 01:00 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach CREDITVIEW RD						E Approach BRISTOL RD						S Approach CREDITVIEW RD						W Approach BRISTOL RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	9	127	28	0	14	164	28	49	40	0	7	117	17	120	22	0	2	159	33	53	8	0	6	94	534
12:15:00	8	131	40	0	10	179	30	55	30	0	6	115	29	148	37	0	0	214	28	50	13	0	5	91	599
12:30:00	14	123	35	0	11	172	20	71	24	0	9	115	19	131	30	0	2	180	19	63	17	0	4	99	566
12:45:00	6	143	34	0	6	183	34	71	29	0	4	134	24	120	29	0	0	173	27	41	11	0	1	79	569
Grand Total	37	524	137	0	41	698	112	246	123	0	26	481	89	519	118	0	4	726	107	207	49	0	16	363	**2268**
Approach%	5.3%	75.1%	19.6%	0%		-	23.3%	51.1%	25.6%	0%		-	12.3%	71.5%	16.3%	0%		-	29.5%	57%	13.5%	0%		-	-
Totals %	1.6%	23.1%	6%	0%		30.8%	4.9%	10.8%	5.4%	0%		21.2%	3.9%	22.9%	5.2%	0%		32%	4.7%	9.1%	2.2%	0%		16%	-
PHF	0.66	0.92	0.86	0		0.95	0.82	0.87	0.77	0		0.9	0.77	0.88	0.8	0		0.85	0.81	0.82	0.72	0		0.92	-
Heavy	0	13	1	0		14	3	5	1	0		9	1	20	5	0		26	2	5	0	0		7	-
Heavy %	0%	2.5%	0.7%	0%		2%	2.7%	2%	0.8%	0%		1.9%	1.1%	3.9%	4.2%	0%		3.6%	1.9%	2.4%	0%	0%		1.9%	-
Lights	37	511	136	0		684	109	241	122	0		472	85	499	113	0		697	105	202	49	0		356	-
Lights %	100%	97.5%	99.3%	0%		98%	97.3%	98%	99.2%	0%		98.1%	95.5%	96.1%	95.8%	0%		96%	98.1%	97.6%	100%	0%		98.1%	-
Single-Unit Trucks	0	4	1	0		5	1	3	1	0		5	1	5	4	0		10	2	0	0	0		2	-
Single-Unit Trucks %	0%	0.8%	0.7%	0%		0.7%	0.9%	1.2%	0.8%	0%		1%	1.1%	1%	3.4%	0%		1.4%	1.9%	0%	0%	0%		0.6%	-
Buses	0	9	0	0		9	2	2	0	0		4	0	14	1	0		15	0	5	0	0		5	-
Buses %	0%	1.7%	0%	0%		1.3%	1.8%	0.8%	0%	0%		0.8%	0%	2.7%	0.8%	0%		2.1%	0%	2.4%	0%	0%		1.4%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	3	0	0	0		3	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	3.4%	0%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	37	-	-	-	-	-	24	-	-	-	-	-	3	-	-	-	-	-	13	-	-
Pedestrians%	-	-	-	-	42.5%		-	-	-	-	27.6%		-	-	-	-	3.4%		-	-	-	-	14.9%		-
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Bicycles on Crosswalk%	-	-	-	-	4.6%		-	-	-	-	2.3%		-	-	-	-	1.1%		-	-	-	-	3.4%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)

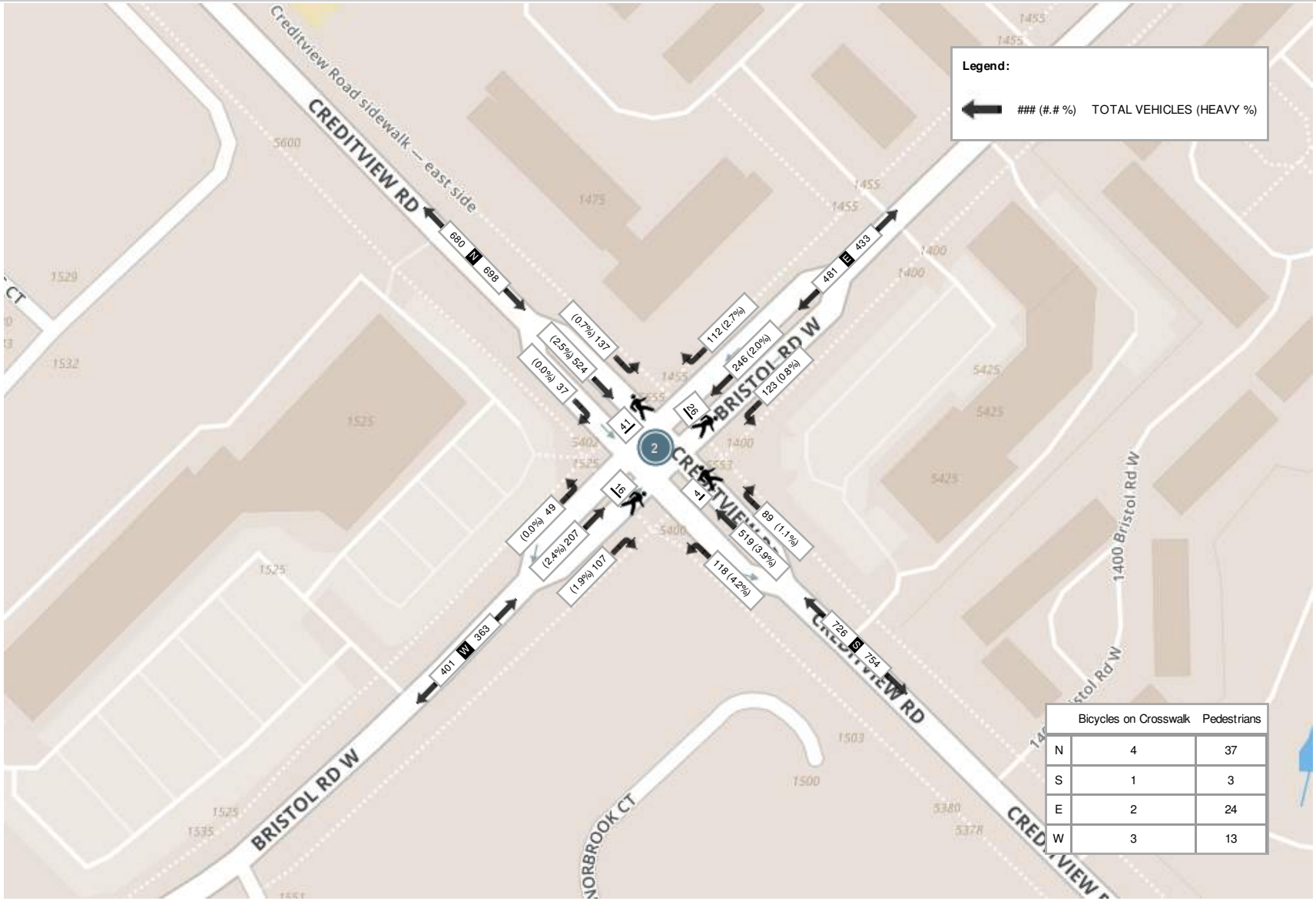
Start Time	N Approach CREDITVIEW RD						E Approach BRISTOL RD						S Approach CREDITVIEW RD						W Approach BRISTOL RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	15	258	45	0	4	318	47	172	102	0	2	321	23	182	47	0	3	252	37	88	19	0	3	144	1035
17:15:00	21	320	57	0	6	398	52	162	84	0	5	298	24	239	43	0	4	306	65	58	16	0	5	139	1141
17:30:00	23	263	65	0	7	351	47	159	87	0	6	293	30	203	38	0	5	271	57	90	28	0	9	175	1090
17:45:00	15	324	62	0	11	401	49	164	67	0	6	280	46	230	43	0	2	319	41	74	14	0	9	129	1129
Grand Total	74	1165	229	0	28	1468	195	657	340	0	19	1192	123	854	171	0	14	1148	200	310	77	0	26	587	**4395**
Approach%	5%	79.4%	15.6%	0%		-	16.4%	55.1%	28.5%	0%		-	10.7%	74.4%	14.9%	0%		-	34.1%	52.8%	13.1%	0%		-	-
Totals %	1.7%	26.5%	5.2%	0%		33.4%	4.4%	14.9%	7.7%	0%		27.1%	2.8%	19.4%	3.9%	0%		26.1%	4.6%	7.1%	1.8%	0%		13.4%	-
PHF	0.8	0.9	0.88	0		0.92	0.94	0.95	0.83	0		0.93	0.67	0.89	0.91	0		0.9	0.77	0.86	0.69	0		0.84	-
Heavy	0	9	0	0		9	2	4	1	0		7	0	19	0	0		19	0	8	0	0		8	-
Heavy %	0%	0.8%	0%	0%		0.6%	1%	0.6%	0.3%	0%		0.6%	0%	2.2%	0%	0%		1.7%	0%	2.6%	0%	0%		1.4%	-
Lights	74	1155	229	0		1458	193	650	339	0		1182	122	835	171	0		1128	200	299	77	0		576	-
Lights %	100%	99.1%	100%	0%		99.3%	99%	98.9%	99.7%	0%		99.2%	99.2%	97.8%	100%	0%		98.3%	100%	96.5%	100%	0%		98.1%	-
Single-Unit Trucks	0	1	0	0		1	2	1	1	0		4	0	6	0	0		6	0	3	0	0		3	-
Single-Unit Trucks %	0%	0.1%	0%	0%		0.1%	1%	0.2%	0.3%	0%		0.3%	0%	0.7%	0%	0%		0.5%	0%	1%	0%	0%		0.5%	-
Buses	0	8	0	0		8	0	3	0	0		3	0	13	0	0		13	0	5	0	0		5	-
Buses %	0%	0.7%	0%	0%		0.5%	0%	0.5%	0%	0%		0.3%	0%	1.5%	0%	0%		1.1%	0%	1.6%	0%	0%		0.9%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	3	0	0		3	1	0	0	0		1	0	3	0	0		3	-
Bicycles on Road %	0%	0.1%	0%	0%		0.1%	0%	0.5%	0%	0%		0.3%	0.8%	0%	0%	0%		0.1%	0%	1%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	25	-	-	-	-	-	17	-	-	-	-	-	14	-	-	-	-	-	25	-	-
Pedestrians%	-	-	-	-	28.7%		-	-	-	-	19.5%		-	-	-	-	16.1%		-	-	-	-	28.7%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	3.4%		-	-	-	-	2.3%		-	-	-	-	0%		-	-	-	-	1.1%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)



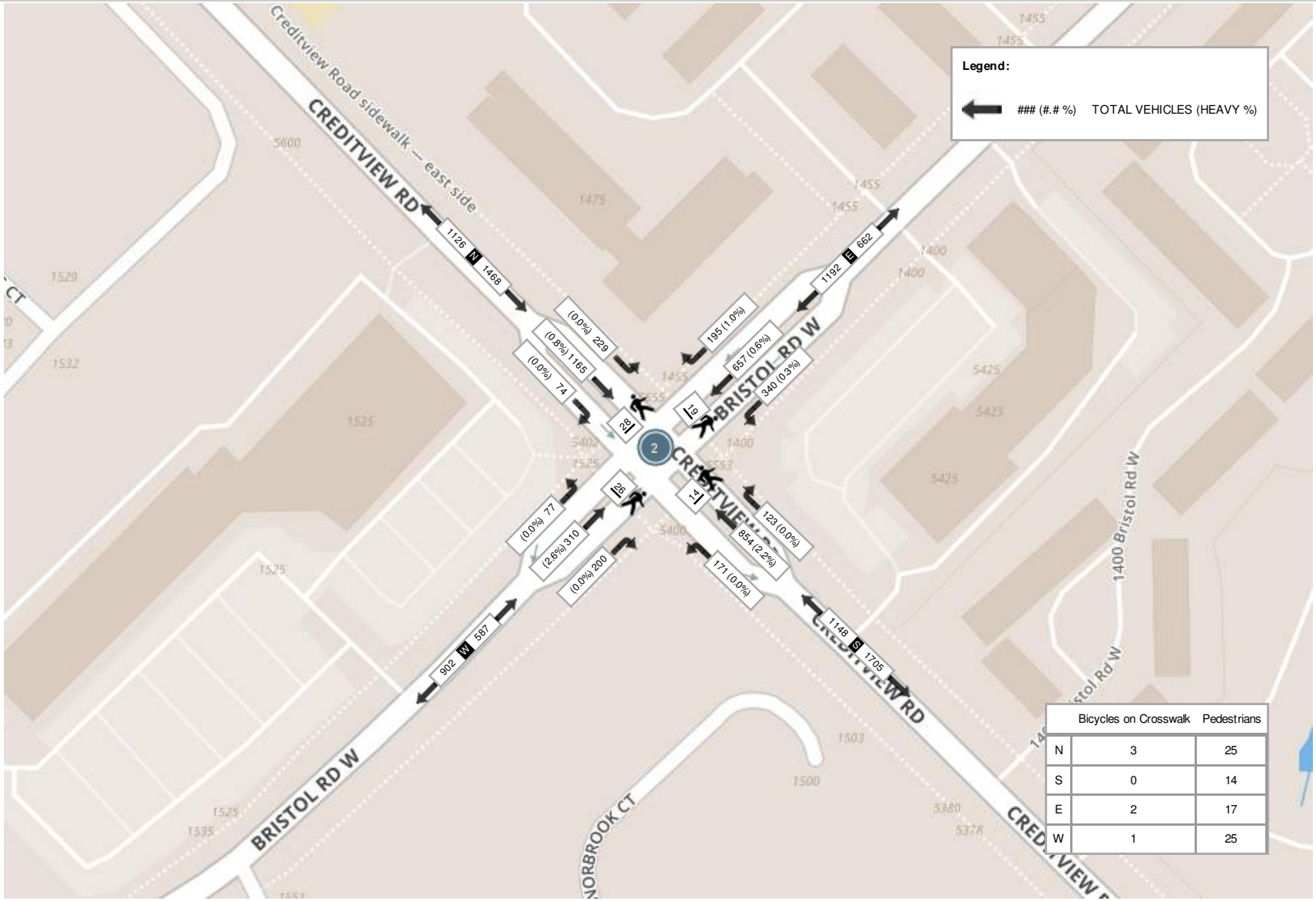
	Bicycles on Crosswalk	Pedestrians
N	0	24
S	2	16
E	9	32
W	4	27

Peak Hour: 12:00 PM - 01:00 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	4	37
S	1	3
E	2	24
W	3	13

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	3	25
S	0	14
E	2	17
W	1	25

Turning Movement Count (4 . CREDITVIEW RD & BURNHAMTHORPE RD W)

Start Time	N Approach CREDITVIEW RD						E Approach BURNHAMTHORPE RD W						S Approach CENTRAL PKWY W						W Approach BURNHAMTHORPE RD W						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	24	104	25	0	2	153	25	49	6	0	3	80	0	54	15	0	3	69	48	167	58	0	5	273	575	
07:15:00	29	115	39	0	0	183	47	84	6	0	4	137	4	57	22	0	3	83	54	209	70	0	2	333	736	
07:30:00	29	114	47	0	3	190	42	98	7	0	3	147	2	93	23	0	4	118	60	260	86	1	4	407	862	
07:45:00	50	194	49	0	8	293	43	95	12	0	5	150	3	115	37	0	8	155	82	253	79	0	6	414	1012	3185
08:00:00	52	167	43	0	5	262	48	93	31	0	6	172	4	88	24	0	8	116	89	307	75	0	5	471	1021	3631
08:15:00	70	207	56	0	6	333	48	124	35	1	2	208	10	119	26	0	8	155	102	262	54	0	16	418	1114	4009
08:30:00	55	226	63	0	10	344	60	164	29	0	7	253	10	141	36	0	4	187	95	278	72	0	19	445	1229	4376
08:45:00	67	200	63	1	8	331	37	131	30	0	22	198	17	112	39	0	32	168	102	321	71	0	10	494	1191	4555
09:00:00	53	226	78	0	5	357	44	89	28	0	8	161	21	122	35	0	15	178	97	251	71	1	26	420	1116	4650
09:15:00	44	179	52	0	7	275	51	89	19	0	5	159	17	85	29	0	20	131	78	236	28	0	26	342	907	4443
09:30:00	45	145	49	0	6	239	50	88	27	1	9	166	15	70	31	0	6	116	72	201	27	1	15	301	822	4036
09:45:00	58	118	54	0	2	230	47	87	18	0	3	152	9	98	28	0	13	135	78	192	49	0	12	319	836	3681
BREAK																										
11:00:00	41	102	32	0	14	175	48	116	16	0	19	180	26	97	49	0	13	172	75	155	41	0	7	271	798	
11:15:00	38	126	53	0	6	217	55	94	13	0	9	162	21	118	55	0	16	194	46	120	37	0	2	203	776	
11:30:00	42	86	53	0	5	181	52	127	28	0	13	207	32	96	63	0	38	191	42	148	51	0	11	241	820	
11:45:00	31	133	55	0	12	219	61	137	27	0	18	225	26	111	54	0	30	191	60	169	53	0	12	282	917	3311
12:00:00	42	115	60	0	5	217	65	123	26	1	8	215	35	127	55	0	39	217	50	148	31	1	18	230	879	3392
12:15:00	57	126	55	2	8	240	51	138	31	1	5	221	33	113	55	0	34	201	59	164	49	0	50	272	934	3550
12:30:00	54	134	53	0	6	241	65	128	23	0	11	216	26	154	68	0	27	248	58	106	44	0	36	208	913	3643
12:45:00	39	124	44	0	12	207	57	135	23	0	12	215	38	102	64	0	40	204	79	183	48	0	48	310	936	3662
13:00:00	63	114	57	0	4	234	78	150	29	1	13	258	40	140	57	0	34	237	43	130	44	0	36	217	946	3729
13:15:00	49	118	58	0	18	225	45	119	30	1	17	195	37	134	69	1	23	241	57	128	34	0	28	219	880	3675
13:30:00	45	98	44	0	8	187	68	154	33	1	9	256	24	101	64	0	20	189	51	133	37	0	22	221	853	3615
13:45:00	44	110	55	1	8	210	55	143	21	0	10	219	32	141	65	0	19	238	49	129	28	0	9	206	873	3552
BREAK																										
16:00:00	61	145	51	0	14	257	77	190	11	1	14	279	30	229	108	0	21	367	56	131	47	0	11	234	1137	
16:15:00	75	162	63	0	8	300	59	226	14	0	6	299	24	153	86	0	18	263	41	195	48	0	11	284	1146	
16:30:00	51	159	57	0	5	267	72	211	16	0	12	299	13	221	80	0	12	314	61	164	49	0	14	274	1154	
16:45:00	64	190	59	0	8	313	62	207	4	0	16	273	24	173	87	0	11	284	47	135	47	0	8	229	1099	4536
17:00:00	73	158	60	0	7	291	56	234	13	0	8	303	20	222	90	0	26	332	61	165	61	0	16	287	1213	4612

17:15:00	85	195	67	0	7	347	90	211	13	0	7	314	22	200	93	0	10	315	54	171	51	2	5	278	1254	4720
17:30:00	78	175	77	0	6	330	71	207	12	0	5	290	24	160	89	0	11	273	46	164	40	2	11	252	1145	4711
17:45:00	77	150	52	0	10	279	58	180	17	0	4	255	23	173	81	0	12	277	55	176	68	2	13	301	1112	4724
18:00:00	85	158	63	0	6	306	62	171	11	0	10	244	22	173	79	0	11	274	53	159	43	1	8	256	1080	4591
18:15:00	72	158	68	0	3	298	72	196	14	2	5	284	16	153	76	0	4	245	50	151	53	0	2	254	1081	4418
18:30:00	74	166	65	0	6	305	59	189	16	1	4	265	23	149	64	0	6	236	52	141	45	1	2	239	1045	4318
18:45:00	53	148	48	0	1	249	55	146	18	0	5	219	21	154	78	0	5	253	47	137	54	0	7	238	959	4165
Grand Total	1969	5345	1967	4	249	9285	2035	5123	707	11	317	7876	744	4748	2074	1	604	7567	2249	6539	1843	12	533	10643	**35371**	-
Approach%	21.2%	57.6%	21.2%	0%		-	25.8%	65%	9%	0.1%		-	9.8%	62.7%	27.4%	0%		-	21.1%	61.4%	17.3%	0.1%		-	-	-
Totals %	5.6%	15.1%	5.6%	0%		26.3%	5.8%	14.5%	2%	0%		22.3%	2.1%	13.4%	5.9%	0%		21.4%	6.4%	18.5%	5.2%	0%		30.1%	-	-
Heavy	38	144	41	0		-	72	203	4	0		-	15	98	50	0		-	76	191	31	0		-	-	-
Heavy %	1.9%	2.7%	2.1%	0%		-	3.5%	4%	0.6%	0%		-	2%	2.1%	2.4%	0%		-	3.4%	2.9%	1.7%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:15 AM - 09:15 AM Weather: Light Rain (17.06 °C)

Start Time	N Approach CREDITVIEW RD						E Approach BURNHAMTHORPE RD W						S Approach CENTRAL PKWY W						W Approach BURNHAMTHORPE RD W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:15:00	70	207	56	0	6	333	48	124	35	1	2	208	10	119	26	0	8	155	102	262	54	0	16	418	1114
08:30:00	55	226	63	0	10	344	60	164	29	0	7	253	10	141	36	0	4	187	95	278	72	0	19	445	1229
08:45:00	67	200	63	1	8	331	37	131	30	0	22	198	17	112	39	0	32	168	102	321	71	0	10	494	1191
09:00:00	53	226	78	0	5	357	44	89	28	0	8	161	21	122	35	0	15	178	97	251	71	1	26	420	1116
Grand Total	245	859	260	1	29	1365	189	508	122	1	39	820	58	494	136	0	59	688	396	1112	268	1	71	1777	**4650**
Approach%	17.9%	62.9%	19%	0.1%		-	23%	62%	14.9%	0.1%		-	8.4%	71.8%	19.8%	0%		-	22.3%	62.6%	15.1%	0.1%		-	-
Totals %	5.3%	18.5%	5.6%	0%		29.4%	4.1%	10.9%	2.6%	0%		17.6%	1.2%	10.6%	2.9%	0%		14.8%	8.5%	23.9%	5.8%	0%		38.2%	-
PHF	0.88	0.95	0.83	0.25		0.96	0.79	0.77	0.87	0.25		0.81	0.69	0.88	0.87	0		0.92	0.97	0.87	0.93	0.25		0.9	-
Heavy	10	20	9	0		39	6	35	0	0		41	0	16	8	0		24	12	33	6	0		51	-
Heavy %	4.1%	2.3%	3.5%	0%		2.9%	3.2%	6.9%	0%	0%		5%	0%	3.2%	5.9%	0%		3.5%	3%	3%	2.2%	0%		2.9%	-
Lights	235	839	251	1		1326	183	473	122	1		779	58	478	128	0		664	384	1079	262	1		1726	-
Lights %	95.9%	97.7%	96.5%	100%		97.1%	96.8%	93.1%	100%	100%		95%	100%	96.8%	94.1%	0%		96.5%	97%	97%	97.8%	100%		97.1%	-
Single-Unit Trucks	2	4	4	0		10	3	11	0	0		14	0	5	2	0		7	2	11	0	0		13	-
Single-Unit Trucks %	0.8%	0.5%	1.5%	0%		0.7%	1.6%	2.2%	0%	0%		1.7%	0%	1%	1.5%	0%		1%	0.5%	1%	0%	0%		0.7%	-
Buses	8	16	4	0		28	3	22	0	0		25	0	10	5	0		15	10	21	5	0		36	-
Buses %	3.3%	1.9%	1.5%	0%		2.1%	1.6%	4.3%	0%	0%		3%	0%	2%	3.7%	0%		2.2%	2.5%	1.9%	1.9%	0%		2%	-
Articulated Trucks	0	0	1	0		1	0	2	0	0		2	0	1	1	0		2	0	1	1	0		2	-
Articulated Trucks %	0%	0%	0.4%	0%		0.1%	0%	0.4%	0%	0%		0.2%	0%	0.2%	0.7%	0%		0.3%	0%	0.1%	0.4%	0%		0.1%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	28	-	-	-	-	-	38	-	-	-	-	-	59	-	-	-	-	-	69	-	-
Pedestrians%	-	-	-	-	14.1%		-	-	-	-	19.2%		-	-	-	-	29.8%		-	-	-	-	34.8%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0.5%		-	-	-	-	0.5%		-	-	-	-	0%		-	-	-	-	1%		-

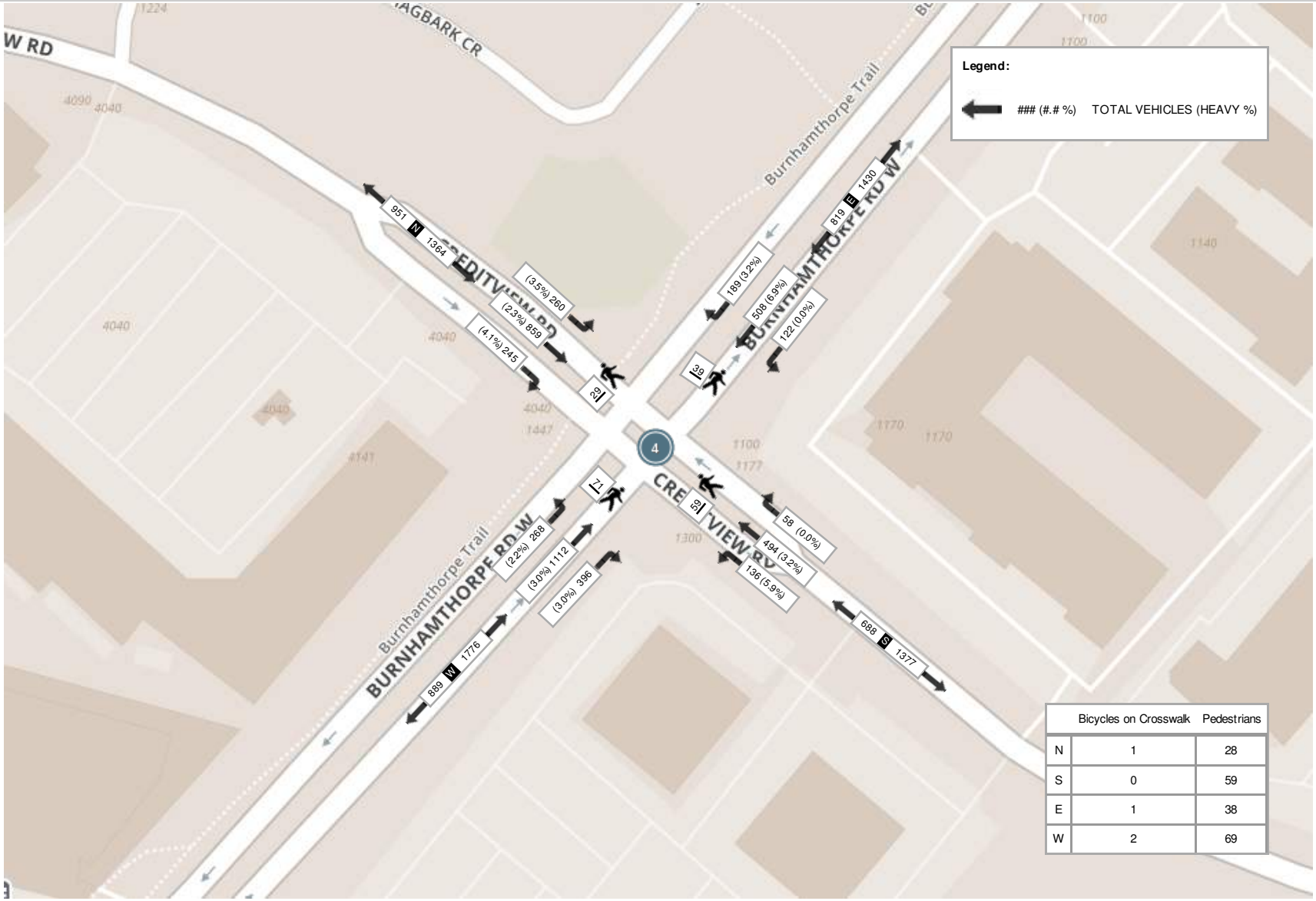
Peak Hour: 12:15 PM - 01:15 PM Weather:

Start Time	N Approach CREDITVIEW RD						E Approach BURNHAMTHORPE RD W						S Approach CENTRAL PKWY W						W Approach BURNHAMTHORPE RD W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	57	126	55	2	8	240	51	138	31	1	5	221	33	113	55	0	34	201	59	164	49	0	50	272	934
12:30:00	54	134	53	0	6	241	65	128	23	0	11	216	26	154	68	0	27	248	58	106	44	0	36	208	913
12:45:00	39	124	44	0	12	207	57	135	23	0	12	215	38	102	64	0	40	204	79	183	48	0	48	310	936
13:00:00	63	114	57	0	4	234	78	150	29	1	13	258	40	140	57	0	34	237	43	130	44	0	36	217	946
Grand Total	213	498	209	2	30	922	251	551	106	2	41	910	137	509	244	0	135	890	239	583	185	0	170	1007	**3729**
Approach%	23.1%	54%	22.7%	0.2%		-	27.6%	60.5%	11.6%	0.2%		-	15.4%	57.2%	27.4%	0%		-	23.7%	57.9%	18.4%	0%		-	-
Totals %	5.7%	13.4%	5.6%	0.1%		24.7%	6.7%	14.8%	2.8%	0.1%		24.4%	3.7%	13.6%	6.5%	0%		23.9%	6.4%	15.6%	5%	0%		27%	-
PHF	0.85	0.93	0.92	0.25		0.96	0.8	0.92	0.85	0.5		0.88	0.86	0.83	0.9	0		0.9	0.76	0.8	0.94	0		0.81	-
Heavy	3	24	3	0		30	9	25	0	0		34	3	10	5	0		18	18	14	5	0		37	-
Heavy %	1.4%	4.8%	1.4%	0%		3.3%	3.6%	4.5%	0%	0%		3.7%	2.2%	2%	2%	0%		2%	7.5%	2.4%	2.7%	0%		3.7%	-
Lights	210	474	206	2		892	242	526	106	2		876	134	499	239	0		872	221	569	180	0		970	-
Lights %	98.6%	95.2%	98.6%	100%		96.7%	96.4%	95.5%	100%	100%		96.3%	97.8%	98%	98%	0%		98%	92.5%	97.6%	97.3%	0%		96.3%	-
Single-Unit Trucks	1	3	2	0		6	2	4	0	0		6	1	2	3	0		6	4	4	1	0		9	-
Single-Unit Trucks %	0.5%	0.6%	1%	0%		0.7%	0.8%	0.7%	0%	0%		0.7%	0.7%	0.4%	1.2%	0%		0.7%	1.7%	0.7%	0.5%	0%		0.9%	-
Buses	2	21	0	0		23	6	19	0	0		25	0	8	2	0		10	14	8	2	0		24	-
Buses %	0.9%	4.2%	0%	0%		2.5%	2.4%	3.4%	0%	0%		2.7%	0%	1.6%	0.8%	0%		1.1%	5.9%	1.4%	1.1%	0%		2.4%	-
Articulated Trucks	0	0	1	0		1	1	2	0	0		3	2	0	0	0		2	0	2	2	0		4	-
Articulated Trucks %	0%	0%	0.5%	0%		0.1%	0.4%	0.4%	0%	0%		0.3%	1.5%	0%	0%	0%		0.2%	0%	0.3%	1.1%	0%		0.4%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	29	-	-	-	-	-	41	-	-	-	-	-	135	-	-	-	-	-	170	-	-
Pedestrians%	-	-	-	-	7.7%		-	-	-	-	10.9%		-	-	-	-	35.9%		-	-	-	-	45.2%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 05:00 PM - 06:00 PM Weather:

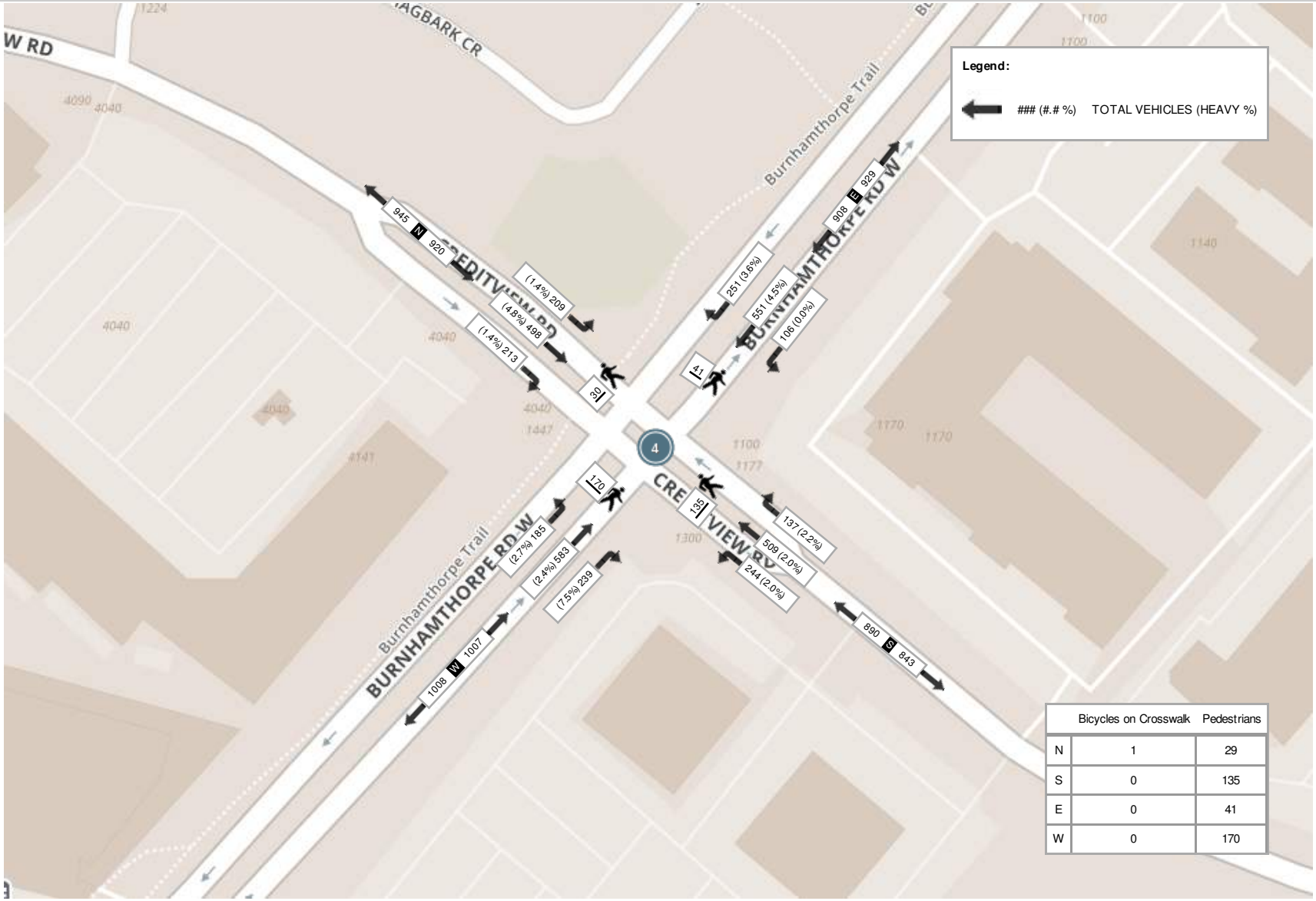
Start Time	N Approach CREDITVIEW RD						E Approach BURNHAMTHORPE RD W						S Approach CENTRAL PKWY W						W Approach BURNHAMTHORPE RD W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	73	158	60	0	7	291	56	234	13	0	8	303	20	222	90	0	26	332	61	165	61	0	16	287	1213
17:15:00	85	195	67	0	7	347	90	211	13	0	7	314	22	200	93	0	10	315	54	171	51	2	5	278	1254
17:30:00	78	175	77	0	6	330	71	207	12	0	5	290	24	160	89	0	11	273	46	164	40	2	11	252	1145
17:45:00	77	150	52	0	10	279	58	180	17	0	4	255	23	173	81	0	12	277	55	176	68	2	13	301	1112
Grand Total	313	678	256	0	30	1247	275	832	55	0	24	1162	89	755	353	0	59	1197	216	676	220	6	45	1118	**4724**
Approach%	25.1%	54.4%	20.5%	0%		-	23.7%	71.6%	4.7%	0%		-	7.4%	63.1%	29.5%	0%		-	19.3%	60.5%	19.7%	0.5%		-	-
Totals %	6.6%	14.4%	5.4%	0%		26.4%	5.8%	17.6%	1.2%	0%		24.6%	1.9%	16%	7.5%	0%		25.3%	4.6%	14.3%	4.7%	0.1%		23.7%	-
PHF	0.92	0.87	0.83	0		0.9	0.76	0.89	0.81	0		0.93	0.93	0.85	0.95	0		0.9	0.89	0.96	0.81	0.75		0.93	-
Heavy	2	4	2	0		8	8	12	1	0		21	1	5	3	0		9	0	12	2	0		14	-
Heavy %	0.6%	0.6%	0.8%	0%		0.6%	2.9%	1.4%	1.8%	0%		1.8%	1.1%	0.7%	0.8%	0%		0.8%	0%	1.8%	0.9%	0%		1.3%	-
Lights	311	674	253	0		1238	267	820	54	0		1141	88	750	350	0		1188	216	664	218	6		1104	-
Lights %	99.4%	99.4%	98.8%	0%		99.3%	97.1%	98.6%	98.2%	0%		98.2%	98.9%	99.3%	99.2%	0%		99.2%	100%	98.2%	99.1%	100%		98.7%	-
Single-Unit Trucks	1	1	1	0		3	2	2	1	0		5	1	2	3	0		6	0	1	2	0		3	-
Single-Unit Trucks %	0.3%	0.1%	0.4%	0%		0.2%	0.7%	0.2%	1.8%	0%		0.4%	1.1%	0.3%	0.8%	0%		0.5%	0%	0.1%	0.9%	0%		0.3%	-
Buses	1	3	1	0		5	5	10	0	0		15	0	3	0	0		3	0	10	0	0		10	-
Buses %	0.3%	0.4%	0.4%	0%		0.4%	1.8%	1.2%	0%	0%		1.3%	0%	0.4%	0%	0%		0.3%	0%	1.5%	0%	0%		0.9%	-
Articulated Trucks	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	0	1	0	0		1	-
Articulated Trucks %	0%	0%	0%	0%		0%	0.4%	0%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Bicycles on Road	0	0	1	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0.4%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	22	-	-	-	-	-	24	-	-	-	-	-	59	-	-	-	-	-	45	-	-
Pedestrians%	-	-	-	-	13.9%		-	-	-	-	15.2%		-	-	-	-	37.3%		-	-	-	-	28.5%		-
Bicycles on Crosswalk	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	5.1%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 08:15 AM - 09:15 AM Weather: Light Rain (17.06 °C)



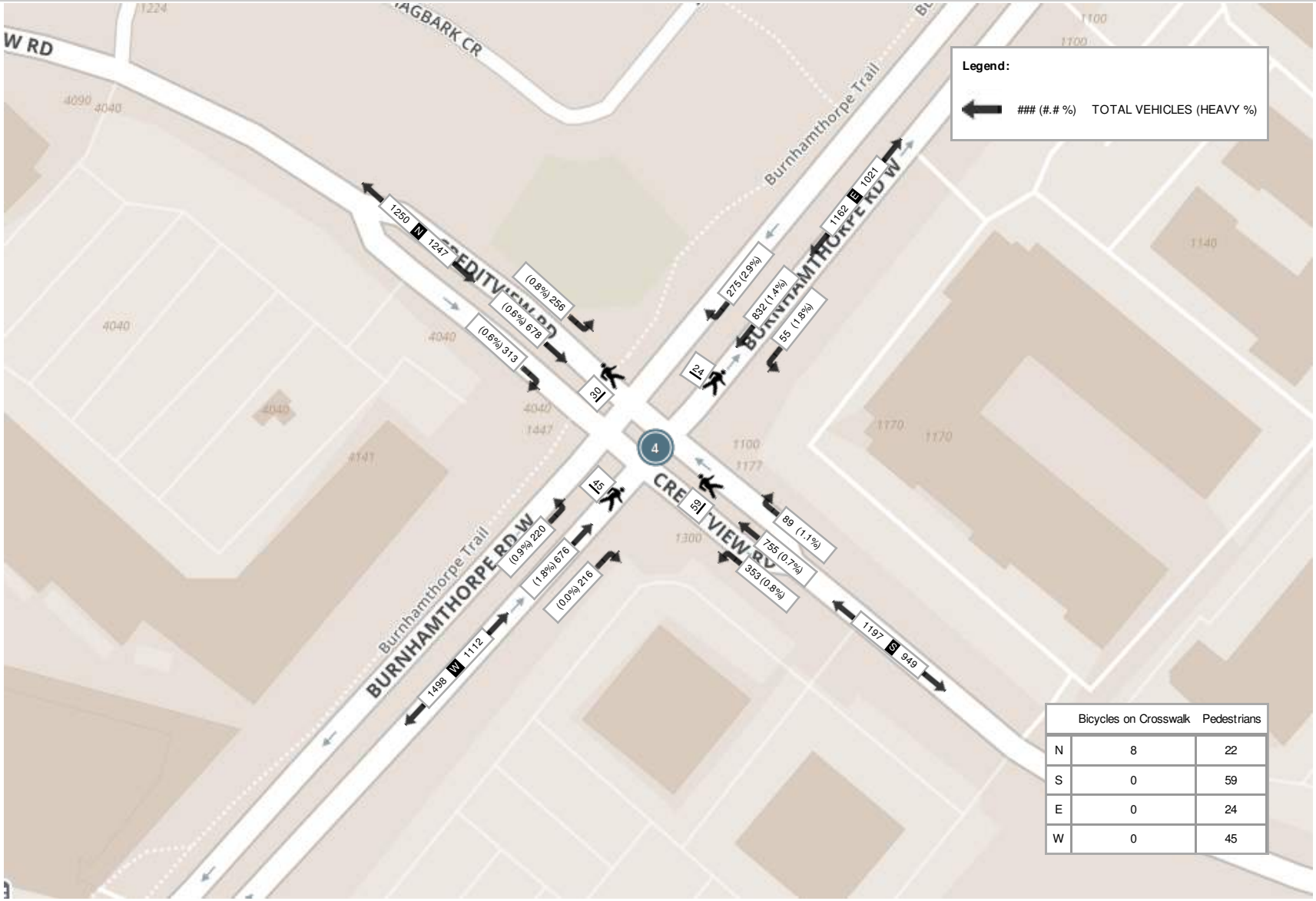
	Bicycles on Crosswalk	Pedestrians
N	1	28
S	0	59
E	1	38
W	2	69

Peak Hour: 12:15 PM - 01:15 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	1	29
S	0	135
E	0	41
W	0	170

Peak Hour: 05:00 PM - 06:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	8	22
S	0	59
E	0	24
W	0	45

Turning Movement Count (3 . CREDITVIEW RD & EGLINTON AVE W)

Start Time	N Approach CREDITVIEW RD						E Approach EGLINTON AVE W						S Approach CREDITVIEW RD						W Approach EGLINTON AVE W						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	59	122	20	0	2	201	16	58	38	0	2	112	16	96	26	0	4	138	88	282	31	0	4	401	852	
07:15:00	60	202	25	0	4	287	24	81	34	0	4	139	13	124	27	0	7	164	122	321	34	0	8	477	1067	
07:30:00	88	193	27	0	5	308	20	112	40	0	8	172	23	137	53	0	2	213	137	424	42	0	6	603	1296	
07:45:00	87	222	22	0	3	331	51	130	35	0	6	216	28	163	44	0	9	235	114	472	59	0	4	645	1427	4642
08:00:00	73	241	39	0	1	353	38	156	51	1	5	246	20	179	59	0	11	258	139	437	57	0	5	633	1490	5280
08:15:00	97	190	52	0	1	339	44	135	30	0	5	209	19	150	55	0	15	224	124	447	54	0	5	625	1397	5610
08:30:00	107	204	29	0	3	340	50	148	37	0	6	235	13	169	54	0	9	236	161	407	59	0	6	627	1438	5752
08:45:00	75	192	50	0	0	317	44	129	27	0	3	200	23	155	67	0	10	245	168	404	54	1	7	627	1389	5714
09:00:00	68	123	30	0	2	221	41	142	29	0	2	212	19	128	45	1	5	193	118	374	49	0	7	541	1167	5391
09:15:00	63	113	45	0	4	221	31	129	17	0	8	177	22	97	51	2	8	172	112	297	45	0	6	454	1024	5018
09:30:00	55	112	45	0	0	212	31	139	24	0	2	194	7	103	44	1	5	155	75	255	34	0	7	364	925	4505
09:45:00	57	98	43	0	1	198	28	137	21	1	3	187	17	92	51	0	6	160	66	211	41	1	5	319	864	3980
BREAK																										
11:00:00	65	102	39	0	2	206	34	136	28	0	8	198	23	94	48	0	13	165	73	174	44	0	14	291	860	
11:15:00	47	110	46	0	0	203	42	132	35	0	4	209	14	77	58	0	9	149	64	137	24	0	5	225	786	
11:30:00	69	85	32	0	1	186	38	163	20	1	2	222	15	92	51	0	12	158	68	189	47	0	4	304	870	
11:45:00	56	105	44	0	1	205	28	147	19	0	6	194	31	99	59	0	8	189	65	155	48	0	6	268	856	3372
12:00:00	60	101	47	0	4	208	45	163	40	0	5	248	27	87	61	0	20	175	66	196	50	0	5	312	943	3455
12:15:00	66	117	36	0	5	219	48	165	29	0	5	242	17	119	36	0	8	172	65	202	46	1	10	314	947	3616
12:30:00	66	96	38	0	3	200	37	149	29	0	5	215	20	123	89	2	2	234	63	149	37	0	5	249	898	3644
12:45:00	45	102	41	0	2	188	44	190	28	0	5	262	17	101	59	0	12	177	55	181	44	0	4	280	907	3695
13:00:00	56	94	38	0	4	188	58	173	28	0	4	259	11	127	67	0	12	205	72	186	40	0	4	298	950	3702
13:15:00	45	114	34	0	3	193	53	152	32	0	8	237	19	95	73	0	3	187	52	187	43	0	3	282	899	3654
13:30:00	53	83	29	0	3	165	30	198	25	0	5	253	19	137	56	0	2	212	56	176	45	0	2	277	907	3663
13:45:00	69	84	44	0	1	197	34	160	24	0	5	218	14	123	85	0	8	222	68	163	38	0	5	269	906	3662
BREAK																										
16:00:00	78	151	37	0	1	266	36	393	20	0	1	449	19	171	137	0	8	327	77	179	57	0	2	313	1355	
16:15:00	147	186	35	0	3	368	35	392	14	0	8	441	20	206	125	0	14	351	84	260	60	0	1	404	1564	
16:30:00	154	185	48	0	1	387	45	331	19	0	7	395	20	217	179	0	10	416	59	202	58	0	1	319	1517	
16:45:00	138	166	65	0	7	369	32	418	22	0	7	472	28	189	158	0	16	375	73	226	60	0	6	359	1575	6011
17:00:00	150	203	65	0	0	418	31	387	16	0	7	434	29	204	133	0	4	366	78	213	62	0	5	353	1571	6227

17:15:00	148	214	66	0	2	428	47	350	17	0	3	414	21	215	150	0	11	386	86	221	56	0	9	363	1591	6254
17:30:00	146	213	57	0	4	416	45	399	18	0	7	462	26	237	112	0	8	375	92	230	63	0	6	385	1638	6375
17:45:00	133	234	80	0	7	447	55	340	23	0	6	418	24	227	130	0	9	381	99	231	63	0	9	393	1639	6439
18:00:00	102	177	53	0	6	332	59	376	25	0	6	460	25	203	129	1	10	358	69	236	61	0	6	366	1516	6384
18:15:00	104	170	50	0	6	324	50	377	37	0	9	464	28	237	102	0	5	367	81	245	66	0	11	392	1547	6340
18:30:00	116	141	53	1	2	311	54	277	41	0	2	372	32	211	112	0	11	355	65	208	55	0	0	328	1366	6068
18:45:00	74	126	62	0	4	262	48	268	33	0	6	349	15	127	84	1	10	227	68	226	59	0	6	353	1191	5620
Grand Total	3076	5371	1566	1	98	10014	1446	7732	1005	3	185	10186	734	5311	2869	8	316	8922	3122	9103	1785	3	199	14013	**43135**	-
Approach%	30.7%	53.6%	15.6%	0%		-	14.2%	75.9%	9.9%	0%		-	8.2%	59.5%	32.2%	0.1%		-	22.3%	65%	12.7%	0%		-	-	-
Totals %	7.1%	12.5%	3.6%	0%		23.2%	3.4%	17.9%	2.3%	0%		23.6%	1.7%	12.3%	6.7%	0%		20.7%	7.2%	21.1%	4.1%	0%		32.5%	-	-
Heavy	34	144	32	0		-	35	215	13	0		-	16	141	98	0		-	121	218	40	0		-	-	-
Heavy %	1.1%	2.7%	2%	0%		-	2.4%	2.8%	1.3%	0%		-	2.2%	2.7%	3.4%	0%		-	3.9%	2.4%	2.2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)

Start Time	N Approach CREDITVIEW RD						E Approach EGLINTON AVE W						S Approach CREDITVIEW RD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	87	222	22	0	3	331	51	130	35	0	6	216	28	163	44	0	9	235	114	472	59	0	4	645	1427
08:00:00	73	241	39	0	1	353	38	156	51	1	5	246	20	179	59	0	11	258	139	437	57	0	5	633	1490
08:15:00	97	190	52	0	1	339	44	135	30	0	5	209	19	150	55	0	15	224	124	447	54	0	5	625	1397
08:30:00	107	204	29	0	3	340	50	148	37	0	6	235	13	169	54	0	9	236	161	407	59	0	6	627	1438
Grand Total	364	857	142	0	8	1363	183	569	153	1	22	906	80	661	212	0	44	953	538	1763	229	0	20	2530	**5752**
Approach%	26.7%	62.9%	10.4%	0%		-	20.2%	62.8%	16.9%	0.1%		-	8.4%	69.4%	22.2%	0%		-	21.3%	69.7%	9.1%	0%		-	-
Totals %	6.3%	14.9%	2.5%	0%		23.7%	3.2%	9.9%	2.7%	0%		15.8%	1.4%	11.5%	3.7%	0%		16.6%	9.4%	30.7%	4%	0%		44%	-
PHF	0.85	0.89	0.68	0		0.97	0.9	0.91	0.75	0.25		0.92	0.71	0.92	0.9	0		0.92	0.84	0.93	0.97	0		0.98	-
Heavy	7	29	8	0		44	5	20	3	0		28	4	18	12	0		34	15	31	7	0		53	-
Heavy %	1.9%	3.4%	5.6%	0%		3.2%	2.7%	3.5%	2%	0%		3.1%	5%	2.7%	5.7%	0%		3.6%	2.8%	1.8%	3.1%	0%		2.1%	-
Lights	357	828	134	0		1319	178	549	150	1		878	76	642	200	0		918	522	1732	222	0		2476	-
Lights %	98.1%	96.6%	94.4%	0%		96.8%	97.3%	96.5%	98%	100%		96.9%	95%	97.1%	94.3%	0%		96.3%	97%	98.2%	96.9%	0%		97.9%	-
Single-Unit Trucks	1	9	1	0		11	3	3	2	0		8	2	3	0	0		5	4	8	2	0		14	-
Single-Unit Trucks %	0.3%	1.1%	0.7%	0%		0.8%	1.6%	0.5%	1.3%	0%		0.9%	2.5%	0.5%	0%	0%		0.5%	0.7%	0.5%	0.9%	0%		0.6%	-
Buses	6	20	7	0		33	2	16	1	0		19	2	11	12	0		25	11	17	5	0		33	-
Buses %	1.6%	2.3%	4.9%	0%		2.4%	1.1%	2.8%	0.7%	0%		2.1%	2.5%	1.7%	5.7%	0%		2.6%	2%	1%	2.2%	0%		1.3%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	4	0	0		4	0	6	0	0		6	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0.6%	0%	0%		0.4%	0%	0.3%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	1	0	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0.2%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	19	-	-	-	-	-	41	-	-	-	-	-	15	-	-
Pedestrians%	-	-	-	-	7.4%		-	-	-	-	20.2%		-	-	-	-	43.6%		-	-	-	-	16%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	5	-	-
Bicycles on Crosswalk%	-	-	-	-	1.1%		-	-	-	-	3.2%		-	-	-	-	3.2%		-	-	-	-	5.3%		-

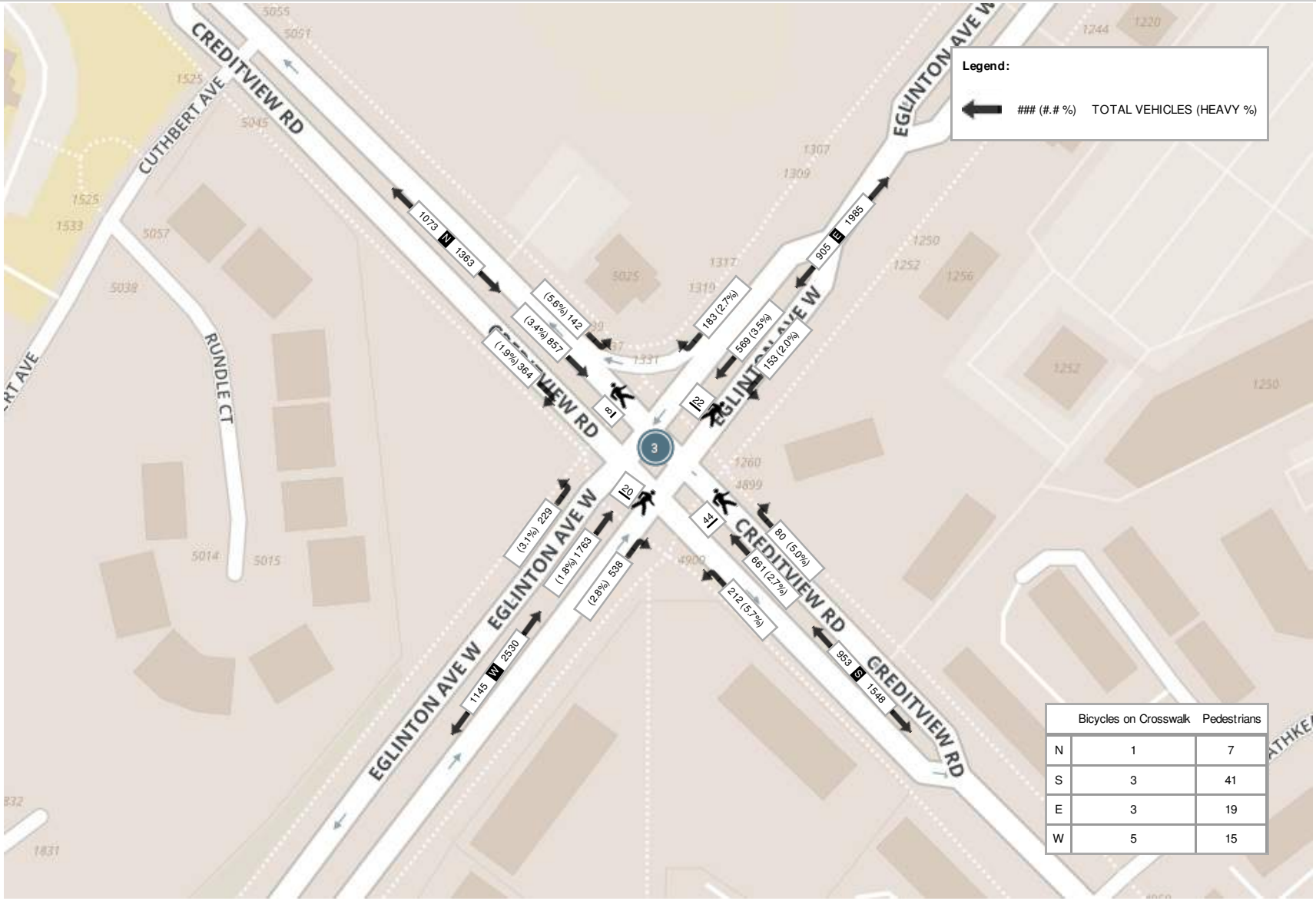
Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach CREDITVIEW RD						E Approach EGLINTON AVE W						S Approach CREDITVIEW RD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	66	117	36	0	5	219	48	165	29	0	5	242	17	119	36	0	8	172	65	202	46	1	10	314	947
12:30:00	66	96	38	0	3	200	37	149	29	0	5	215	20	123	89	2	2	234	63	149	37	0	5	249	898
12:45:00	45	102	41	0	2	188	44	190	28	0	5	262	17	101	59	0	12	177	55	181	44	0	4	280	907
13:00:00	56	94	38	0	4	188	58	173	28	0	4	259	11	127	67	0	12	205	72	186	40	0	4	298	950
Grand Total	233	409	153	0	14	795	187	677	114	0	19	978	65	470	251	2	34	788	255	718	167	1	23	1141	**3702**
Approach%	29.3%	51.4%	19.2%	0%		-	19.1%	69.2%	11.7%	0%		-	8.2%	59.6%	31.9%	0.3%		-	22.3%	62.9%	14.6%	0.1%		-	-
Totals %	6.3%	11%	4.1%	0%		21.5%	5.1%	18.3%	3.1%	0%		26.4%	1.8%	12.7%	6.8%	0.1%		21.3%	6.9%	19.4%	4.5%	0%		30.8%	-
PHF	0.88	0.87	0.93	0		0.91	0.81	0.89	0.98	0		0.93	0.81	0.93	0.71	0.25		0.84	0.89	0.89	0.91	0.25		0.91	-
Heavy	0	18	1	0		19	4	19	1	0		24	0	16	10	0		26	17	26	5	0		48	-
Heavy %	0%	4.4%	0.7%	0%		2.4%	2.1%	2.8%	0.9%	0%		2.5%	0%	3.4%	4%	0%		3.3%	6.7%	3.6%	3%	0%		4.2%	-
Lights	233	391	152	0		776	180	658	113	0		951	65	454	241	2		762	238	691	162	1		1092	-
Lights %	100%	95.6%	99.3%	0%		97.6%	96.3%	97.2%	99.1%	0%		97.2%	100%	96.6%	96%	100%		96.7%	93.3%	96.2%	97%	100%		95.7%	-
Single-Unit Trucks	0	7	1	0		8	3	8	1	0		12	0	5	3	0		8	3	15	3	0		21	-
Single-Unit Trucks %	0%	1.7%	0.7%	0%		1%	1.6%	1.2%	0.9%	0%		1.2%	0%	1.1%	1.2%	0%		1%	1.2%	2.1%	1.8%	0%		1.8%	-
Buses	0	11	0	0		11	1	8	0	0		9	0	11	7	0		18	14	7	2	0		23	-
Buses %	0%	2.7%	0%	0%		1.4%	0.5%	1.2%	0%	0%		0.9%	0%	2.3%	2.8%	0%		2.3%	5.5%	1%	1.2%	0%		2%	-
Articulated Trucks	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.4%	-
Bicycles on Road	0	0	0	0		0	3	0	0	0		3	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	1.6%	0%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	19	-	-	-	-	-	34	-	-	-	-	-	23	-	-
Pedestrians%	-	-	-	-	13.3%		-	-	-	-	21.1%		-	-	-	-	37.8%		-	-	-	-	25.6%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	2.2%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)

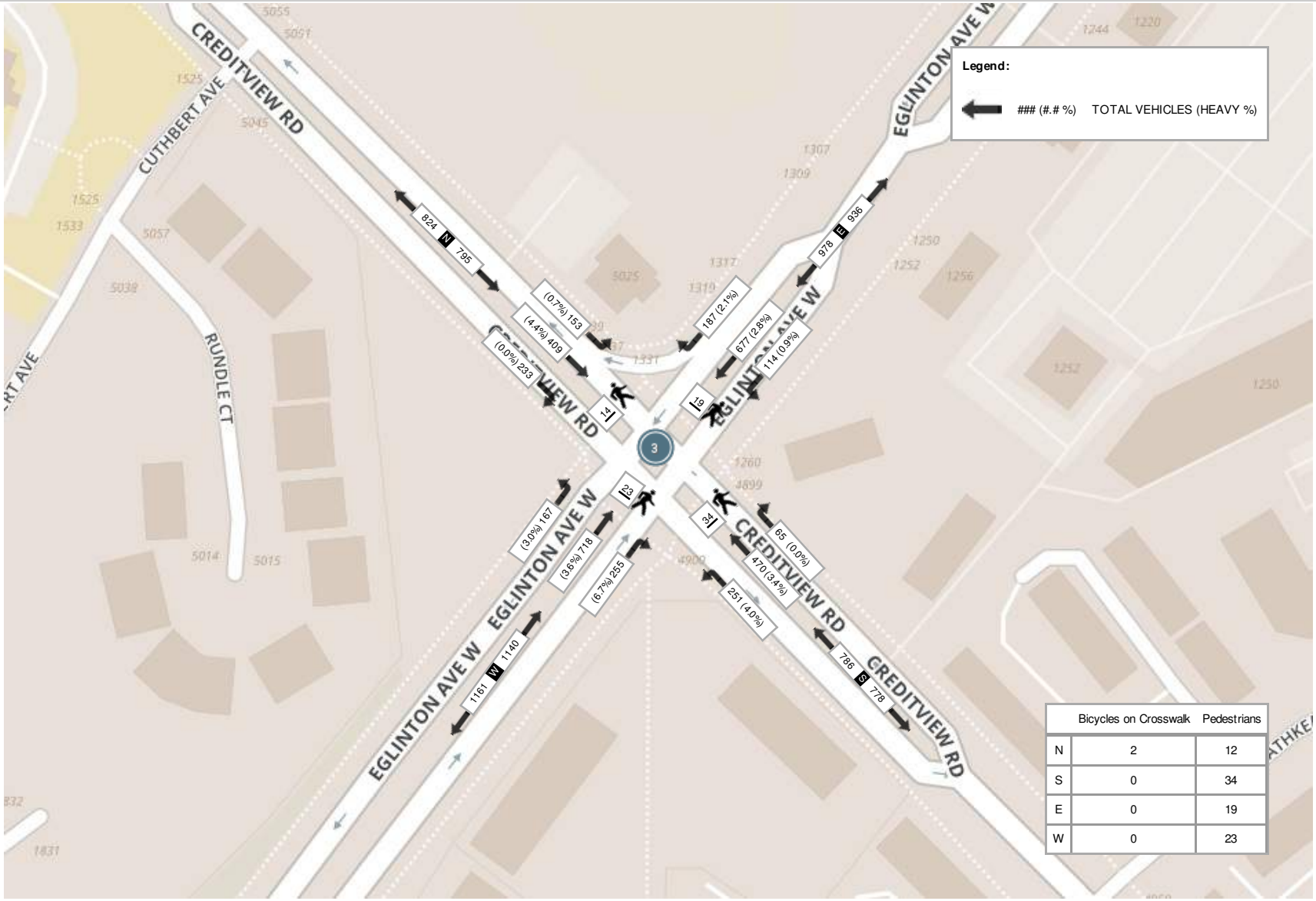
Start Time	N Approach CREDITVIEW RD						E Approach EGLINTON AVE W						S Approach CREDITVIEW RD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	150	203	65	0	0	418	31	387	16	0	7	434	29	204	133	0	4	366	78	213	62	0	5	353	1571
17:15:00	148	214	66	0	2	428	47	350	17	0	3	414	21	215	150	0	11	386	86	221	56	0	9	363	1591
17:30:00	146	213	57	0	4	416	45	399	18	0	7	462	26	237	112	0	8	375	92	230	63	0	6	385	1638
17:45:00	133	234	80	0	7	447	55	340	23	0	6	418	24	227	130	0	9	381	99	231	63	0	9	393	1639
Grand Total	577	864	268	0	13	1709	178	1476	74	0	23	1728	100	883	525	0	32	1508	355	895	244	0	29	1494	**6439**
Approach%	33.8%	50.6%	15.7%	0%		-	10.3%	85.4%	4.3%	0%		-	6.6%	58.6%	34.8%	0%		-	23.8%	59.9%	16.3%	0%		-	-
Totals %	9%	13.4%	4.2%	0%		26.5%	2.8%	22.9%	1.1%	0%		26.8%	1.6%	13.7%	8.2%	0%		23.4%	5.5%	13.9%	3.8%	0%		23.2%	-
PHF	0.96	0.92	0.84	0		0.96	0.81	0.92	0.8	0		0.94	0.86	0.93	0.88	0		0.98	0.9	0.97	0.97	0		0.95	-
Heavy	2	7	1	0		10	3	16	0	0		19	0	16	6	0		22	8	17	0	0		25	-
Heavy %	0.3%	0.8%	0.4%	0%		0.6%	1.7%	1.1%	0%	0%		1.1%	0%	1.8%	1.1%	0%		1.5%	2.3%	1.9%	0%	0%		1.7%	-
Lights	574	856	267	0		1697	175	1460	74	0		1709	100	867	519	0		1486	347	877	244	0		1468	-
Lights %	99.5%	99.1%	99.6%	0%		99.3%	98.3%	98.9%	100%	0%		98.9%	100%	98.2%	98.9%	0%		98.5%	97.7%	98%	100%	0%		98.3%	-
Single-Unit Trucks	1	0	1	0		2	0	4	0	0		4	0	7	3	0		10	0	8	0	0		8	-
Single-Unit Trucks %	0.2%	0%	0.4%	0%		0.1%	0%	0.3%	0%	0%		0.2%	0%	0.8%	0.6%	0%		0.7%	0%	0.9%	0%	0%		0.5%	-
Buses	1	7	0	0		8	3	11	0	0		14	0	9	3	0		12	8	8	0	0		16	-
Buses %	0.2%	0.8%	0%	0%		0.5%	1.7%	0.7%	0%	0%		0.8%	0%	1%	0.6%	0%		0.8%	2.3%	0.9%	0%	0%		1.1%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Bicycles on Road	1	1	0	0		2	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0.2%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	23	-	-	-	-	-	29	-	-	-	-	-	29	-	-
Pedestrians%	-	-	-	-	13.4%		-	-	-	-	23.7%		-	-	-	-	29.9%		-	-	-	-	29.9%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	3.1%		-	-	-	-	0%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)



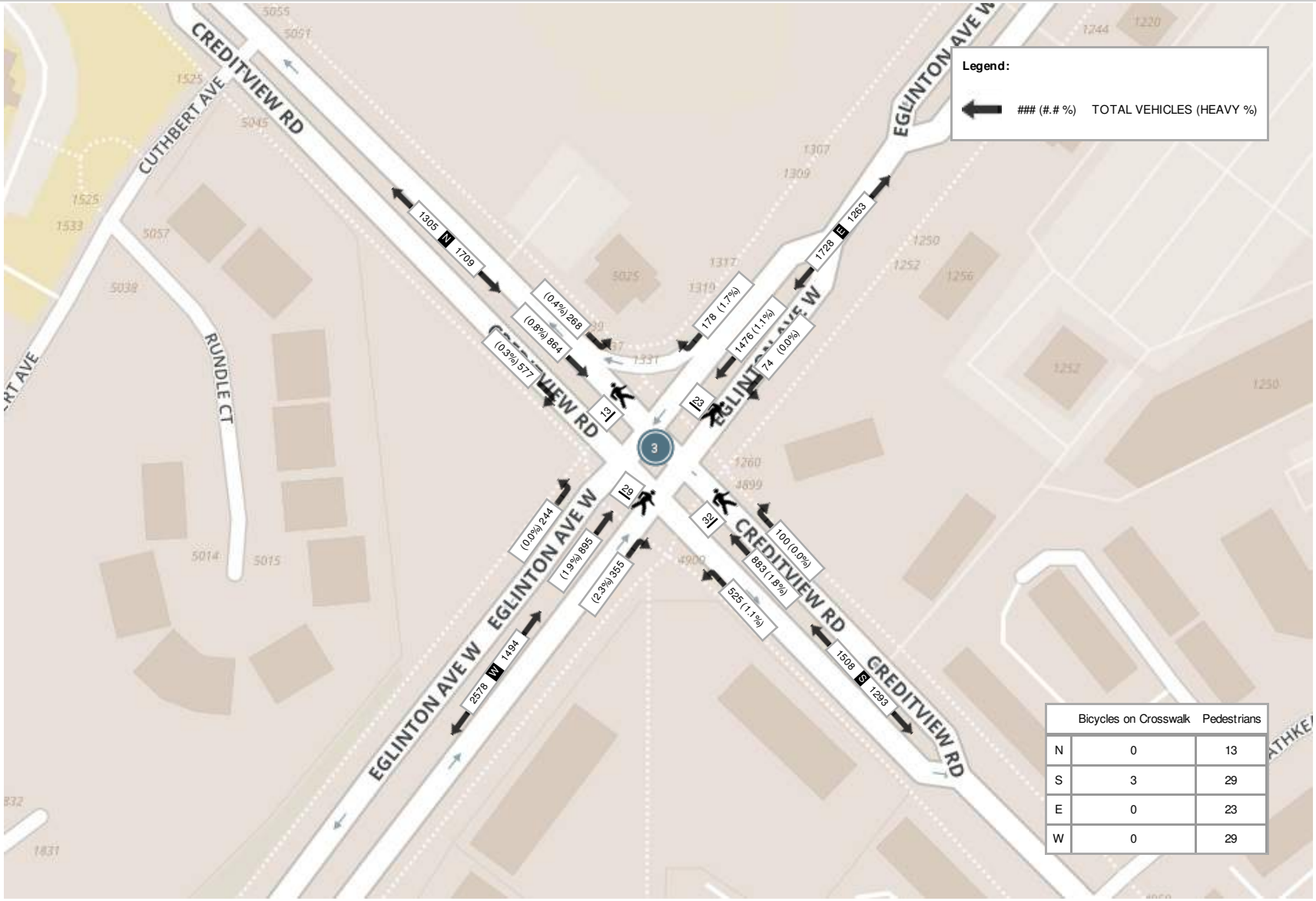
	Bicycles on Crosswalk	Pedestrians
N	1	7
S	3	41
E	3	19
W	5	15

Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	12
S	0	34
E	0	19
W	0	23

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	13
S	3	29
E	0	23
W	0	29

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (7 . ERIN MILLS PKWY & BRITANNIA RD) CustID: 001-13700 MioID: 498838

Start Time	Southbound ERIN MILLS PARKWAY						Westbound BRITANNIA RD						Northbound ERIN MILLS PARKWAY						Eastbound BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	26	235	16	0	0	277	23	36	11	0	0	70	5	246	66	0	2	317	33	193	24	0	1	250	914	
07:15:00	40	239	9	0	0	288	39	44	20	0	0	103	4	283	65	0	3	352	48	260	32	0	2	340	1083	
07:30:00	47	341	10	0	5	398	51	40	12	0	0	103	6	383	104	0	5	493	57	251	31	0	5	339	1333	
07:45:00	64	351	13	0	1	428	45	53	21	0	1	119	14	392	69	0	4	475	57	273	48	0	4	378	1400	4730
08:00:00	50	353	14	0	0	417	61	78	41	0	1	180	20	346	85	0	5	451	96	261	46	0	1	403	1451	5267
08:15:00	35	349	20	1	0	405	42	49	33	0	0	124	10	409	77	0	1	496	62	206	38	0	0	306	1331	5515
08:30:00	58	289	14	0	3	361	46	65	14	0	2	125	8	343	88	1	2	440	90	263	49	0	3	402	1328	5510
08:45:00	33	288	19	0	0	340	32	56	20	0	0	108	11	366	66	0	1	443	65	232	29	0	1	326	1217	5327
BREAK																										
11:00:00	30	207	21	0	2	258	31	61	20	0	1	112	18	191	27	0	1	236	27	88	19	0	2	134	740	
11:15:00	29	198	30	1	0	258	32	67	25	0	0	124	16	159	34	1	0	210	21	104	22	0	1	147	739	
11:30:00	17	207	24	1	0	249	37	84	37	0	0	158	10	155	48	0	3	213	30	96	23	0	3	149	769	
11:45:00	25	221	26	1	0	273	31	97	33	0	0	161	16	222	45	0	2	283	27	99	24	0	2	150	867	3115
12:00:00	28	202	30	0	0	260	60	111	40	1	0	212	19	160	44	0	0	223	41	90	24	0	0	155	850	3225
12:15:00	24	234	25	0	0	283	34	89	28	0	1	151	11	208	46	0	2	265	33	99	25	0	0	157	856	3342
12:30:00	33	220	32	0	0	285	30	89	32	0	0	151	21	232	32	0	2	285	19	89	20	0	0	128	849	3422
12:45:00	26	183	28	0	1	237	46	92	28	0	1	166	17	184	53	0	3	254	36	96	21	0	0	153	810	3365
13:00:00	27	233	28	0	0	288	34	64	24	0	1	122	23	229	49	0	1	301	30	100	21	0	0	151	862	3377
13:15:00	24	197	24	0	0	245	44	81	37	1	0	163	16	194	34	0	0	244	31	93	19	0	0	143	795	3316
13:30:00	18	219	16	1	0	254	41	87	28	0	1	156	14	213	31	0	2	258	34	80	20	0	1	134	802	3269
13:45:00	22	223	27	0	2	272	33	76	33	0	1	142	13	219	39	1	2	272	22	79	20	1	0	122	808	3267
BREAK																										
15:00:00	33	231	50	0	0	314	40	136	51	0	0	227	27	275	38	0	5	340	34	91	20	0	6	145	1026	
15:15:00	19	317	41	0	0	377	69	165	50	0	0	284	25	320	38	0	0	383	35	102	32	0	0	169	1213	
15:30:00	32	279	44	1	1	356	52	135	30	0	3	217	30	277	50	0	3	357	17	111	42	0	2	170	1100	
15:45:00	25	276	39	0	1	340	45	192	41	0	0	278	40	299	56	0	1	395	32	84	20	0	2	136	1149	4488
16:00:00	30	336	39	0	1	405	51	190	48	0	0	289	26	314	53	1	3	394	21	104	22	0	0	147	1235	4697
16:15:00	25	320	60	0	3	405	63	226	55	0	0	344	28	254	44	1	0	327	31	100	18	0	0	149	1225	4709
16:30:00	27	411	60	0	2	498	74	204	54	0	0	332	34	307	49	0	3	390	37	86	14	0	0	137	1357	4966
16:45:00	30	420	69	0	3	519	72	238	35	0	1	345	34	314	43	0	0	391	30	110	17	0	0	157	1412	5229
17:00:00	22	352	49	0	0	423	82	227	66	0	0	375	31	283	43	0	0	357	25	107	19	0	1	151	1306	5300
17:15:00	25	427	70	0	0	522	78	196	42	0	0	316	38	358	48	0	0	444	34	83	34	1	1	152	1434	5509

17:30:00	28	363	71	0	4	462	61	231	41	0	0	333	38	302	52	0	3	392	38	114	23	0	3	175	1362	5514
17:45:00	27	378	70	0	0	475	78	195	45	0	0	318	37	266	58	0	1	361	31	112	22	0	0	165	1319	5421
Grand Total	979	9099	1088	6	29	11172	1557	3754	1095	2	14	6408	660	8703	1674	5	60	11042	1224	4256	838	2	41	6320	**34942**	-
Approach%	8.8%	81.4%	9.7%	0.1%		-	24.3%	58.6%	17.1%	0%		-	6%	78.8%	15.2%	0%		-	19.4%	67.3%	13.3%	0%		-	-	-
Totals %	2.8%	26%	3.1%	0%		32%	4.5%	10.7%	3.1%	0%		18.3%	1.9%	24.9%	4.8%	0%		31.6%	3.5%	12.2%	2.4%	0%		18.1%	-	-
Heavy	58	373	23	0		-	78	86	66	0		-	17	441	73	0		-	23	94	18	0		-	-	-
Heavy %	5.9%	4.1%	2.1%	0%		-	5%	2.3%	6%	0%		-	2.6%	5.1%	4.4%	0%		-	1.9%	2.2%	2.1%	0%		-	-	-
Bicycles	0	0	0	0		-	0	0	0	0		-	0	0	0	0		-	0	1	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (4.6 °C)

Start Time	Southbound ERIN MILLS PARKWAY						Westbound BRITANNIA RD						Northbound ERIN MILLS PARKWAY						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:30:00	47	341	10	0	5	398	51	40	12	0	0	103	6	383	104	0	5	493	57	251	31	0	5	339	1333
07:45:00	64	351	13	0	1	428	45	53	21	0	1	119	14	392	69	0	4	475	57	273	48	0	4	378	1400
08:00:00	50	353	14	0	0	417	61	78	41	0	1	180	20	346	85	0	5	451	96	261	46	0	1	403	1451
08:15:00	35	349	20	1	0	405	42	49	33	0	0	124	10	409	77	0	1	496	62	206	38	0	0	306	1331
Grand Total	196	1394	57	1	6	1648	199	220	107	0	2	526	50	1530	335	0	15	1915	272	991	163	0	10	1426	**5515**
Approach%	11.9%	84.6%	3.5%	0.1%		-	37.8%	41.8%	20.3%	0%		-	2.6%	79.9%	17.5%	0%		-	19.1%	69.5%	11.4%	0%		-	-
Totals %	3.6%	25.3%	1%	0%		29.9%	3.6%	4%	1.9%	0%		9.5%	0.9%	27.7%	6.1%	0%		34.7%	4.9%	18%	3%	0%		25.9%	-
PHF	0.77	0.99	0.71	0.25		0.96	0.82	0.71	0.65	0		0.73	0.63	0.94	0.81	0		0.97	0.71	0.91	0.85	0		0.88	-
Heavy	14	52	3	0		69	16	12	18	0		46	3	60	5	0		68	0	15	4	0		19	-
Heavy %	7.1%	3.7%	5.3%	0%		4.2%	8%	5.5%	16.8%	0%		8.7%	6%	3.9%	1.5%	0%		3.6%	0%	1.5%	2.5%	0%		1.3%	-
Lights	182	1342	54	1		1579	183	208	89	0		480	47	1470	330	0		1847	272	976	159	0		1407	-
Lights %	92.9%	96.3%	94.7%	100%		95.8%	92%	94.5%	83.2%	0%		91.3%	94%	96.1%	98.5%	0%		96.4%	100%	98.5%	97.5%	0%		98.7%	-
Single-Unit Trucks	1	31	1	0		33	2	2	2	0		6	1	35	2	0		38	0	3	1	0		4	-
Single-Unit Trucks %	0.5%	2.2%	1.8%	0%		2%	1%	0.9%	1.9%	0%		1.1%	2%	2.3%	0.6%	0%		2%	0%	0.3%	0.6%	0%		0.3%	-
Buses	12	20	1	0		33	14	10	16	0		40	2	18	3	0		23	0	11	3	0		14	-
Buses %	6.1%	1.4%	1.8%	0%		2%	7%	4.5%	15%	0%		7.6%	4%	1.2%	0.9%	0%		1.2%	0%	1.1%	1.8%	0%		1%	-
Articulated Trucks	1	1	1	0		3	0	0	0	0		0	0	7	0	0		7	0	1	0	0		1	-
Articulated Trucks %	0.5%	0.1%	1.8%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	14	-	-	-	-	-	8	-	-
Pedestrians%	-	-	-	-	18.2%		-	-	-	-	3%		-	-	-	-	42.4%		-	-	-	-	24.2%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3%		-	-	-	-	3%		-	-	-	-	6.1%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:45 AM - 12:45 PM Weather: Partly Cloudy (11.5 °C)

Start Time	Southbound ERIN MILLS PARKWAY						Westbound BRITANNIA RD						Northbound ERIN MILLS PARKWAY						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
11:45:00	25	221	26	1	0	273	31	97	33	0	0	161	16	222	45	0	2	283	27	99	24	0	2	150	867
12:00:00	28	202	30	0	0	260	60	111	40	1	0	212	19	160	44	0	0	223	41	90	24	0	0	155	850
12:15:00	24	234	25	0	0	283	34	89	28	0	1	151	11	208	46	0	2	265	33	99	25	0	0	157	856
12:30:00	33	220	32	0	0	285	30	89	32	0	0	151	21	232	32	0	2	285	19	89	20	0	0	128	849
Grand Total	110	877	113	1	0	1101	155	386	133	1	1	675	67	822	167	0	6	1056	120	377	93	0	2	590	**3422**
Approach%	10%	79.7%	10.3%	0.1%		-	23%	57.2%	19.7%	0.1%		-	6.3%	77.8%	15.8%	0%		-	20.3%	63.9%	15.8%	0%		-	-
Totals %	3.2%	25.6%	3.3%	0%		32.2%	4.5%	11.3%	3.9%	0%		19.7%	2%	24%	4.9%	0%		30.9%	3.5%	11%	2.7%	0%		17.2%	-
PHF	0.83	0.94	0.88	0.25		0.97	0.65	0.87	0.83	0.25		0.8	0.8	0.89	0.91	0		0.93	0.73	0.95	0.93	0		0.94	-
Heavy	7	61	5	0		73	11	8	6	0		25	2	65	12	0		79	3	8	2	0		13	-
Heavy %	6.4%	7%	4.4%	0%		6.6%	7.1%	2.1%	4.5%	0%		3.7%	3%	7.9%	7.2%	0%		7.5%	2.5%	2.1%	2.2%	0%		2.2%	-
Lights	103	816	108	1		1028	144	378	127	1		650	65	757	155	0		977	117	369	91	0		577	-
Lights %	93.6%	93%	95.6%	100%		93.4%	92.9%	97.9%	95.5%	100%		96.3%	97%	92.1%	92.8%	0%		92.5%	97.5%	97.9%	97.8%	0%		97.8%	-
Single-Unit Trucks	2	38	3	0		43	6	4	3	0		13	1	38	5	0		44	2	3	2	0		7	-
Single-Unit Trucks %	1.8%	4.3%	2.7%	0%		3.9%	3.9%	1%	2.3%	0%		1.9%	1.5%	4.6%	3%	0%		4.2%	1.7%	0.8%	2.2%	0%		1.2%	-
Buses	4	10	2	0		16	3	4	3	0		10	0	14	4	0		18	1	2	0	0		3	-
Buses %	3.6%	1.1%	1.8%	0%		1.5%	1.9%	1%	2.3%	0%		1.5%	0%	1.7%	2.4%	0%		1.7%	0.8%	0.5%	0%	0%		0.5%	-
Articulated Trucks	1	13	0	0		14	2	0	0	0		2	1	13	3	0		17	0	3	0	0		3	-
Articulated Trucks %	0.9%	1.5%	0%	0%		1.3%	1.3%	0%	0%	0%		0.3%	1.5%	1.6%	1.8%	0%		1.6%	0%	0.8%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	6	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	11.1%		-	-	-	-	66.7%		-	-	-	-	22.2%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

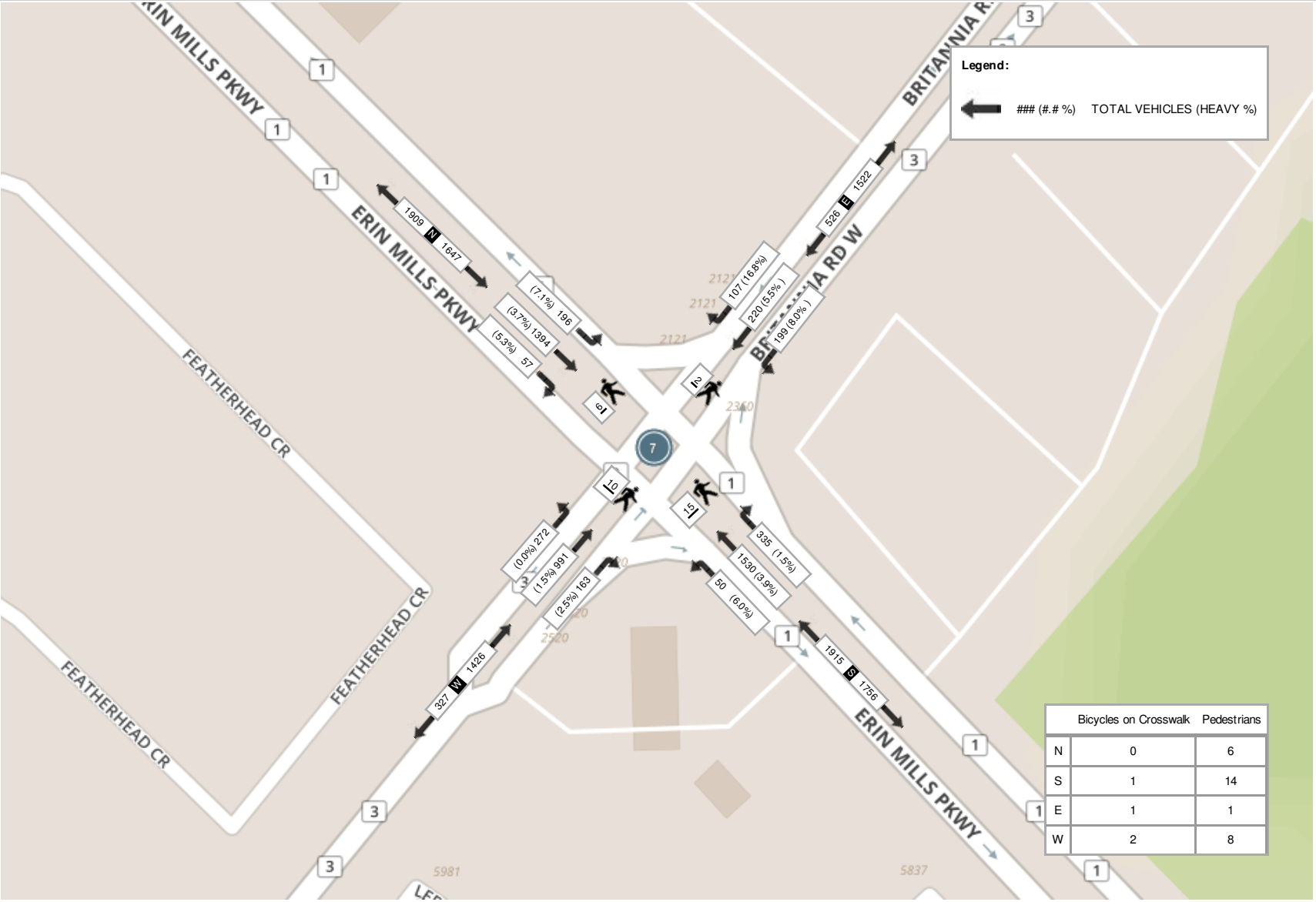
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (16.6 °C)

Start Time	Southbound ERIN MILLS PARKWAY						Westbound BRITANNIA RD						Northbound ERIN MILLS PARKWAY						Eastbound BRITANNIA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:45:00	30	420	69	0	3	519	72	238	35	0	1	345	34	314	43	0	0	391	30	110	17	0	0	157	1412
17:00:00	22	352	49	0	0	423	82	227	66	0	0	375	31	283	43	0	0	357	25	107	19	0	1	151	1306
17:15:00	25	427	70	0	0	522	78	196	42	0	0	316	38	358	48	0	0	444	34	83	34	1	1	152	1434
17:30:00	28	363	71	0	4	462	61	231	41	0	0	333	38	302	52	0	3	392	38	114	23	0	3	175	1362
Grand Total	105	1562	259	0	7	1926	293	892	184	0	1	1369	141	1257	186	0	3	1584	127	414	93	1	5	635	**5514**
Approach%	5.5%	81.1%	13.4%	0%		-	21.4%	65.2%	13.4%	0%		-	8.9%	79.4%	11.7%	0%		-	20%	65.2%	14.6%	0.2%		-	-
Totals %	1.9%	28.3%	4.7%	0%		34.9%	5.3%	16.2%	3.3%	0%		24.8%	2.6%	22.8%	3.4%	0%		28.7%	2.3%	7.5%	1.7%	0%		11.5%	-
PHF	0.88	0.91	0.91	0		0.92	0.89	0.94	0.7	0		0.91	0.93	0.88	0.89	0		0.89	0.84	0.91	0.68	0.25		0.91	-
Heavy	6	15	1	0		22	1	11	4	0		16	1	24	10	0		35	3	8	1	0		12	-
Heavy %	5.7%	1%	0.4%	0%		1.1%	0.3%	1.2%	2.2%	0%		1.2%	0.7%	1.9%	5.4%	0%		2.2%	2.4%	1.9%	1.1%	0%		1.9%	-
Lights	99	1547	258	0		1904	292	881	180	0		1353	140	1233	176	0		1549	124	406	92	1		623	-
Lights %	94.3%	99%	99.6%	0%		98.9%	99.7%	98.8%	97.8%	0%		98.8%	99.3%	98.1%	94.6%	0%		97.8%	97.6%	98.1%	98.9%	100%		98.1%	-
Single-Unit Trucks	1	4	1	0		6	0	3	0	0		3	0	9	4	0		13	2	3	1	0		6	-
Single-Unit Trucks %	1%	0.3%	0.4%	0%		0.3%	0%	0.3%	0%	0%		0.2%	0%	0.7%	2.2%	0%		0.8%	1.6%	0.7%	1.1%	0%		0.9%	-
Buses	5	9	0	0		14	0	8	4	0		12	1	11	4	0		16	0	5	0	0		5	-
Buses %	4.8%	0.6%	0%	0%		0.7%	0%	0.9%	2.2%	0%		0.9%	0.7%	0.9%	2.2%	0%		1%	0%	1.2%	0%	0%		0.8%	-
Articulated Trucks	0	2	0	0		2	1	0	0	0		1	0	4	2	0		6	1	0	0	0		1	-
Articulated Trucks %	0%	0.1%	0%	0%		0.1%	0.3%	0%	0%	0%		0.1%	0%	0.3%	1.1%	0%		0.4%	0.8%	0%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	37.5%		-	-	-	-	6.3%		-	-	-	-	12.5%		-	-	-	-	25%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	6.3%		-	-	-	-	0%		-	-	-	-	6.3%		-	-	-	-	6.3%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

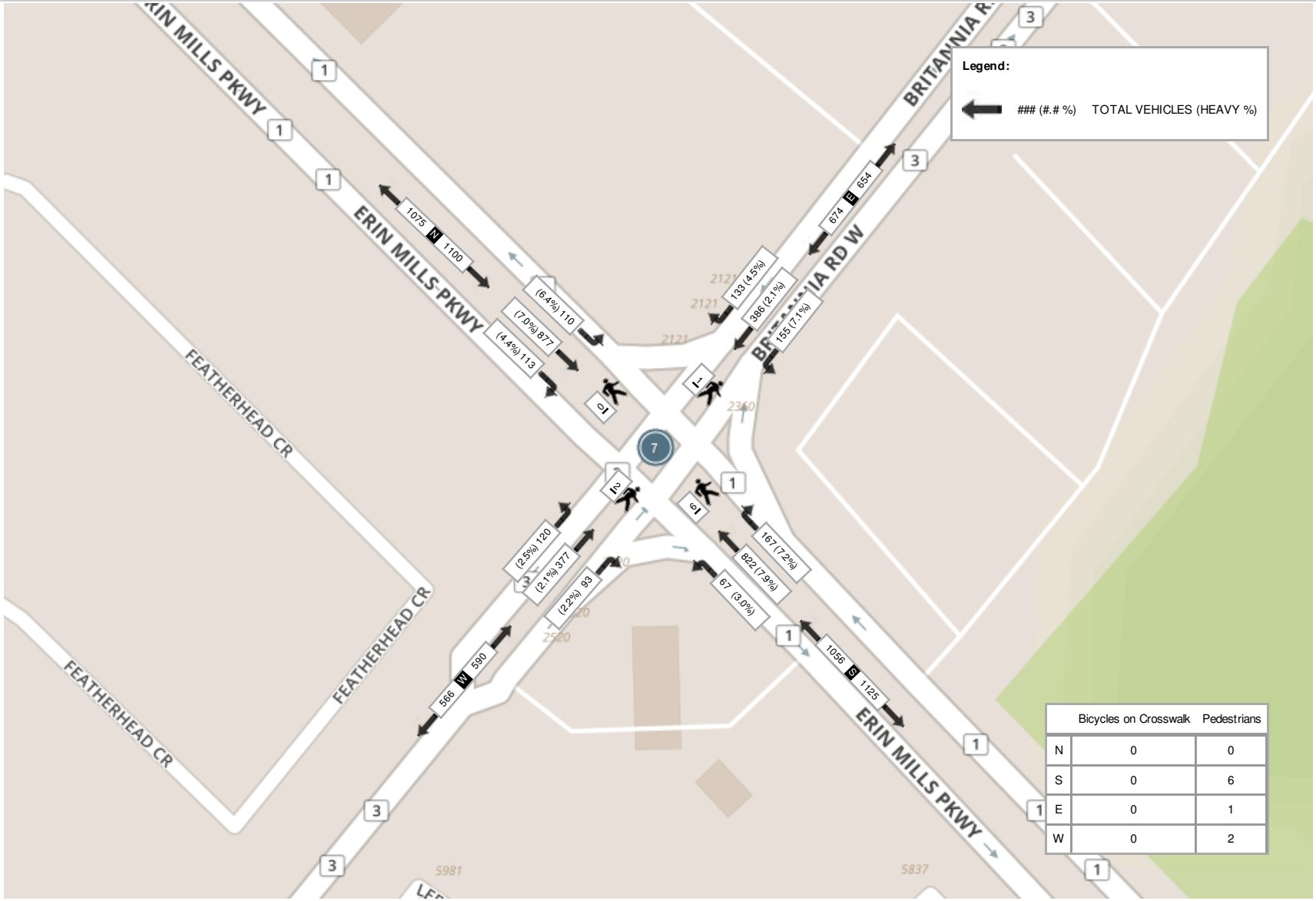
Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (4.6 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	6
S	1	14
E	1	1
W	2	8

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:45 AM - 12:45 PM Weather: Partly Cloudy (11.5 °C)

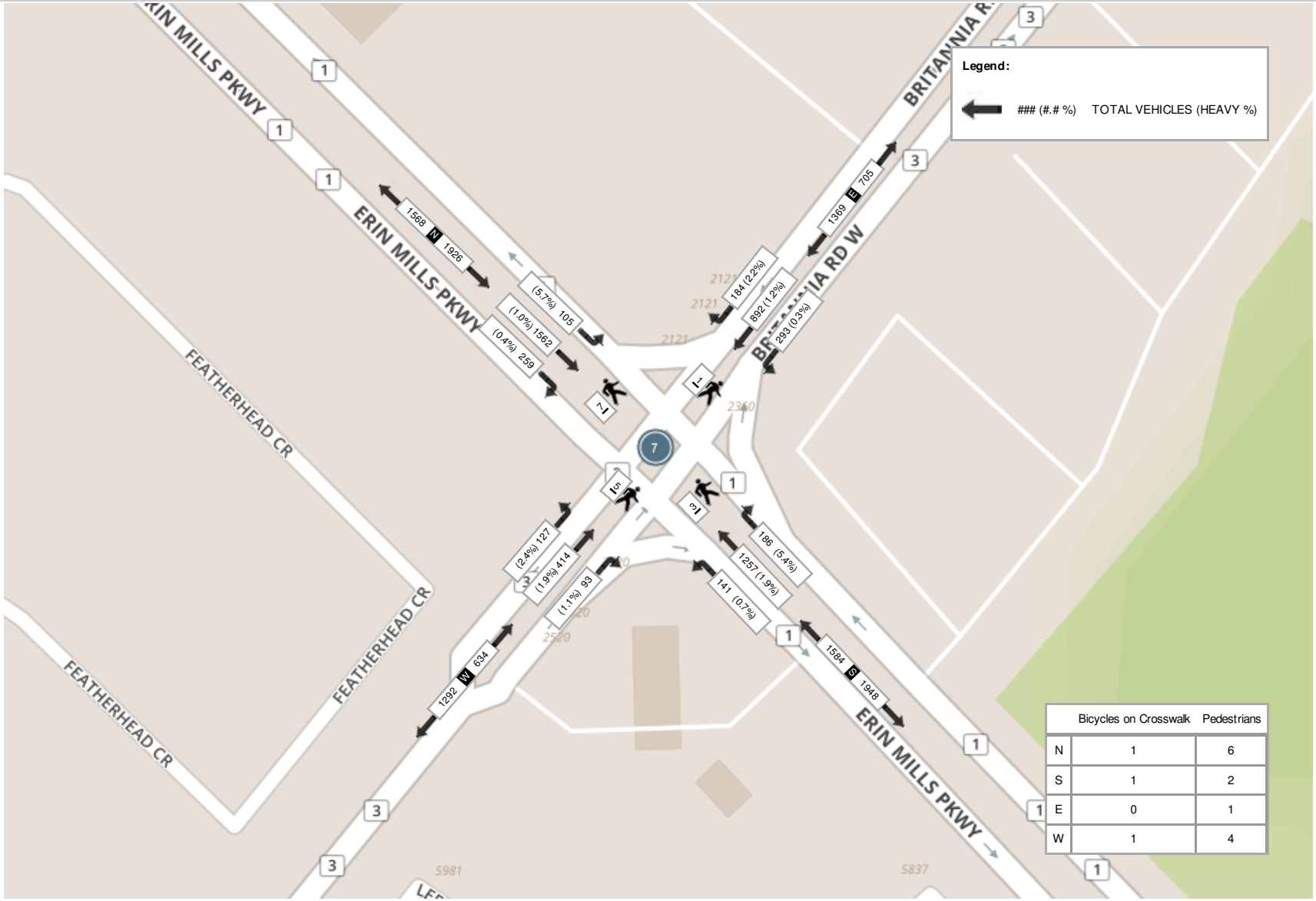


	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	6
E	0	1
W	0	2

Turning Movement Count
Location Name: ERIN MILLS PKWY & BRITANNIA RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (16.6 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	6
S	1	2
E	0	1
W	1	4

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (14 . ERIN MILLS PKWY & BURNHAMTHORPE RD) CustID: 001-02877 MioID: 499903

Start Time	Southbound ERIN MILLS PKWY						Westbound BURNHAMTHORPE RD						Northbound ERIN MILLS PKWY						Eastbound BURNHAMTHORPE RD						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	40	189	43	0	0	272	41	47	26	0	1	114	13	300	35	0	0	348	51	140	30	0	1	221	955	
07:15:00	61	291	35	0	1	387	33	48	30	0	0	111	11	355	62	0	0	428	75	179	38	0	0	292	1218	
07:30:00	78	310	34	0	1	422	54	86	27	0	0	167	28	339	53	0	1	420	73	264	57	0	1	394	1403	
07:45:00	84	405	47	1	0	537	63	115	30	0	1	208	17	380	52	0	0	449	77	206	60	0	0	343	1537	5113
08:00:00	102	382	37	0	2	521	57	106	41	0	1	204	23	336	70	1	1	430	91	211	59	1	4	362	1517	5675
08:15:00	89	375	41	0	1	505	54	110	41	0	1	205	20	406	70	0	0	496	85	251	47	0	4	383	1589	6046
08:30:00	99	439	61	0	2	599	54	104	33	0	0	191	33	411	55	0	0	499	59	184	49	0	3	292	1581	6224
08:45:00	94	372	71	0	1	537	72	118	40	0	1	230	28	261	60	0	2	349	65	211	68	1	1	345	1461	6148
BREAK																										
11:00:00	56	175	38	0	1	269	57	84	55	0	0	196	21	279	50	0	1	350	50	93	29	0	1	172	987	
11:15:00	49	190	30	0	0	269	41	99	65	0	0	205	20	245	32	0	1	297	64	113	38	0	5	215	986	
11:30:00	50	203	44	0	0	297	57	121	47	1	1	226	21	313	36	0	1	370	65	102	31	0	0	198	1091	
11:45:00	67	275	33	0	2	375	73	114	75	0	2	262	21	258	48	0	0	327	53	100	22	0	3	175	1139	4203
12:00:00	40	260	43	0	2	343	68	107	60	0	1	235	23	233	40	0	3	296	68	106	30	0	0	204	1078	4294
12:15:00	45	285	52	0	0	382	66	102	60	0	0	228	29	274	47	1	2	351	63	112	29	0	1	204	1165	4473
12:30:00	55	247	34	0	0	336	44	108	66	0	0	218	27	252	27	1	2	307	59	128	32	0	0	219	1080	4462
12:45:00	56	233	44	2	0	335	57	98	49	1	1	205	26	230	44	0	2	300	63	124	40	0	2	227	1067	4390
13:00:00	58	269	37	0	0	364	65	90	61	0	1	216	19	261	45	0	4	325	45	107	26	0	0	178	1083	4395
13:15:00	38	256	42	0	0	336	56	102	56	1	2	215	16	242	39	0	3	297	70	97	28	0	4	195	1043	4273
13:30:00	45	242	47	0	0	334	62	94	54	1	0	211	25	285	28	0	3	338	54	107	25	0	0	186	1069	4262
13:45:00	37	295	40	0	0	372	38	79	43	1	0	161	28	256	37	0	1	321	51	95	27	0	0	173	1027	4222
BREAK																										
15:00:00	44	338	48	0	2	430	49	127	77	0	0	253	31	310	45	0	3	386	72	130	48	0	2	250	1319	
15:15:00	59	321	54	0	0	434	81	167	99	0	2	347	33	334	49	0	9	416	55	124	28	0	2	207	1404	
15:30:00	40	270	54	0	2	364	88	193	78	0	0	359	43	377	56	2	0	478	61	131	37	0	6	229	1430	
15:45:00	50	358	64	0	0	472	69	168	60	0	1	297	36	407	58	1	1	502	54	132	41	0	2	227	1498	5651
16:00:00	53	294	59	0	1	406	84	193	83	0	2	360	40	328	41	0	2	409	69	150	41	0	3	260	1435	5767
16:15:00	54	298	74	0	0	426	68	197	98	0	1	363	38	449	53	0	4	540	69	147	24	0	4	240	1569	5932
16:30:00	51	378	58	1	1	488	68	198	70	0	1	336	32	435	69	0	1	536	61	123	29	0	7	213	1573	6075
16:45:00	49	297	40	3	0	389	78	213	74	5	1	370	31	402	60	1	0	494	65	146	28	0	1	239	1492	6069
17:00:00	46	384	53	0	1	483	76	182	65	0	1	323	41	503	73	0	2	617	57	159	31	1	5	248	1671	6305
17:15:00	46	324	43	1	1	414	73	239	71	1	2	384	49	449	59	0	4	557	57	163	31	1	3	252	1607	6343

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

17:30:00	48	320	52	0	2	420	87	230	64	0	0	381	46	429	55	0	3	530	60	178	30	0	3	268	1599	6369
17:45:00	58	347	93	0	0	498	83	190	60	0	0	333	48	428	63	0	1	539	63	154	35	0	5	252	1622	6499
Grand Total	1841	9622	1545	8	23	13016	2016	4229	1858	11	24	8114	917	10767	1611	7	57	13302	2024	4667	1168	4	73	7863	**42295**	-
Approach%	14.1%	73.9%	11.9%	0.1%		-	24.8%	52.1%	22.9%	0.1%		-	6.9%	80.9%	12.1%	0.1%		-	25.7%	59.4%	14.9%	0.1%		-	**-**	-
Totals %	4.4%	22.7%	3.7%	0%		30.8%	4.8%	10%	4.4%	0%		19.2%	2.2%	25.5%	3.8%	0%		31.5%	4.8%	11%	2.8%	0%		18.6%	**-**	-
Heavy	57	307	106	0		-	65	103	82	0		-	23	380	50	0		-	123	120	85	0		-	**-**	-
Heavy %	3.1%	3.2%	6.9%	0%		-	3.2%	2.4%	4.4%	0%		-	2.5%	3.5%	3.1%	0%		-	6.1%	2.6%	7.3%	0%		-	**-**	-
Bicycles	0	0	1	0		-	0	1	0	0		-	0	0	0	0		-	0	2	0	0		-	**-**	-
Bicycle %	0%	0%	0.1%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (4.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BURNHAMTHORPE RD						Northbound ERIN MILLS PKWY						Eastbound BURNHAMTHORPE RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:45:00	84	405	47	1	0	537	63	115	30	0	1	208	17	380	52	0	0	449	77	206	60	0	0	343	1537
08:00:00	102	382	37	0	2	521	57	106	41	0	1	204	23	336	70	1	1	430	91	211	59	1	4	362	1517
08:15:00	89	375	41	0	1	505	54	110	41	0	1	205	20	406	70	0	0	496	85	251	47	0	4	383	1589
08:30:00	99	439	61	0	2	599	54	104	33	0	0	191	33	411	55	0	0	499	59	184	49	0	3	292	1581
Grand Total	374	1601	186	1	5	2162	228	435	145	0	3	808	93	1533	247	1	1	1874	312	852	215	1	11	1380	**6224**
Approach%	17.3%	74.1%	8.6%	0%		-	28.2%	53.8%	17.9%	0%		-	5%	81.8%	13.2%	0.1%		-	22.6%	61.7%	15.6%	0.1%		-	-
Totals %	6%	25.7%	3%	0%		34.7%	3.7%	7%	2.3%	0%		13%	1.5%	24.6%	4%	0%		30.1%	5%	13.7%	3.5%	0%		22.2%	-
PHF	0.92	0.91	0.76	0.25		0.9	0.9	0.95	0.88	0		0.97	0.7	0.93	0.88	0.25		0.94	0.86	0.85	0.9	0.25		0.9	-
Heavy	9	57	18	0		84	10	9	9	0		28	6	29	4	0		39	14	17	12	0		43	-
Heavy %	2.4%	3.6%	9.7%	0%		3.9%	4.4%	2.1%	6.2%	0%		3.5%	6.5%	1.9%	1.6%	0%		2.1%	4.5%	2%	5.6%	0%		3.1%	-
Lights	365	1544	168	1		2078	218	426	136	0		780	87	1504	243	1		1835	298	835	203	1		1337	-
Lights %	97.6%	96.4%	90.3%	100%		96.1%	95.6%	97.9%	93.8%	0%		96.5%	93.5%	98.1%	98.4%	100%		97.9%	95.5%	98%	94.4%	100%		96.9%	-
Single-Unit Trucks	0	26	6	0		32	1	2	8	0		11	2	11	1	0		14	2	5	3	0		10	-
Single-Unit Trucks %	0%	1.6%	3.2%	0%		1.5%	0.4%	0.5%	5.5%	0%		1.4%	2.2%	0.7%	0.4%	0%		0.7%	0.6%	0.6%	1.4%	0%		0.7%	-
Buses	9	17	12	0		38	7	6	1	0		14	4	10	3	0		17	12	11	9	0		32	-
Buses %	2.4%	1.1%	6.5%	0%		1.8%	3.1%	1.4%	0.7%	0%		1.7%	4.3%	0.7%	1.2%	0%		0.9%	3.8%	1.3%	4.2%	0%		2.3%	-
Articulated Trucks	0	14	0	0		14	2	1	0	0		3	0	8	0	0		8	0	1	0	0		1	-
Articulated Trucks %	0%	0.9%	0%	0%		0.6%	0.9%	0.2%	0%	0%		0.4%	0%	0.5%	0%	0%		0.4%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	11	-	-
Pedestrians%	-	-	-	-	20%		-	-	-	-	10%		-	-	-	-	5%		-	-	-	-	55%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	5%		-	-	-	-	5%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	1	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:30 AM - 12:30 PM Weather: Partly Cloudy (11.5 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BURNHAMTHORPE RD						Northbound ERIN MILLS PKWY						Eastbound BURNHAMTHORPE RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
11:30:00	50	203	44	0	0	297	57	121	47	1	1	226	21	313	36	0	1	370	65	102	31	0	0	198	1091
11:45:00	67	275	33	0	2	375	73	114	75	0	2	262	21	258	48	0	0	327	53	100	22	0	3	175	1139
12:00:00	40	260	43	0	2	343	68	107	60	0	1	235	23	233	40	0	3	296	68	106	30	0	0	204	1078
12:15:00	45	285	52	0	0	382	66	102	60	0	0	228	29	274	47	1	2	351	63	112	29	0	1	204	1165
Grand Total	202	1023	172	0	4	1397	264	444	242	1	4	951	94	1078	171	1	6	1344	249	420	112	0	4	781	**4473**
Approach%	14.5%	73.2%	12.3%	0%		-	27.8%	46.7%	25.4%	0.1%		-	7%	80.2%	12.7%	0.1%		-	31.9%	53.8%	14.3%	0%		-	-
Totals %	4.5%	22.9%	3.8%	0%		31.2%	5.9%	9.9%	5.4%	0%		21.3%	2.1%	24.1%	3.8%	0%		30%	5.6%	9.4%	2.5%	0%		17.5%	-
PHF	0.75	0.9	0.83	0		0.91	0.9	0.92	0.81	0.25		0.91	0.81	0.86	0.89	0.25		0.91	0.92	0.94	0.9	0		0.96	-
Heavy	8	50	13	0		71	18	11	21	0		50	5	67	6	0		78	16	12	10	0		38	-
Heavy %	4%	4.9%	7.6%	0%		5.1%	6.8%	2.5%	8.7%	0%		5.3%	5.3%	6.2%	3.5%	0%		5.8%	6.4%	2.9%	8.9%	0%		4.9%	-
Lights	194	973	159	0		1326	246	433	221	1		901	89	1011	165	1		1266	233	408	102	0		743	-
Lights %	96%	95.1%	92.4%	0%		94.9%	93.2%	97.5%	91.3%	100%		94.7%	94.7%	93.8%	96.5%	100%		94.2%	93.6%	97.1%	91.1%	0%		95.1%	-
Single-Unit Trucks	4	37	6	0		47	8	6	8	0		22	5	37	2	0		44	8	5	3	0		16	-
Single-Unit Trucks %	2%	3.6%	3.5%	0%		3.4%	3%	1.4%	3.3%	0%		2.3%	5.3%	3.4%	1.2%	0%		3.3%	3.2%	1.2%	2.7%	0%		2%	-
Buses	2	3	7	0		12	7	4	7	0		18	0	8	3	0		11	8	7	7	0		22	-
Buses %	1%	0.3%	4.1%	0%		0.9%	2.7%	0.9%	2.9%	0%		1.9%	0%	0.7%	1.8%	0%		0.8%	3.2%	1.7%	6.3%	0%		2.8%	-
Articulated Trucks	2	10	0	0		12	3	1	6	0		10	0	22	1	0		23	0	0	0	0		0	-
Articulated Trucks %	1%	1%	0%	0%		0.9%	1.1%	0.2%	2.5%	0%		1.1%	0%	2%	0.6%	0%		1.7%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	22.2%		-	-	-	-	22.2%		-	-	-	-	27.8%		-	-	-	-	22.2%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	5.6%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

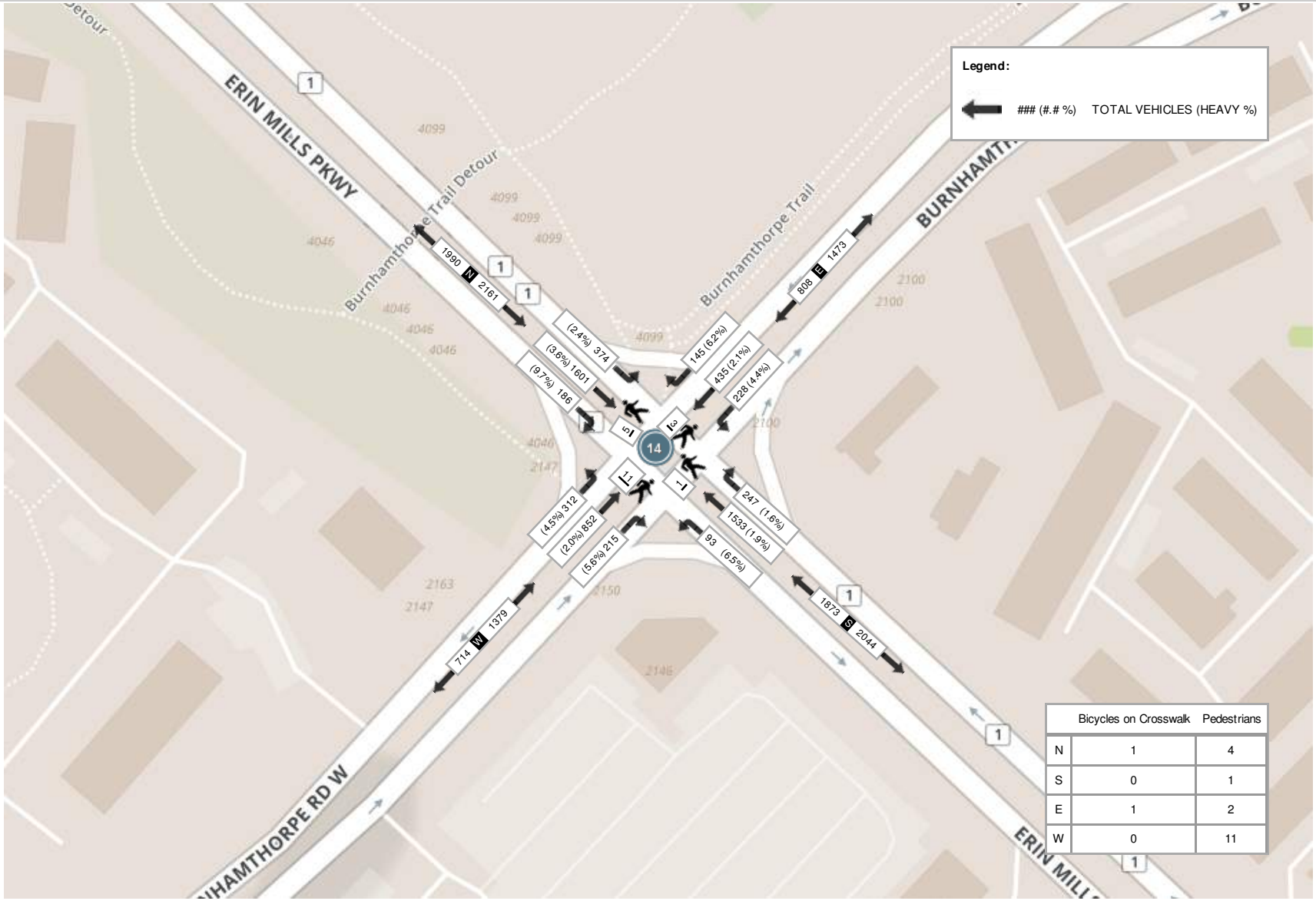
Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (16.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BURNHAMTHORPE RD						Northbound ERIN MILLS PKWY						Eastbound BURNHAMTHORPE RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	46	384	53	0	1	483	76	182	65	0	1	323	41	503	73	0	2	617	57	159	31	1	5	248	1671
17:15:00	46	324	43	1	1	414	73	239	71	1	2	384	49	449	59	0	4	557	57	163	31	1	3	252	1607
17:30:00	48	320	52	0	2	420	87	230	64	0	0	381	46	429	55	0	3	530	60	178	30	0	3	268	1599
17:45:00	58	347	93	0	0	498	83	190	60	0	0	333	48	428	63	0	1	539	63	154	35	0	5	252	1622
Grand Total	198	1375	241	1	4	1815	319	841	260	1	3	1421	184	1809	250	0	10	2243	237	654	127	2	16	1020	**6499**
Approach%	10.9%	75.8%	13.3%	0.1%		-	22.4%	59.2%	18.3%	0.1%		-	8.2%	80.7%	11.1%	0%		-	23.2%	64.1%	12.5%	0.2%		-	-
Totals %	3%	21.2%	3.7%	0%		27.9%	4.9%	12.9%	4%	0%		21.9%	2.8%	27.8%	3.8%	0%		34.5%	3.6%	10.1%	2%	0%		15.7%	-
PHF	0.85	0.9	0.65	0.25		0.91	0.92	0.88	0.92	0.25		0.93	0.94	0.9	0.86	0		0.91	0.94	0.92	0.91	0.5		0.95	-
Heavy	3	17	11	0		31	1	2	1	0		4	2	34	2	0		38	12	7	8	0		27	-
Heavy %	1.5%	1.2%	4.6%	0%		1.7%	0.3%	0.2%	0.4%	0%		0.3%	1.1%	1.9%	0.8%	0%		1.7%	5.1%	1.1%	6.3%	0%		2.6%	-
Lights	195	1358	230	1		1784	318	839	259	1		1417	182	1775	248	0		2205	225	647	119	2		993	-
Lights %	98.5%	98.8%	95.4%	100%		98.3%	99.7%	99.8%	99.6%	100%		99.7%	98.9%	98.1%	99.2%	0%		98.3%	94.9%	98.9%	93.7%	100%		97.4%	-
Single-Unit Trucks	2	6	1	0		9	0	2	0	0		2	0	25	1	0		26	1	4	0	0		5	-
Single-Unit Trucks %	1%	0.4%	0.4%	0%		0.5%	0%	0.2%	0%	0%		0.1%	0%	1.4%	0.4%	0%		1.2%	0.4%	0.6%	0%	0%		0.5%	-
Buses	1	7	10	0		18	1	0	1	0		2	2	3	1	0		6	11	3	7	0		21	-
Buses %	0.5%	0.5%	4.1%	0%		1%	0.3%	0%	0.4%	0%		0.1%	1.1%	0.2%	0.4%	0%		0.3%	4.6%	0.5%	5.5%	0%		2.1%	-
Articulated Trucks	0	4	0	0		4	0	0	0	0		0	0	6	0	0		6	0	0	1	0		1	-
Articulated Trucks %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0.8%	0%		0.1%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	14	-	-
Pedestrians%	-	-	-	-	6.1%		-	-	-	-	9.1%		-	-	-	-	30.3%		-	-	-	-	42.4%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	6.1%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	6.1%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (4.6 °C)

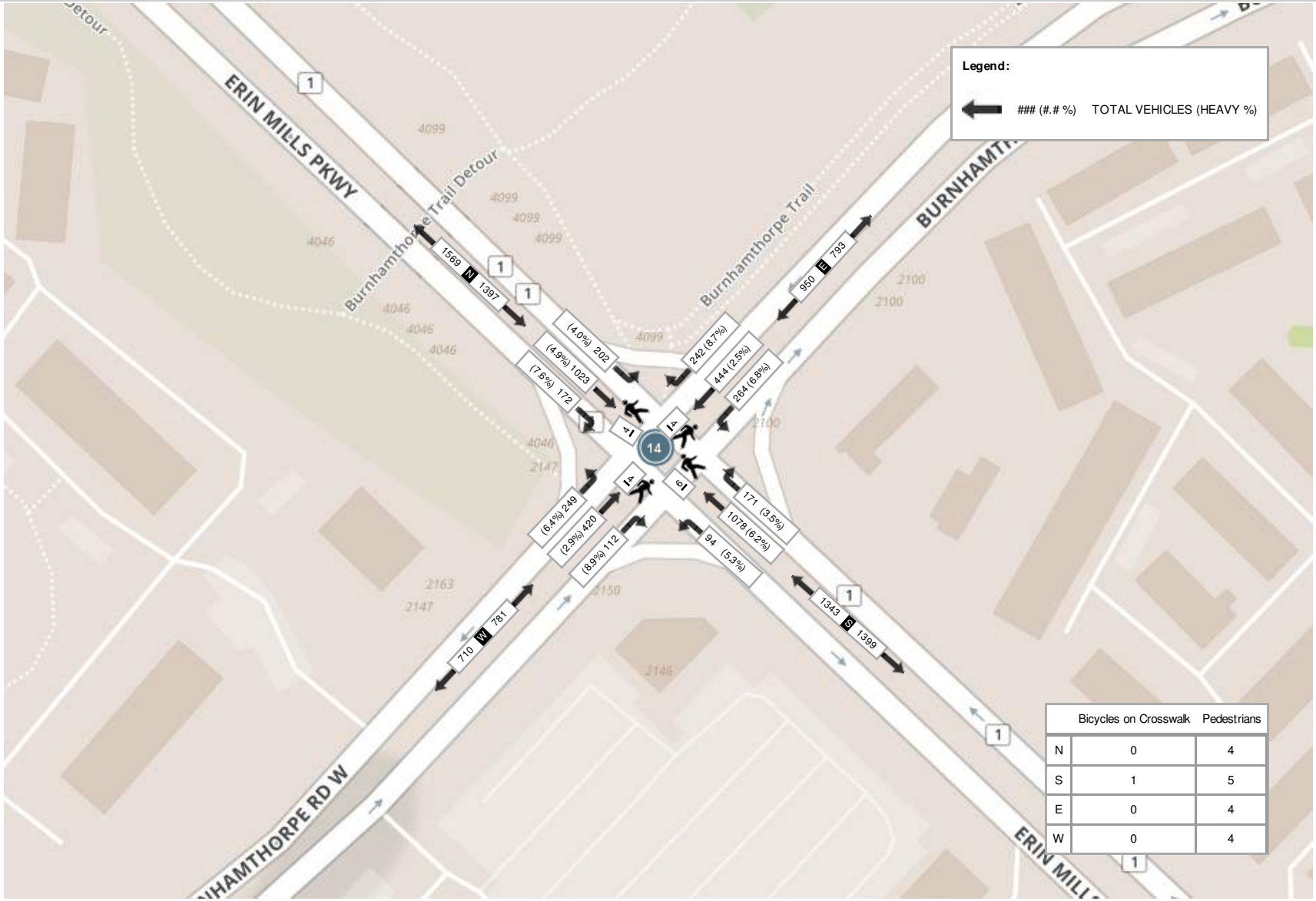


	Bicycles on Crosswalk	Pedestrians
N	1	4
S	0	1
E	1	2
W	0	11

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:30 AM - 12:30 PM Weather: Partly Cloudy (11.5 °C)

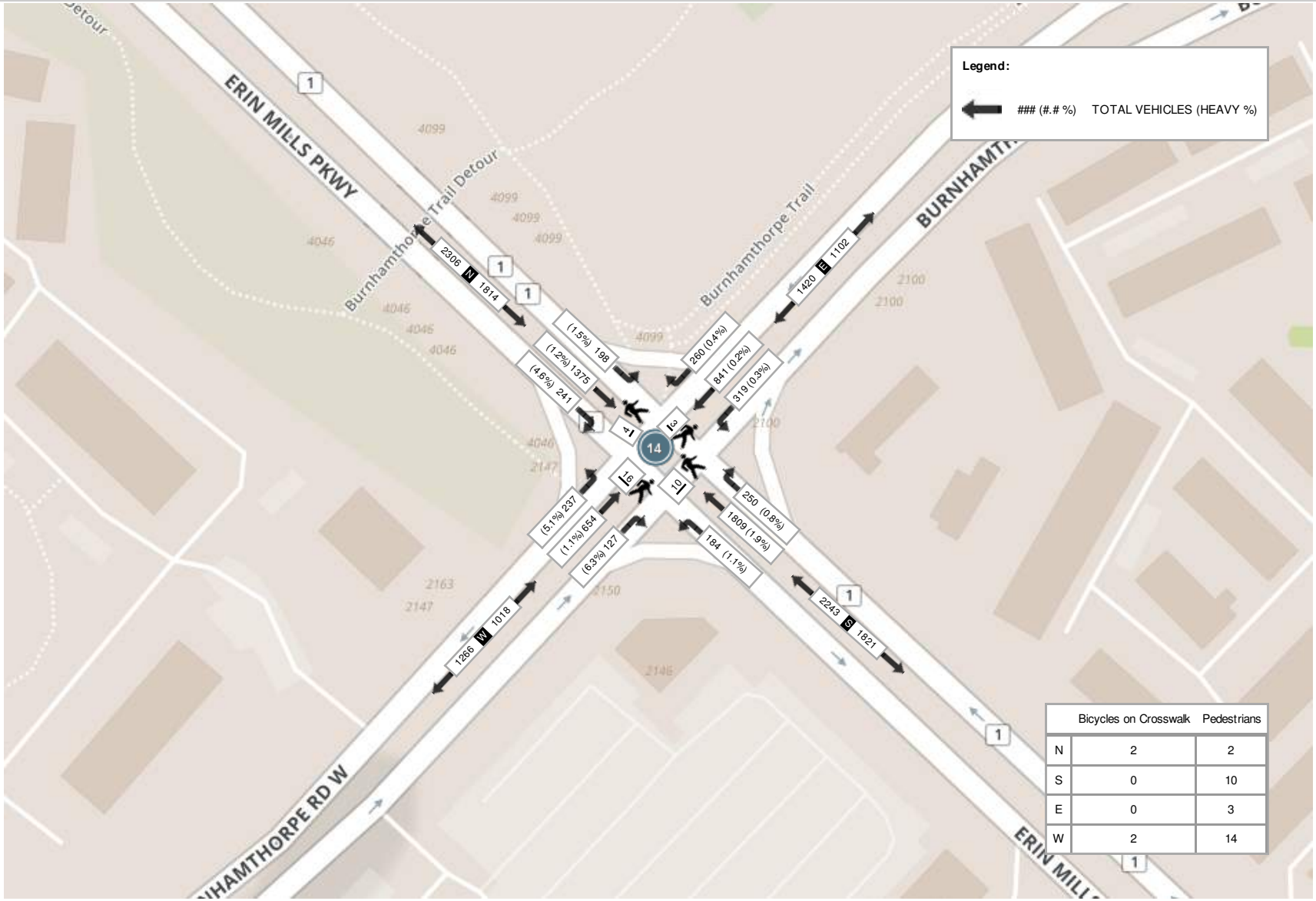


	Bicycles on Crosswalk	Pedestrians
N	0	4
S	1	5
E	0	4
W	0	4

Turning Movement Count
Location Name: ERIN MILLS PKWY & BURNHAMTHORPE RD
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (16.6 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	2
S	0	10
E	0	3
W	2	14

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (11 . ERIN MILLS PKWY & EGLINTON AVE) CustID: 001-05227 MioID: 499877

Start Time	Southbound ERIN MILLS PKWY						Westbound EGLINTON AVE						Northbound ERIN MILLS PKWY						Eastbound EGLINTON AVE						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	47	254	23	0	1	324	27	57	5	0	2	89	20	215	25	0	6	260	21	246	52	0	2	319	992	
07:15:00	74	372	18	0	2	464	18	93	18	1	2	130	30	278	44	0	4	352	20	310	70	0	2	400	1346	
07:30:00	93	345	23	0	7	461	23	104	27	0	5	154	39	283	41	0	9	363	24	381	83	0	3	488	1466	
07:45:00	79	419	36	0	4	534	24	117	52	0	10	193	28	360	70	0	23	458	26	398	84	0	14	508	1693	5497
08:00:00	105	433	43	0	5	581	26	160	65	0	3	251	43	385	58	0	9	486	31	375	100	0	6	506	1824	6329
08:15:00	91	340	39	0	6	470	22	118	44	0	1	184	46	294	62	0	13	402	27	432	99	0	7	558	1614	6597
08:30:00	98	379	42	0	11	519	35	124	37	1	16	197	45	332	62	0	13	439	29	339	89	0	7	457	1612	6743
08:45:00	77	356	35	0	15	468	22	122	32	0	10	176	39	320	50	0	19	409	25	257	98	0	17	380	1433	6483
BREAK																										
11:00:00	46	204	23	0	27	273	35	154	48	0	29	237	47	210	36	0	11	293	15	150	69	0	10	234	1037	
11:15:00	43	229	38	0	17	310	40	165	47	2	19	254	69	190	36	0	29	295	16	100	76	0	23	192	1051	
11:30:00	50	208	38	0	22	296	48	184	53	0	23	285	56	164	32	2	28	254	22	169	61	0	19	252	1087	
11:45:00	61	236	35	0	22	332	57	192	64	0	31	313	61	252	36	2	24	351	27	139	68	0	28	234	1230	4405
12:00:00	48	256	36	0	13	340	48	183	63	0	14	294	70	215	47	0	35	332	16	127	71	0	25	214	1180	4548
12:15:00	39	227	40	0	12	306	40	142	51	2	12	235	75	224	36	0	26	335	22	148	65	0	14	235	1111	4608
12:30:00	56	246	41	0	29	343	29	134	46	0	28	209	79	236	37	0	21	352	23	125	80	0	17	228	1132	4653
12:45:00	60	193	30	0	11	283	32	121	40	0	17	193	89	213	49	0	22	351	25	131	64	0	9	220	1047	4470
13:00:00	45	241	38	0	25	324	29	146	41	0	25	216	69	240	39	0	19	348	19	142	79	0	18	240	1128	4418
13:15:00	49	226	44	1	18	320	39	150	55	0	23	244	69	254	33	0	26	356	25	97	62	0	11	184	1104	4411
13:30:00	53	207	28	0	21	288	27	148	40	0	13	215	62	237	36	0	39	335	19	136	78	0	21	233	1071	4350
13:45:00	58	250	39	0	25	347	26	167	30	0	22	223	77	261	32	0	24	370	21	129	71	0	24	221	1161	4464
BREAK																										
15:00:00	48	242	36	0	20	326	31	185	60	1	17	277	70	323	37	0	22	430	20	153	71	0	10	244	1277	
15:15:00	73	311	46	0	24	430	49	246	65	0	32	360	74	381	30	0	21	485	20	142	94	0	8	256	1531	
15:30:00	55	276	43	0	24	374	24	239	77	0	24	340	88	380	46	0	23	514	28	157	70	0	18	255	1483	
15:45:00	37	247	45	0	15	329	29	247	77	0	17	353	78	343	46	0	17	467	19	187	54	0	5	260	1409	5700
16:00:00	46	296	29	2	18	373	37	290	98	1	20	426	89	403	42	0	21	534	15	144	54	0	17	213	1546	5969
16:15:00	50	291	34	2	18	377	28	271	87	0	13	386	86	344	34	0	14	464	21	147	56	0	10	224	1451	5889
16:30:00	41	385	32	0	4	458	36	317	95	0	6	448	78	406	27	0	19	511	22	143	55	0	11	220	1637	6043
16:45:00	58	395	59	3	14	515	33	298	104	0	10	435	86	416	34	0	10	536	31	129	53	0	4	213	1699	6333
17:00:00	35	278	33	0	4	346	22	285	91	0	3	398	73	334	47	1	8	455	20	179	70	0	4	269	1468	6255
17:15:00	40	369	43	0	6	452	46	336	102	0	8	484	76	425	34	0	6	535	32	159	56	0	6	247	1718	6522

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

17:30:00	52	365	65	0	9	482	32	324	91	1	8	448	93	393	34	0	8	520	38	130	62	0	5	230	1680	6565
17:45:00	52	347	57	0	3	456	30	336	91	0	5	457	73	383	27	1	16	484	20	197	69	0	9	286	1683	6549
Grand Total	1859	9423	1211	8	452	12501	1044	6155	1896	9	468	9104	2077	9695	1299	6	585	13076	739	6198	2283	0	384	9220	**43901**	-
Approach%	14.9%	75.4%	9.7%	0.1%		-	11.5%	67.6%	20.8%	0.1%		-	15.9%	74.1%	9.9%	0%		-	8%	67.2%	24.8%	0%		-	-	-
Totals %	4.2%	21.5%	2.8%	0%		28.5%	2.4%	14%	4.3%	0%		20.7%	4.7%	22.1%	3%	0%		29.8%	1.7%	14.1%	5.2%	0%		21%	-	-
Heavy	76	354	111	0		-	49	160	91	0		-	68	393	49	0		-	121	145	90	0		-	-	-
Heavy %	4.1%	3.8%	9.2%	0%		-	4.7%	2.6%	4.8%	0%		-	3.3%	4.1%	3.8%	0%		-	16.4%	2.3%	3.9%	0%		-	-	-
Bicycles	0	0	0	0		-	1	0	0	0		-	0	0	0	0		-	0	0	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0.1%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (4.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound EGLINTON AVE						Northbound ERIN MILLS PKWY						Eastbound EGLINTON AVE						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:45:00	79	419	36	0	4	534	24	117	52	0	10	193	28	360	70	0	23	458	26	398	84	0	14	508	1693
08:00:00	105	433	43	0	5	581	26	160	65	0	3	251	43	385	58	0	9	486	31	375	100	0	6	506	1824
08:15:00	91	340	39	0	6	470	22	118	44	0	1	184	46	294	62	0	13	402	27	432	99	0	7	558	1614
08:30:00	98	379	42	0	11	519	35	124	37	1	16	197	45	332	62	0	13	439	29	339	89	0	7	457	1612
Grand Total	373	1571	160	0	26	2104	107	519	198	1	30	825	162	1371	252	0	58	1785	113	1544	372	0	34	2029	**6743**
Approach%	17.7%	74.7%	7.6%	0%		-	13%	62.9%	24%	0.1%		-	9.1%	76.8%	14.1%	0%		-	5.6%	76.1%	18.3%	0%		-	-
Totals %	5.5%	23.3%	2.4%	0%		31.2%	1.6%	7.7%	2.9%	0%		12.2%	2.4%	20.3%	3.7%	0%		26.5%	1.7%	22.9%	5.5%	0%		30.1%	-
PHF	0.89	0.91	0.93	0		0.91	0.76	0.81	0.76	0.25		0.82	0.88	0.89	0.9	0		0.92	0.91	0.89	0.93	0		0.91	-
Heavy	12	44	20	0		76	7	29	14	0		50	12	47	9	0		68	20	25	14	0		59	-
Heavy %	3.2%	2.8%	12.5%	0%		3.6%	6.5%	5.6%	7.1%	0%		6.1%	7.4%	3.4%	3.6%	0%		3.8%	17.7%	1.6%	3.8%	0%		2.9%	-
Lights	361	1527	140	0		2028	100	490	184	1		775	150	1324	243	0		1717	93	1519	358	0		1970	-
Lights %	96.8%	97.2%	87.5%	0%		96.4%	93.5%	94.4%	92.9%	100%		93.9%	92.6%	96.6%	96.4%	0%		96.2%	82.3%	98.4%	96.2%	0%		97.1%	-
Single-Unit Trucks	1	16	18	0		35	4	11	2	0		17	6	26	4	0		36	20	7	7	0		34	-
Single-Unit Trucks %	0.3%	1%	11.3%	0%		1.7%	3.7%	2.1%	1%	0%		2.1%	3.7%	1.9%	1.6%	0%		2%	17.7%	0.5%	1.9%	0%		1.7%	-
Buses	10	25	2	0		37	1	17	12	0		30	4	13	0	0		17	0	15	5	0		20	-
Buses %	2.7%	1.6%	1.3%	0%		1.8%	0.9%	3.3%	6.1%	0%		3.6%	2.5%	0.9%	0%	0%		1%	0%	1%	1.3%	0%		1%	-
Articulated Trucks	1	3	0	0		4	2	1	0	0		3	2	8	5	0		15	0	3	2	0		5	-
Articulated Trucks %	0.3%	0.2%	0%	0%		0.2%	1.9%	0.2%	0%	0%		0.4%	1.2%	0.6%	2%	0%		0.8%	0%	0.2%	0.5%	0%		0.2%	-
Pedestrians	-	-	-	-	26	-	-	-	-	-	29	-	-	-	-	-	57	-	-	-	-	-	33	-	-
Pedestrians%	-	-	-	-	17.6%		-	-	-	-	19.6%		-	-	-	-	38.5%		-	-	-	-	22.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0.7%		-	-	-	-	0.7%		-	-	-	-	0.7%		-
Bicycles on Road	0	0	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:45 AM - 12:45 PM Weather: Partly Cloudy (11.5 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound EGLINTON AVE						Northbound ERIN MILLS PKWY						Eastbound EGLINTON AVE						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
11:45:00	61	236	35	0	22	332	57	192	64	0	31	313	61	252	36	2	24	351	27	139	68	0	28	234	1230
12:00:00	48	256	36	0	13	340	48	183	63	0	14	294	70	215	47	0	35	332	16	127	71	0	25	214	1180
12:15:00	39	227	40	0	12	306	40	142	51	2	12	235	75	224	36	0	26	335	22	148	65	0	14	235	1111
12:30:00	56	246	41	0	29	343	29	134	46	0	28	209	79	236	37	0	21	352	23	125	80	0	17	228	1132
Grand Total	204	965	152	0	76	1321	174	651	224	2	85	1051	285	927	156	2	106	1370	88	539	284	0	84	911	**4653**
Approach%	15.4%	73.1%	11.5%	0%		-	16.6%	61.9%	21.3%	0.2%		-	20.8%	67.7%	11.4%	0.1%		-	9.7%	59.2%	31.2%	0%		-	-
Totals %	4.4%	20.7%	3.3%	0%		28.4%	3.7%	14%	4.8%	0%		22.6%	6.1%	19.9%	3.4%	0%		29.4%	1.9%	11.6%	6.1%	0%		19.6%	-
PHF	0.84	0.94	0.93	0		0.96	0.76	0.85	0.88	0.25		0.84	0.9	0.92	0.83	0.25		0.97	0.81	0.91	0.89	0		0.97	-
Heavy	7	52	21	0		80	17	23	14	0		54	12	50	9	0		71	25	13	13	0		51	-
Heavy %	3.4%	5.4%	13.8%	0%		6.1%	9.8%	3.5%	6.3%	0%		5.1%	4.2%	5.4%	5.8%	0%		5.2%	28.4%	2.4%	4.6%	0%		5.6%	-
Lights	197	913	131	0		1241	157	628	210	2		997	273	877	147	2		1299	63	526	271	0		860	-
Lights %	96.6%	94.6%	86.2%	0%		93.9%	90.2%	96.5%	93.8%	100%		94.9%	95.8%	94.6%	94.2%	100%		94.8%	71.6%	97.6%	95.4%	0%		94.4%	-
Single-Unit Trucks	2	28	20	0		50	6	11	3	0		20	6	17	4	0		27	25	3	8	0		36	-
Single-Unit Trucks %	1%	2.9%	13.2%	0%		3.8%	3.4%	1.7%	1.3%	0%		1.9%	2.1%	1.8%	2.6%	0%		2%	28.4%	0.6%	2.8%	0%		4%	-
Buses	4	12	0	0		16	1	9	10	0		20	5	17	0	0		22	0	10	4	0		14	-
Buses %	2%	1.2%	0%	0%		1.2%	0.6%	1.4%	4.5%	0%		1.9%	1.8%	1.8%	0%	0%		1.6%	0%	1.9%	1.4%	0%		1.5%	-
Articulated Trucks	1	12	1	0		14	10	3	1	0		14	1	16	5	0		22	0	0	1	0		1	-
Articulated Trucks %	0.5%	1.2%	0.7%	0%		1.1%	5.7%	0.5%	0.4%	0%		1.3%	0.4%	1.7%	3.2%	0%		1.6%	0%	0%	0.4%	0%		0.1%	-
Pedestrians	-	-	-	-	76	-	-	-	-	-	85	-	-	-	-	-	105	-	-	-	-	-	84	-	-
Pedestrians%	-	-	-	-	21.7%		-	-	-	-	24.2%		-	-	-	-	29.9%		-	-	-	-	23.9%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0.3%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

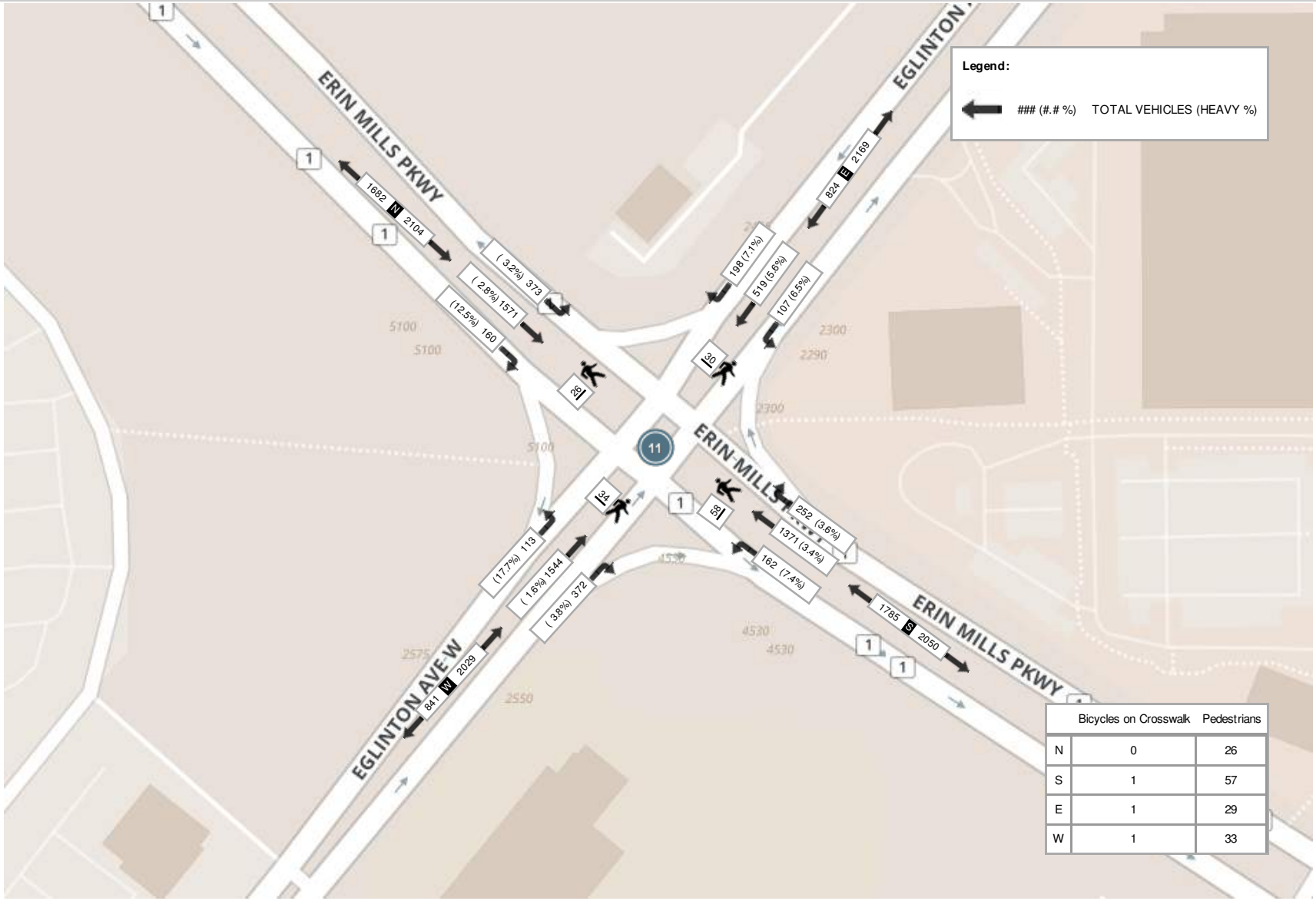
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (16.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound EGLINTON AVE						Northbound ERIN MILLS PKWY						Eastbound EGLINTON AVE						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:45:00	58	395	59	3	14	515	33	298	104	0	10	435	86	416	34	0	10	536	31	129	53	0	4	213	1699
17:00:00	35	278	33	0	4	346	22	285	91	0	3	398	73	334	47	1	8	455	20	179	70	0	4	269	1468
17:15:00	40	369	43	0	6	452	46	336	102	0	8	484	76	425	34	0	6	535	32	159	56	0	6	247	1718
17:30:00	52	365	65	0	9	482	32	324	91	1	8	448	93	393	34	0	8	520	38	130	62	0	5	230	1680
Grand Total	185	1407	200	3	33	1795	133	1243	388	1	29	1765	328	1568	149	1	32	2046	121	597	241	0	19	959	**6565**
Approach%	10.3%	78.4%	11.1%	0.2%		-	7.5%	70.4%	22%	0.1%		-	16%	76.6%	7.3%	0%		-	12.6%	62.3%	25.1%	0%		-	-
Totals %	2.8%	21.4%	3%	0%		27.3%	2%	18.9%	5.9%	0%		26.9%	5%	23.9%	2.3%	0%		31.2%	1.8%	9.1%	3.7%	0%		14.6%	-
PHF	0.8	0.89	0.77	0.25		0.87	0.72	0.92	0.93	0.25		0.91	0.88	0.92	0.79	0.25		0.95	0.8	0.83	0.86	0		0.89	-
Heavy	4	18	2	0		24	1	10	9	0		20	5	36	2	0		43	2	13	5	0		20	-
Heavy %	2.2%	1.3%	1%	0%		1.3%	0.8%	0.8%	2.3%	0%		1.1%	1.5%	2.3%	1.3%	0%		2.1%	1.7%	2.2%	2.1%	0%		2.1%	-
Lights	181	1389	198	3		1771	132	1233	379	1		1745	323	1532	147	1		2003	119	584	236	0		939	-
Lights %	97.8%	98.7%	99%	100%		98.7%	99.2%	99.2%	97.7%	100%		98.9%	98.5%	97.7%	98.7%	100%		97.9%	98.3%	97.8%	97.9%	0%		97.9%	-
Single-Unit Trucks	1	5	1	0		7	1	1	2	0		4	2	19	2	0		23	1	4	2	0		7	-
Single-Unit Trucks %	0.5%	0.4%	0.5%	0%		0.4%	0.8%	0.1%	0.5%	0%		0.2%	0.6%	1.2%	1.3%	0%		1.1%	0.8%	0.7%	0.8%	0%		0.7%	-
Buses	3	8	0	0		11	0	9	7	0		16	2	12	0	0		14	0	9	3	0		12	-
Buses %	1.6%	0.6%	0%	0%		0.6%	0%	0.7%	1.8%	0%		0.9%	0.6%	0.8%	0%	0%		0.7%	0%	1.5%	1.2%	0%		1.3%	-
Articulated Trucks	0	5	1	0		6	0	0	0	0		0	1	5	0	0		6	1	0	0	0		1	-
Articulated Trucks %	0%	0.4%	0.5%	0%		0.3%	0%	0%	0%	0%		0%	0.3%	0.3%	0%	0%		0.3%	0.8%	0%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	33	-	-	-	-	-	29	-	-	-	-	-	31	-	-	-	-	-	19	-	-
Pedestrians%	-	-	-	-	29.2%		-	-	-	-	25.7%		-	-	-	-	27.4%		-	-	-	-	16.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0.9%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (4.6 °C)

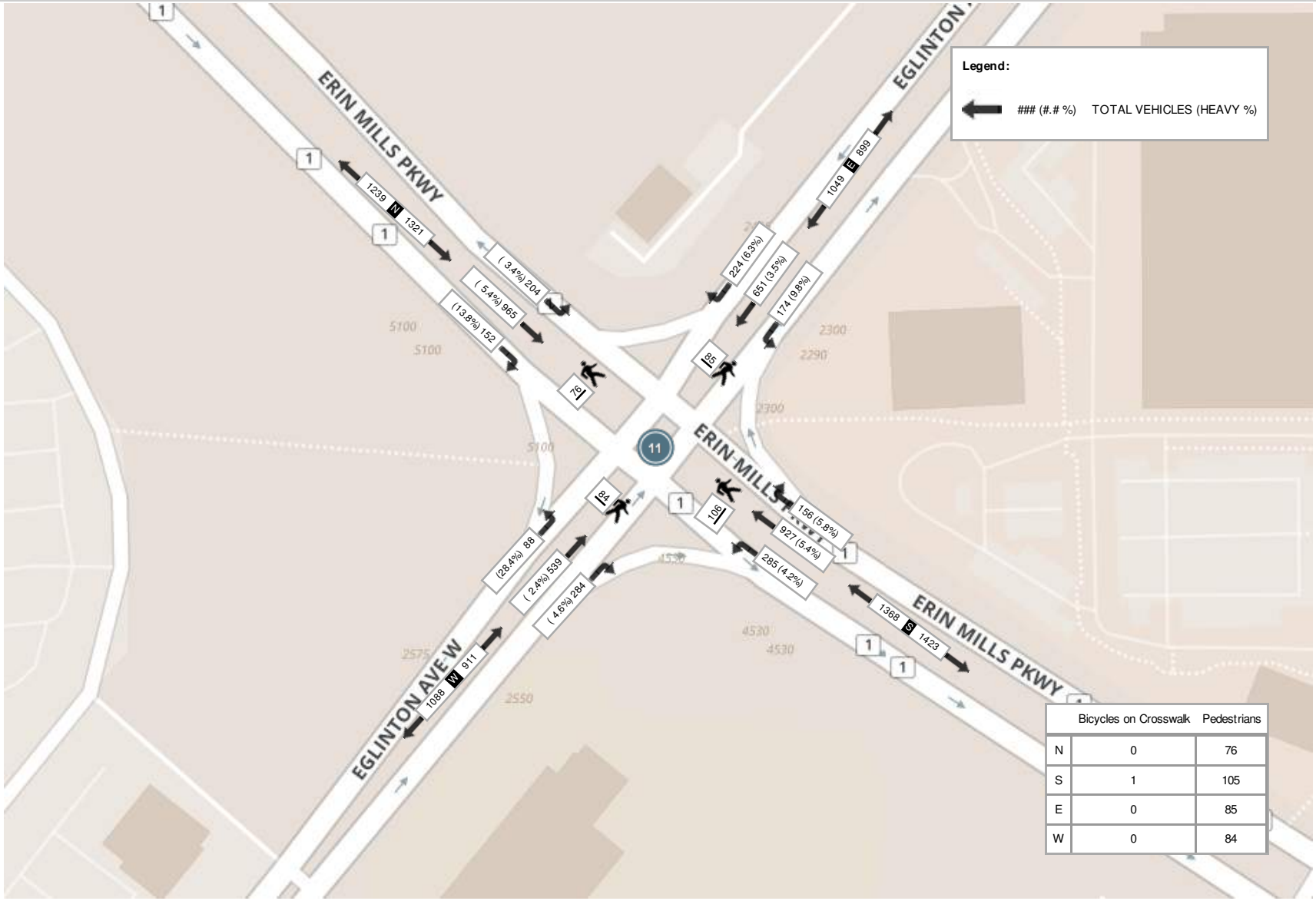


	Bicycles on Crosswalk	Pedestrians
N	0	26
S	1	57
E	1	29
W	1	33

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 11:45 AM - 12:45 PM Weather: Partly Cloudy (11.5 °C)

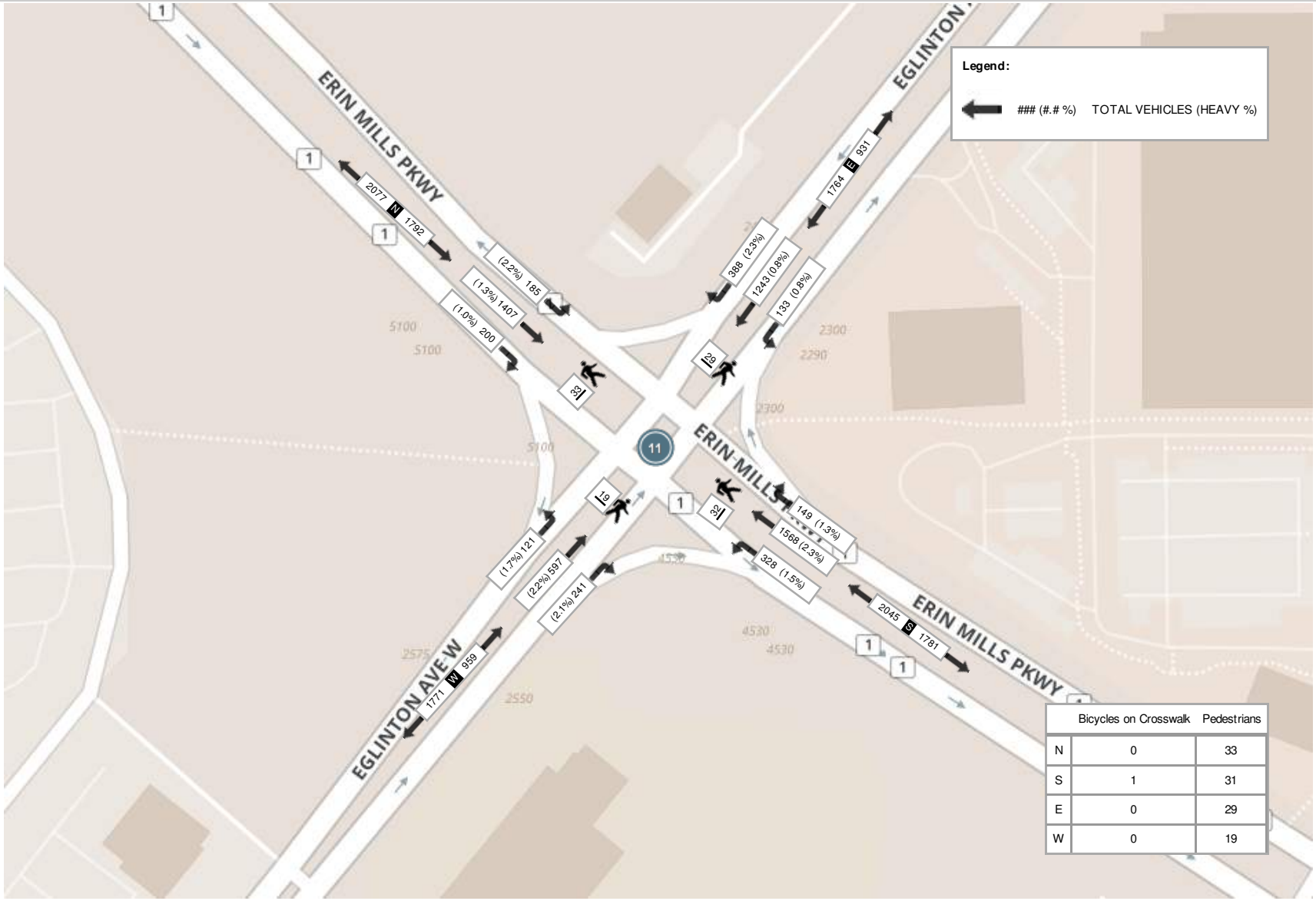


	Bicycles on Crosswalk	Pedestrians
N	0	76
S	1	105
E	0	85
W	0	84

Turning Movement Count
Location Name: ERIN MILLS PKWY & EGLINTON AVE
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (16.6 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	33
S	1	31
E	0	29
W	0	19

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (5 . ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD) CustID: 001-09396 MioID: 498805

Start Time	Southbound ERIN MILLS PKWY						Westbound BATTLEFORD RD						Northbound ERIN MILLS PKWY						Eastbound MISSISSAUGA RD						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	5	169	25	1	0	200	5	5	4	0	1	14	21	226	11	0	0	258	138	47	71	0	0	256	728	
07:15:00	3	227	42	0	2	272	4	5	4	0	1	13	24	371	13	0	2	408	152	45	103	0	0	300	993	
07:30:00	5	208	34	1	8	248	4	9	4	0	0	17	31	415	12	0	0	458	170	58	112	0	1	340	1063	
07:45:00	4	230	44	0	4	278	11	15	12	0	0	38	42	426	27	1	0	496	208	87	143	0	1	438	1250	4034
08:00:00	16	278	44	0	3	338	4	20	7	1	0	32	46	460	18	0	0	524	207	54	134	0	1	395	1289	4595
08:15:00	5	211	28	0	0	244	9	15	7	0	1	31	45	434	19	1	1	499	191	47	121	0	1	359	1133	4735
08:30:00	8	227	39	0	5	274	7	22	12	0	1	41	21	413	22	0	1	456	217	52	102	0	2	371	1142	4814
08:45:00	11	218	42	0	4	271	10	19	12	0	0	41	36	415	27	2	0	480	160	59	70	0	0	289	1081	4645
BREAK																										
11:00:00	7	153	40	2	64	202	19	29	7	0	15	55	38	191	24	0	8	253	37	22	62	0	2	121	631	
11:15:00	8	169	47	2	21	226	27	34	13	0	7	74	55	190	18	2	0	265	47	27	51	0	0	125	690	
11:30:00	9	198	37	2	15	246	22	21	13	0	0	56	42	177	13	0	1	232	60	28	50	0	1	138	672	
11:45:00	15	151	53	0	19	219	22	33	9	0	2	64	50	191	13	0	0	254	54	35	42	0	0	131	668	2661
12:00:00	15	192	79	0	4	286	25	35	11	0	1	71	52	193	30	0	1	275	62	27	46	0	1	135	767	2797
12:15:00	17	180	48	1	2	246	25	36	10	0	0	71	55	179	21	1	0	256	61	32	42	0	2	135	708	2815
12:30:00	6	193	42	1	5	242	26	30	17	0	1	73	48	176	15	0	1	239	63	27	55	0	0	145	699	2842
12:45:00	13	200	40	1	6	254	21	31	16	0	1	68	63	182	12	0	0	257	83	17	63	0	3	163	742	2916
13:00:00	15	163	44	0	8	222	28	38	20	0	2	86	47	167	15	0	4	229	64	32	45	0	4	141	678	2827
13:15:00	17	198	42	0	9	257	30	36	10	0	1	76	37	185	12	0	1	234	58	31	50	0	1	139	706	2825
13:30:00	12	197	45	0	26	254	17	33	5	0	0	55	40	209	14	1	0	264	54	26	45	0	3	125	698	2824
13:45:00	5	161	48	0	7	214	23	48	9	0	1	80	56	167	20	0	2	243	76	29	46	0	5	151	688	2770
BREAK																										
15:00:00	10	256	70	0	5	336	22	43	12	0	4	77	56	219	19	0	4	294	54	24	46	0	2	124	831	
15:15:00	6	242	73	0	12	321	32	47	9	0	0	88	73	247	14	1	2	335	70	35	51	0	3	156	900	
15:30:00	8	293	96	0	2	397	24	45	10	0	0	79	67	261	17	0	2	345	53	24	57	0	2	134	955	
15:45:00	9	320	111	0	6	440	19	50	10	0	6	79	83	283	15	0	6	381	56	28	41	0	1	125	1025	3711
16:00:00	8	316	127	0	6	451	42	47	10	0	1	99	73	204	17	1	1	295	72	26	70	0	0	168	1013	3893
16:15:00	11	393	163	1	3	568	27	55	12	0	1	94	96	247	10	0	2	353	54	27	47	0	1	128	1143	4136
16:30:00	4	406	156	1	3	567	31	76	7	0	2	114	84	264	16	0	3	364	48	21	40	0	3	109	1154	4335
16:45:00	5	462	169	0	4	636	30	72	11	1	5	114	75	207	12	0	4	294	46	33	59	0	2	138	1182	4492
17:00:00	7	496	162	0	2	665	32	57	3	0	2	92	93	264	15	0	0	372	64	21	50	0	0	135	1264	4743
17:15:00	7	441	177	0	3	625	32	74	8	0	1	114	91	261	13	2	0	367	66	21	47	0	1	134	1240	4840

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

17:30:00	7	465	190	0	0	662	32	71	6	1	1	110	77	256	15	0	0	348	63	31	49	0	1	143	1263	4949
17:45:00	4	380	170	0	1	554	18	50	7	0	1	75	98	273	17	0	0	388	48	28	62	0	2	138	1155	4922
Grand Total	282	8393	2527	13	259	11215	680	1201	307	3	59	2191	1815	8353	536	12	46	10716	2856	1101	2072	0	46	6029	**30151**	-
Approach%	2.5%	74.8%	22.5%	0.1%		-	31%	54.8%	14%	0.1%		-	16.9%	77.9%	5%	0.1%		-	47.4%	18.3%	34.4%	0%		-	**-**	-
Totals %	0.9%	27.8%	8.4%	0%		37.2%	2.3%	4%	1%	0%		7.3%	6%	27.7%	1.8%	0%		35.5%	9.5%	3.7%	6.9%	0%		20%	**-**	-
Heavy	19	304	27	0		-	22	8	18	0		-	112	287	17	0		-	29	14	86	0		-	**-**	-
Heavy %	6.7%	3.6%	1.1%	0%		-	3.2%	0.7%	5.9%	0%		-	6.2%	3.4%	3.2%	0%		-	1%	1.3%	4.2%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Clear (0 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BATTLEFORD RD						Northbound ERIN MILLS PKWY						Eastbound MISSISSAUGA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:45:00	4	230	44	0	4	278	11	15	12	0	0	38	42	426	27	1	0	496	208	87	143	0	1	438	1250
08:00:00	16	278	44	0	3	338	4	20	7	1	0	32	46	460	18	0	0	524	207	54	134	0	1	395	1289
08:15:00	5	211	28	0	0	244	9	15	7	0	1	31	45	434	19	1	1	499	191	47	121	0	1	359	1133
08:30:00	8	227	39	0	5	274	7	22	12	0	1	41	21	413	22	0	1	456	217	52	102	0	2	371	1142
Grand Total	33	946	155	0	12	1134	31	72	38	1	2	142	154	1733	86	2	2	1975	823	240	500	0	5	1563	**4814**
Approach%	2.9%	83.4%	13.7%	0%		-	21.8%	50.7%	26.8%	0.7%		-	7.8%	87.7%	4.4%	0.1%		-	52.7%	15.4%	32%	0%		-	-
Totals %	0.7%	19.7%	3.2%	0%		23.6%	0.6%	1.5%	0.8%	0%		2.9%	3.2%	36%	1.8%	0%		41%	17.1%	5%	10.4%	0%		32.5%	-
PHF	0.52	0.85	0.88	0		0.84	0.7	0.82	0.79	0.25		0.87	0.84	0.94	0.8	0.5		0.94	0.95	0.69	0.87	0		0.89	-
Heavy	3	49	5	0		57	6	1	2	0		9	20	25	3	0		48	4	3	16	0		23	-
Heavy %	9.1%	5.2%	3.2%	0%		5%	19.4%	1.4%	5.3%	0%		6.3%	13%	1.4%	3.5%	0%		2.4%	0.5%	1.3%	3.2%	0%		1.5%	-
Lights	30	897	150	0		1077	25	71	36	1		133	134	1708	83	2		1927	819	237	484	0		1540	-
Lights %	90.9%	94.8%	96.8%	0%		95%	80.6%	98.6%	94.7%	100%		93.7%	87%	98.6%	96.5%	100%		97.6%	99.5%	98.8%	96.8%	0%		98.5%	-
Single-Unit Trucks	3	26	1	0		30	3	1	0	0		4	2	13	2	0		17	0	2	1	0		3	-
Single-Unit Trucks %	9.1%	2.7%	0.6%	0%		2.6%	9.7%	1.4%	0%	0%		2.8%	1.3%	0.8%	2.3%	0%		0.9%	0%	0.8%	0.2%	0%		0.2%	-
Buses	0	12	4	0		16	1	0	0	0		1	18	6	1	0		25	4	1	15	0		20	-
Buses %	0%	1.3%	2.6%	0%		1.4%	3.2%	0%	0%	0%		0.7%	11.7%	0.3%	1.2%	0%		1.3%	0.5%	0.4%	3%	0%		1.3%	-
Articulated Trucks	0	11	0	0		11	2	0	2	0		4	0	6	0	0		6	0	0	0	0		0	-
Articulated Trucks %	0%	1.2%	0%	0%		1%	6.5%	0%	5.3%	0%		2.8%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	57.1%		-	-	-	-	9.5%		-	-	-	-	9.5%		-	-	-	-	23.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:00 PM - 01:00 PM Weather: Clear (9.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BATTLEFORD RD						Northbound ERIN MILLS PKWY						Eastbound MISSISSAUGA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:00:00	15	192	79	0	4	286	25	35	11	0	1	71	52	193	30	0	1	275	62	27	46	0	1	135	767
12:15:00	17	180	48	1	2	246	25	36	10	0	0	71	55	179	21	1	0	256	61	32	42	0	2	135	708
12:30:00	6	193	42	1	5	242	26	30	17	0	1	73	48	176	15	0	1	239	63	27	55	0	0	145	699
12:45:00	13	200	40	1	6	254	21	31	16	0	1	68	63	182	12	0	0	257	83	17	63	0	3	163	742
Grand Total	51	765	209	3	17	1028	97	132	54	0	3	283	218	730	78	1	2	1027	269	103	206	0	6	578	**2916**
Approach%	5%	74.4%	20.3%	0.3%		-	34.3%	46.6%	19.1%	0%		-	21.2%	71.1%	7.6%	0.1%		-	46.5%	17.8%	35.6%	0%		-	-
Totals %	1.7%	26.2%	7.2%	0.1%		35.3%	3.3%	4.5%	1.9%	0%		9.7%	7.5%	25%	2.7%	0%		35.2%	9.2%	3.5%	7.1%	0%		19.8%	-
PHF	0.75	0.96	0.66	0.75		0.9	0.93	0.92	0.79	0		0.97	0.87	0.95	0.65	0.25		0.93	0.81	0.8	0.82	0		0.89	-
Heavy	3	49	2	0		54	2	1	4	0		7	19	48	3	0		70	5	0	12	0		17	-
Heavy %	5.9%	6.4%	1%	0%		5.3%	2.1%	0.8%	7.4%	0%		2.5%	8.7%	6.6%	3.8%	0%		6.8%	1.9%	0%	5.8%	0%		2.9%	-
Lights	48	716	207	3		974	95	131	50	0		276	199	682	75	1		957	264	103	194	0		561	-
Lights %	94.1%	93.6%	99%	100%		94.7%	97.9%	99.2%	92.6%	0%		97.5%	91.3%	93.4%	96.2%	100%		93.2%	98.1%	100%	94.2%	0%		97.1%	-
Single-Unit Trucks	2	33	2	0		37	1	1	2	0		4	3	38	3	0		44	3	0	2	0		5	-
Single-Unit Trucks %	3.9%	4.3%	1%	0%		3.6%	1%	0.8%	3.7%	0%		1.4%	1.4%	5.2%	3.8%	0%		4.3%	1.1%	0%	1%	0%		0.9%	-
Buses	0	3	0	0		3	0	0	0	0		0	15	4	0	0		19	2	0	8	0		10	-
Buses %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	6.9%	0.5%	0%	0%		1.9%	0.7%	0%	3.9%	0%		1.7%	-
Articulated Trucks	1	13	0	0		14	1	0	2	0		3	1	6	0	0		7	0	0	2	0		2	-
Articulated Trucks %	2%	1.7%	0%	0%		1.4%	1%	0%	3.7%	0%		1.1%	0.5%	0.8%	0%	0%		0.7%	0%	0%	1%	0%		0.3%	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	57.1%		-	-	-	-	10.7%		-	-	-	-	7.1%		-	-	-	-	21.4%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	3.6%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

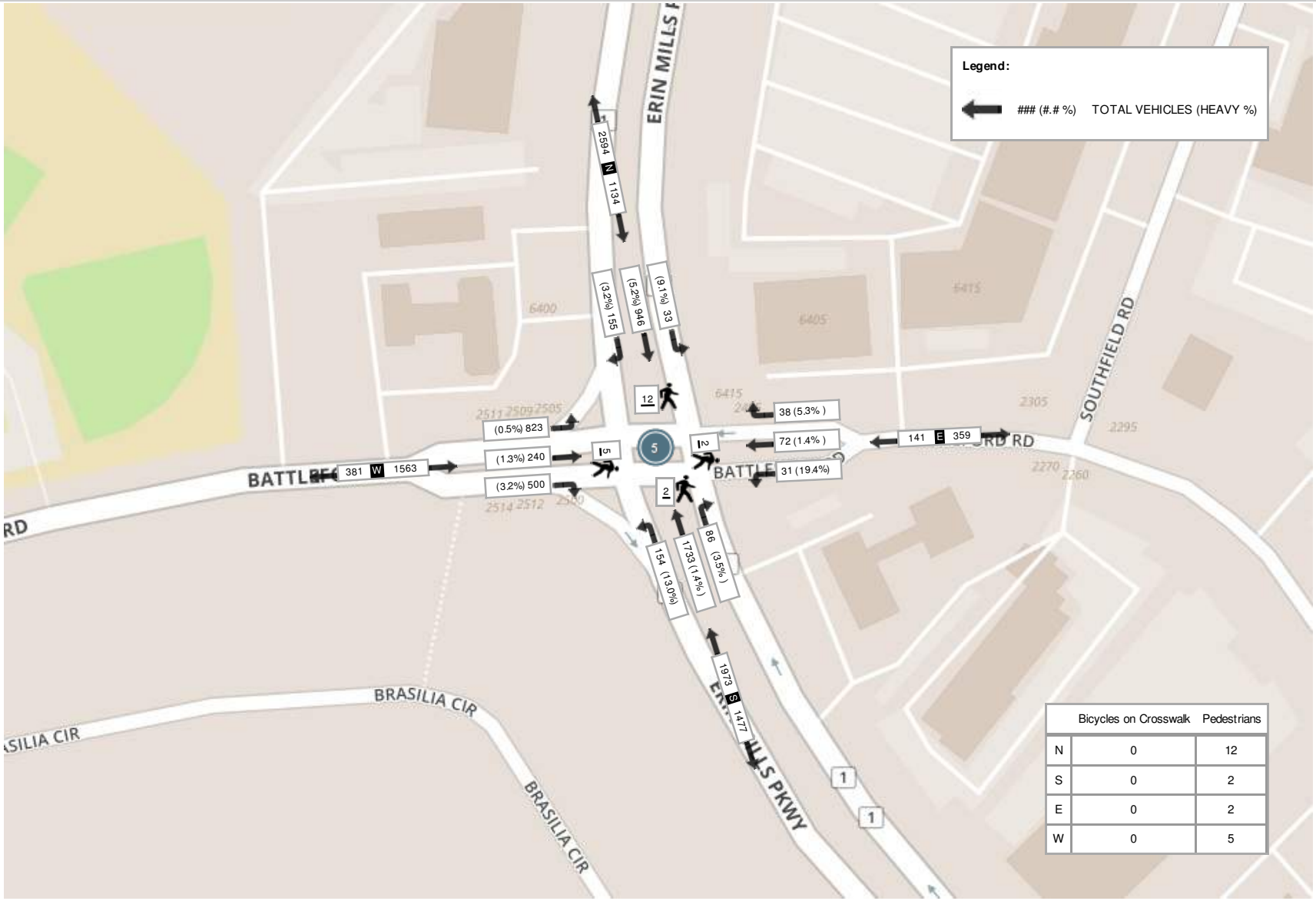
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (14.1 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound BATTLEFORD RD						Northbound ERIN MILLS PKWY						Eastbound MISSISSAUGA RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:45:00	5	462	169	0	4	636	30	72	11	1	5	114	75	207	12	0	4	294	46	33	59	0	2	138	1182
17:00:00	7	496	162	0	2	665	32	57	3	0	2	92	93	264	15	0	0	372	64	21	50	0	0	135	1264
17:15:00	7	441	177	0	3	625	32	74	8	0	1	114	91	261	13	2	0	367	66	21	47	0	1	134	1240
17:30:00	7	465	190	0	0	662	32	71	6	1	1	110	77	256	15	0	0	348	63	31	49	0	1	143	1263
Grand Total	26	1864	698	0	9	2588	126	274	28	2	9	430	336	988	55	2	4	1381	239	106	205	0	4	550	**4949**
Approach%	1%	72%	27%	0%		-	29.3%	63.7%	6.5%	0.5%		-	24.3%	71.5%	4%	0.1%		-	43.5%	19.3%	37.3%	0%		-	-
Totals %	0.5%	37.7%	14.1%	0%		52.3%	2.5%	5.5%	0.6%	0%		8.7%	6.8%	20%	1.1%	0%		27.9%	4.8%	2.1%	4.1%	0%		11.1%	-
PHF	0.93	0.94	0.92	0		0.97	0.98	0.93	0.64	0.5		0.94	0.9	0.94	0.92	0.25		0.93	0.91	0.8	0.87	0		0.96	-
Heavy	0	12	2	0		14	0	1	5	0		6	7	20	1	0		28	2	1	6	0		9	-
Heavy %	0%	0.6%	0.3%	0%		0.5%	0%	0.4%	17.9%	0%		1.4%	2.1%	2%	1.8%	0%		2%	0.8%	0.9%	2.9%	0%		1.6%	-
Lights	26	1852	696	0		2574	126	273	23	2		424	329	968	54	2		1353	237	105	199	0		541	-
Lights %	100%	99.4%	99.7%	0%		99.5%	100%	99.6%	82.1%	100%		98.6%	97.9%	98%	98.2%	100%		98%	99.2%	99.1%	97.1%	0%		98.4%	-
Single-Unit Trucks	0	3	2	0		5	0	0	1	0		1	1	10	0	0		11	2	1	1	0		4	-
Single-Unit Trucks %	0%	0.2%	0.3%	0%		0.2%	0%	0%	3.6%	0%		0.2%	0.3%	1%	0%	0%		0.8%	0.8%	0.9%	0.5%	0%		0.7%	-
Buses	0	5	0	0		5	0	1	0	0		1	6	4	0	0		10	0	0	5	0		5	-
Buses %	0%	0.3%	0%	0%		0.2%	0%	0.4%	0%	0%		0.2%	1.8%	0.4%	0%	0%		0.7%	0%	0%	2.4%	0%		0.9%	-
Articulated Trucks	0	4	0	0		4	0	0	4	0		4	0	6	1	0		7	0	0	0	0		0	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	0%	14.3%	0%		0.9%	0%	0.6%	1.8%	0%		0.5%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	9	-	-	-	-	-	4	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	34.6%		-	-	-	-	34.6%		-	-	-	-	15.4%		-	-	-	-	15.4%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:45 AM - 08:45 AM Weather: Clear (0 °C)

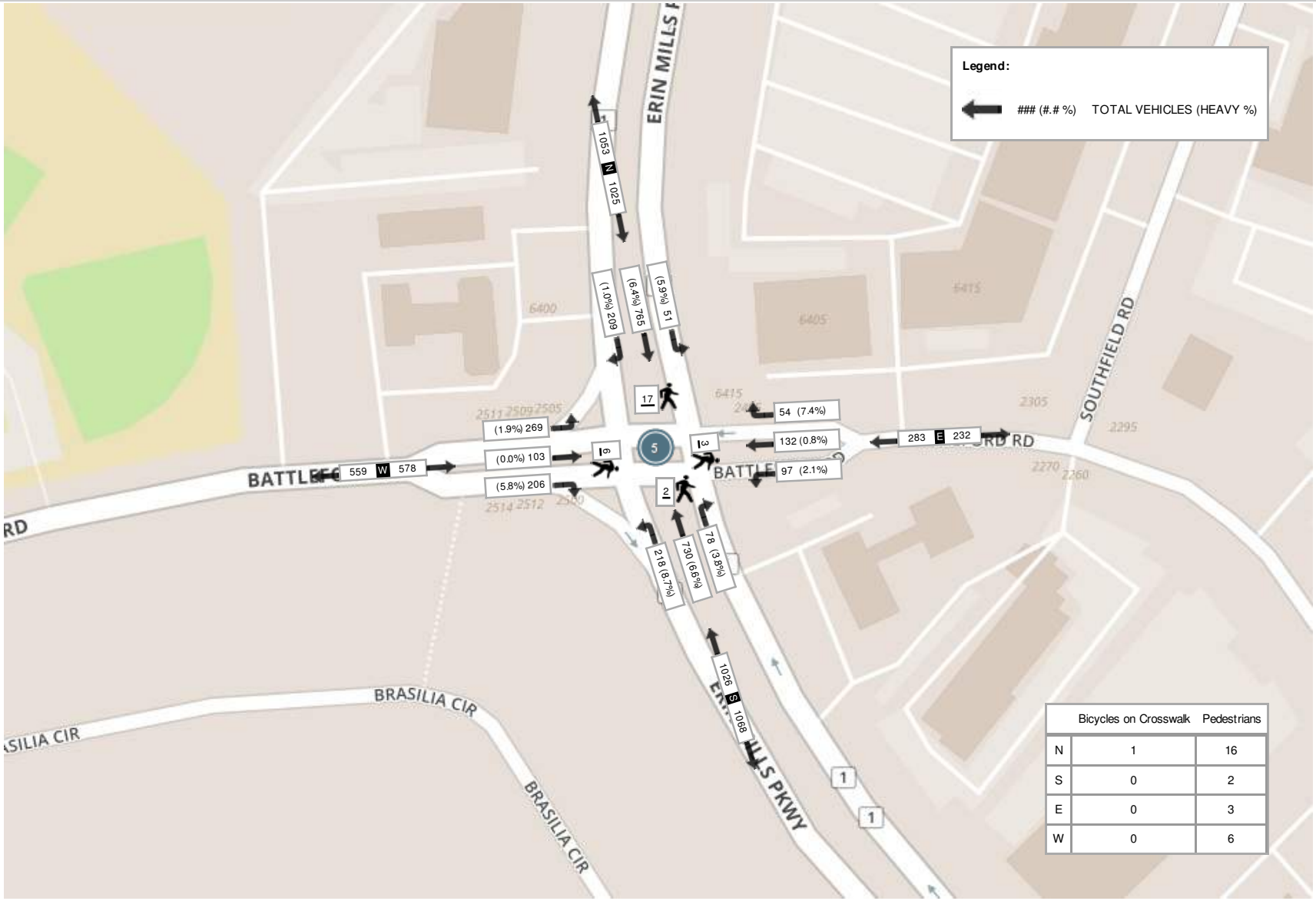


	Bicycles on Crosswalk	Pedestrians
N	0	12
S	0	2
E	0	2
W	0	5

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:00 PM - 01:00 PM Weather: Clear (9.6 °C)

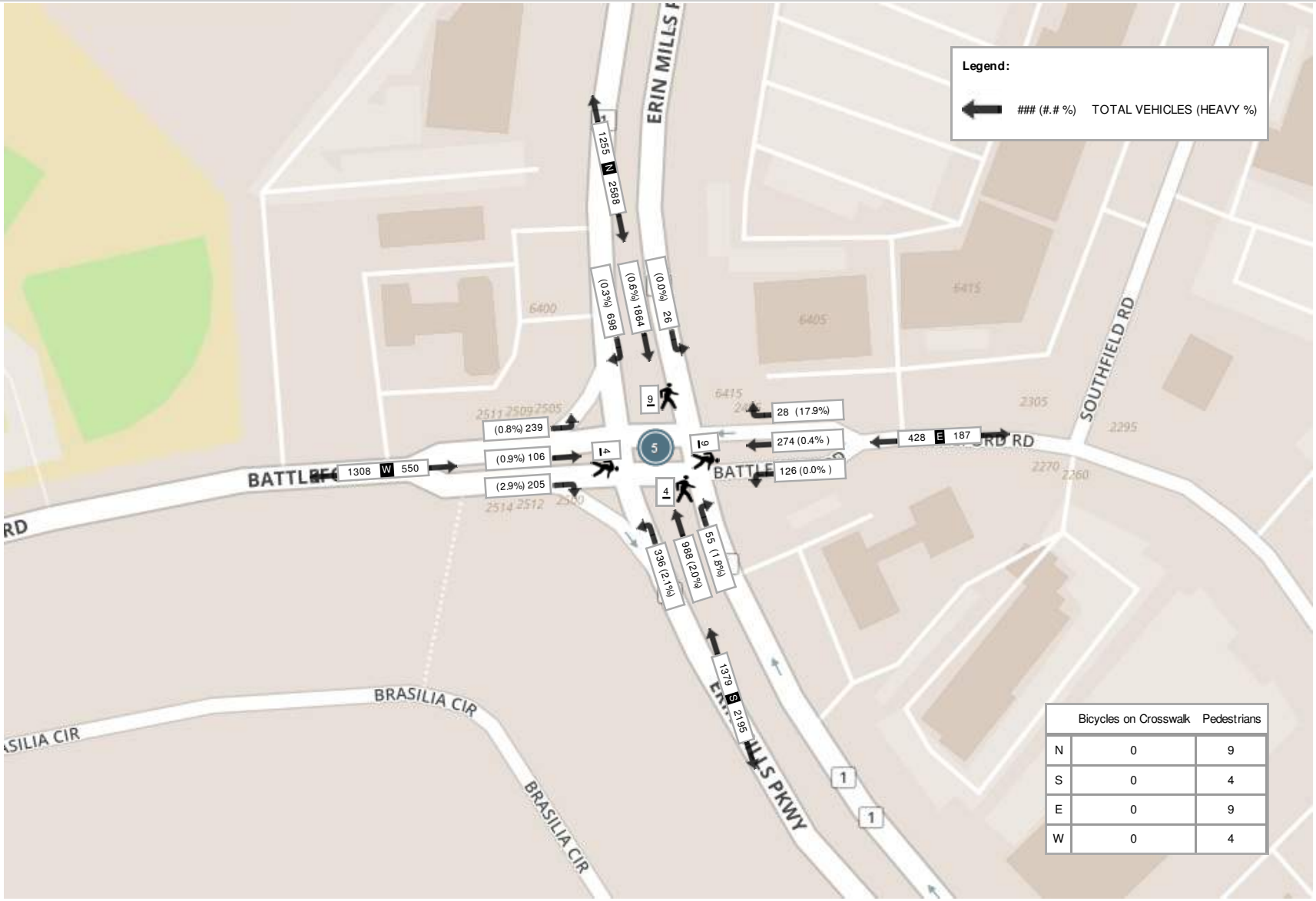


	Bicycles on Crosswalk	Pedestrians
N	1	16
S	0	2
E	0	3
W	0	6

Turning Movement Count
Location Name: ERIN MILLS PKWY & MISSISSAUGA RD / BATTLEFORD RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:45 PM - 05:45 PM Weather: Clear (14.1 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	9
S	0	4
E	0	9
W	0	4

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (8 . ERIN MILLS PKWY & THOMAS ST) CustID: 001-07009 MioID: 501819

Start Time	Southbound ERIN MILLS PKWY						Westbound THOMAS ST						Northbound ERIN MILLS PKWY						Eastbound THOMAS ST						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	17	228	9	1	0	255	31	35	6	0	0	72	7	243	34	0	0	284	66	150	49	0	0	265	876	
07:15:00	23	340	16	0	0	379	36	42	13	0	0	91	12	286	40	1	0	339	61	177	40	0	0	278	1087	
07:30:00	35	388	13	0	0	436	38	54	17	0	0	109	10	346	65	0	0	421	69	232	30	0	1	331	1297	
07:45:00	36	395	24	0	0	455	52	101	17	0	1	170	21	308	61	0	2	390	53	256	40	0	3	349	1364	4624
08:00:00	34	488	32	0	2	554	54	97	18	0	0	169	43	399	80	0	1	522	60	188	83	0	0	331	1576	5324
08:15:00	20	386	32	0	1	438	34	60	23	0	1	117	41	440	60	0	1	541	57	151	79	0	1	287	1383	5620
08:30:00	32	354	22	0	2	408	31	48	15	0	1	94	30	353	41	0	1	424	92	191	68	0	2	351	1277	5600
08:45:00	12	353	17	0	0	382	37	47	10	0	0	94	29	347	46	0	0	422	58	74	64	0	1	196	1094	5330
BREAK																										
11:00:00	11	199	13	0	0	223	27	26	18	0	0	71	13	209	30	0	0	252	15	28	32	0	1	75	621	
11:15:00	15	240	9	0	0	264	40	38	7	0	1	85	21	173	36	1	1	231	21	37	26	0	0	84	664	
11:30:00	10	253	17	0	0	280	36	37	12	0	0	85	18	208	27	0	0	253	40	34	26	0	0	100	718	
11:45:00	8	214	19	0	0	241	32	36	7	1	3	76	23	211	35	0	0	269	24	35	32	0	0	91	677	2680
12:00:00	9	274	31	0	2	314	44	40	22	0	1	106	22	179	41	1	0	243	22	42	29	0	0	93	756	2815
12:15:00	11	256	22	0	1	289	21	42	18	0	2	81	32	243	25	0	1	300	22	38	23	0	4	83	753	2904
12:30:00	9	252	17	0	1	278	29	22	5	0	0	56	28	236	34	0	0	298	22	39	29	0	0	90	722	2908
12:45:00	7	253	20	0	0	280	31	45	14	0	0	90	27	249	46	0	0	322	34	38	26	0	0	98	790	3021
13:00:00	10	238	27	0	3	275	22	30	13	0	4	65	22	237	26	0	1	285	22	34	28	0	0	84	709	2974
13:15:00	15	224	16	0	1	255	32	30	12	0	3	74	29	219	33	0	1	281	20	33	22	0	0	75	685	2906
13:30:00	15	252	19	0	0	286	48	30	11	0	0	89	32	235	30	0	0	297	20	30	16	0	0	66	738	2922
13:45:00	12	235	22	0	0	269	27	25	9	0	0	61	27	212	36	0	0	275	16	32	22	0	0	70	675	2807
BREAK																										
15:00:00	9	242	26	1	2	278	43	70	27	0	0	140	47	282	41	0	2	370	29	38	29	0	2	96	884	
15:15:00	20	337	40	0	0	397	42	51	20	0	0	113	60	338	34	1	1	433	30	47	36	0	2	113	1056	
15:30:00	18	314	28	0	0	360	38	54	22	0	2	114	51	294	57	0	2	402	24	62	33	0	0	119	995	
15:45:00	15	328	45	0	0	388	43	44	13	0	0	100	72	369	38	0	1	479	23	49	25	0	1	97	1064	3999
16:00:00	16	288	43	1	2	348	48	68	12	0	0	128	58	371	47	0	2	476	30	56	38	0	1	124	1076	4191
16:15:00	11	322	51	1	0	385	45	119	20	0	1	184	38	313	38	2	1	391	18	64	31	0	1	113	1073	4208
16:30:00	22	447	53	1	0	523	44	70	17	0	0	131	68	382	31	0	0	481	22	49	31	0	0	102	1237	4450
16:45:00	14	398	76	0	1	488	64	100	22	0	1	186	51	346	53	0	1	450	34	80	28	0	0	142	1266	4652
17:00:00	11	362	60	0	2	433	41	114	21	0	0	176	53	358	36	0	2	447	24	55	39	0	1	118	1174	4750
17:15:00	22	459	60	0	0	541	51	165	22	0	0	238	66	396	36	0	0	498	23	59	38	0	0	120	1397	5074

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

17:30:00	15	363	66	0	3	444	71	207	20	0	2	298	54	339	43	0	3	436	31	77	52	0	4	160	1338	5175
17:45:00	15	451	65	1	3	532	53	163	24	0	4	240	75	363	42	0	3	480	31	73	31	0	1	135	1387	5296
Grand Total	529	10133	1010	6	26	11678	1285	2110	507	1	27	3903	1180	9484	1322	6	27	11992	1113	2548	1175	0	26	4836	**32409**	-
Approach%	4.5%	86.8%	8.6%	0.1%		-	32.9%	54.1%	13%	0%		-	9.8%	79.1%	11%	0.1%		-	23%	52.7%	24.3%	0%		-	**-**	-
Totals %	1.6%	31.3%	3.1%	0%		36%	4%	6.5%	1.6%	0%		12%	3.6%	29.3%	4.1%	0%		37%	3.4%	7.9%	3.6%	0%		14.9%	**-**	-
Heavy	34	423	24	0		-	51	62	28	0		-	33	458	65	0		-	19	73	17	0		-	**-**	-
Heavy %	6.4%	4.2%	2.4%	0%		-	4%	2.9%	5.5%	0%		-	2.8%	4.8%	4.9%	0%		-	1.7%	2.9%	1.4%	0%		-	**-**	-
Bicycles	0	0	0	0		-	0	1	1	0		-	0	1	1	0		-	1	0	0	0		-	**-**	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0.2%	0%		-	0%	0%	0.1%	0%		-	0.1%	0%	0%	0%		-	**-**	-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (4.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound THOMAS ST						Northbound ERIN MILLS PKWY						Eastbound THOMAS ST						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:30:00	35	388	13	0	0	436	38	54	17	0	0	109	10	346	65	0	0	421	69	232	30	0	1	331	1297
07:45:00	36	395	24	0	0	455	52	101	17	0	1	170	21	308	61	0	2	390	53	256	40	0	3	349	1364
08:00:00	34	488	32	0	2	554	54	97	18	0	0	169	43	399	80	0	1	522	60	188	83	0	0	331	1576
08:15:00	20	386	32	0	1	438	34	60	23	0	1	117	41	440	60	0	1	541	57	151	79	0	1	287	1383
Grand Total	125	1657	101	0	3	1883	178	312	75	0	2	565	115	1493	266	0	4	1874	239	827	232	0	5	1298	**5620**
Approach%	6.6%	88%	5.4%	0%		-	31.5%	55.2%	13.3%	0%		-	6.1%	79.7%	14.2%	0%		-	18.4%	63.7%	17.9%	0%		-	-
Totals %	2.2%	29.5%	1.8%	0%		33.5%	3.2%	5.6%	1.3%	0%		10.1%	2%	26.6%	4.7%	0%		33.3%	4.3%	14.7%	4.1%	0%		23.1%	-
PHF	0.87	0.85	0.79	0		0.85	0.82	0.77	0.82	0		0.83	0.67	0.85	0.83	0		0.87	0.87	0.81	0.7	0		0.93	-
Heavy	5	57	4	0		66	4	16	7	0		27	9	59	8	0		76	7	22	4	0		33	-
Heavy %	4%	3.4%	4%	0%		3.5%	2.2%	5.1%	9.3%	0%		4.8%	7.8%	4%	3%	0%		4.1%	2.9%	2.7%	1.7%	0%		2.5%	-
Lights	120	1600	97	0		1817	174	296	68	0		538	106	1434	258	0		1798	232	805	228	0		1265	-
Lights %	96%	96.6%	96%	0%		96.5%	97.8%	94.9%	90.7%	0%		95.2%	92.2%	96%	97%	0%		95.9%	97.1%	97.3%	98.3%	0%		97.5%	-
Single-Unit Trucks	1	28	0	0		29	2	1	1	0		4	0	39	2	0		41	0	1	0	0		1	-
Single-Unit Trucks %	0.8%	1.7%	0%	0%		1.5%	1.1%	0.3%	1.3%	0%		0.7%	0%	2.6%	0.8%	0%		2.2%	0%	0.1%	0%	0%		0.1%	-
Buses	4	27	4	0		35	2	15	6	0		23	9	11	6	0		26	7	21	4	0		32	-
Buses %	3.2%	1.6%	4%	0%		1.9%	1.1%	4.8%	8%	0%		4.1%	7.8%	0.7%	2.3%	0%		1.4%	2.9%	2.5%	1.7%	0%		2.5%	-
Articulated Trucks	0	2	0	0		2	0	0	0	0		0	0	9	0	0		9	0	0	0	0		0	-
Articulated Trucks %	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	21.4%		-	-	-	-	14.3%		-	-	-	-	28.6%		-	-	-	-	35.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:00 PM - 01:00 PM Weather: Partly Cloudy (11.5 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound THOMAS ST						Northbound ERIN MILLS PKWY						Eastbound THOMAS ST						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:00:00	9	274	31	0	2	314	44	40	22	0	1	106	22	179	41	1	0	243	22	42	29	0	0	93	756
12:15:00	11	256	22	0	1	289	21	42	18	0	2	81	32	243	25	0	1	300	22	38	23	0	4	83	753
12:30:00	9	252	17	0	1	278	29	22	5	0	0	56	28	236	34	0	0	298	22	39	29	0	0	90	722
12:45:00	7	253	20	0	0	280	31	45	14	0	0	90	27	249	46	0	0	322	34	38	26	0	0	98	790
Grand Total	36	1035	90	0	4	1161	125	149	59	0	3	333	109	907	146	1	1	1163	100	157	107	0	4	364	**3021**
Approach%	3.1%	89.1%	7.8%	0%		-	37.5%	44.7%	17.7%	0%		-	9.4%	78%	12.6%	0.1%		-	27.5%	43.1%	29.4%	0%		-	-
Totals %	1.2%	34.3%	3%	0%		38.4%	4.1%	4.9%	2%	0%		11%	3.6%	30%	4.8%	0%		38.5%	3.3%	5.2%	3.5%	0%		12%	-
PHF	0.82	0.94	0.73	0		0.92	0.71	0.83	0.67	0		0.79	0.85	0.91	0.79	0.25		0.9	0.74	0.93	0.92	0		0.93	-
Heavy	3	66	4	0		73	8	4	5	0		17	4	64	7	0		75	1	5	1	0		7	-
Heavy %	8.3%	6.4%	4.4%	0%		6.3%	6.4%	2.7%	8.5%	0%		5.1%	3.7%	7.1%	4.8%	0%		6.4%	1%	3.2%	0.9%	0%		1.9%	-
Lights	33	969	86	0		1088	117	145	54	0		316	105	843	139	1		1088	99	152	106	0		357	-
Lights %	91.7%	93.6%	95.6%	0%		93.7%	93.6%	97.3%	91.5%	0%		94.9%	96.3%	92.9%	95.2%	100%		93.6%	99%	96.8%	99.1%	0%		98.1%	-
Single-Unit Trucks	1	38	4	0		43	4	2	2	0		8	3	38	1	0		42	1	2	1	0		4	-
Single-Unit Trucks %	2.8%	3.7%	4.4%	0%		3.7%	3.2%	1.3%	3.4%	0%		2.4%	2.8%	4.2%	0.7%	0%		3.6%	1%	1.3%	0.9%	0%		1.1%	-
Buses	2	13	0	0		15	4	2	3	0		9	1	14	6	0		21	0	3	0	0		3	-
Buses %	5.6%	1.3%	0%	0%		1.3%	3.2%	1.3%	5.1%	0%		2.7%	0.9%	1.5%	4.1%	0%		1.8%	0%	1.9%	0%	0%		0.8%	-
Articulated Trucks	0	15	0	0		15	0	0	0	0		0	0	12	0	0		12	0	0	0	0		0	-
Articulated Trucks %	0%	1.4%	0%	0%		1.3%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	33.3%		-	-	-	-	16.7%		-	-	-	-	8.3%		-	-	-	-	33.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	8.3%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	1	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

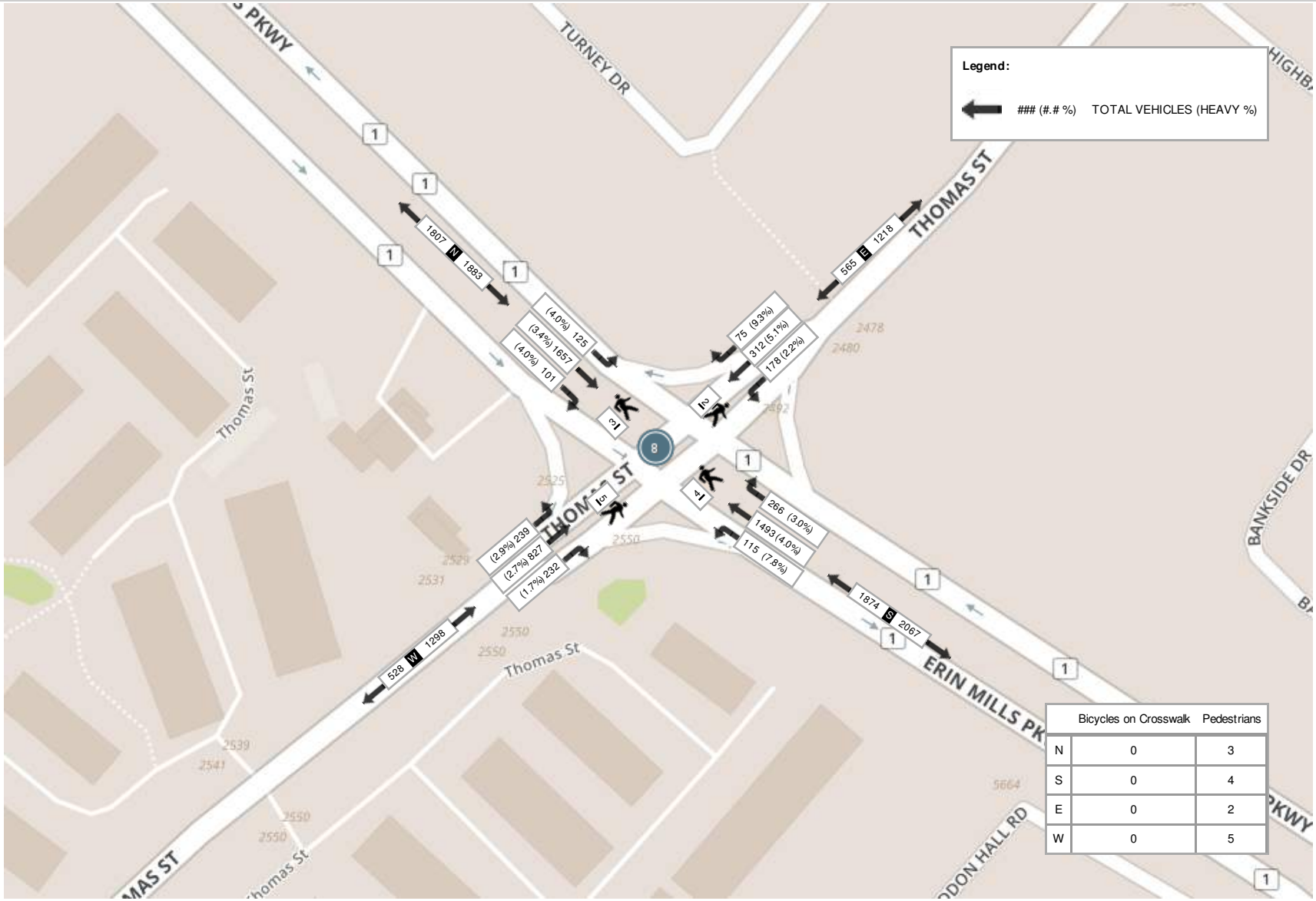
Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (16.6 °C)

Start Time	Southbound ERIN MILLS PKWY						Westbound THOMAS ST						Northbound ERIN MILLS PKWY						Eastbound THOMAS ST						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	11	362	60	0	2	433	41	114	21	0	0	176	53	358	36	0	2	447	24	55	39	0	1	118	1174
17:15:00	22	459	60	0	0	541	51	165	22	0	0	238	66	396	36	0	0	498	23	59	38	0	0	120	1397
17:30:00	15	363	66	0	3	444	71	207	20	0	2	298	54	339	43	0	3	436	31	77	52	0	4	160	1338
17:45:00	15	451	65	1	3	532	53	163	24	0	4	240	75	363	42	0	3	480	31	73	31	0	1	135	1387
Grand Total	63	1635	251	1	8	1950	216	649	87	0	6	952	248	1456	157	0	8	1861	109	264	160	0	6	533	**5296**
Approach%	3.2%	83.8%	12.9%	0.1%		-	22.7%	68.2%	9.1%	0%		-	13.3%	78.2%	8.4%	0%		-	20.5%	49.5%	30%	0%		-	-
Totals %	1.2%	30.9%	4.7%	0%		36.8%	4.1%	12.3%	1.6%	0%		18%	4.7%	27.5%	3%	0%		35.1%	2.1%	5%	3%	0%		10.1%	-
PHF	0.72	0.89	0.95	0.25		0.9	0.76	0.78	0.91	0		0.8	0.83	0.92	0.91	0		0.93	0.88	0.86	0.77	0		0.83	-
Heavy	2	16	0	0		18	5	6	0	0		11	0	32	2	0		34	1	8	0	0		9	-
Heavy %	3.2%	1%	0%	0%		0.9%	2.3%	0.9%	0%	0%		1.2%	0%	2.2%	1.3%	0%		1.8%	0.9%	3%	0%	0%		1.7%	-
Lights	61	1619	251	1		1932	211	643	87	0		941	248	1424	155	0		1827	108	256	160	0		524	-
Lights %	96.8%	99%	100%	100%		99.1%	97.7%	99.1%	100%	0%		98.8%	100%	97.8%	98.7%	0%		98.2%	99.1%	97%	100%	0%		98.3%	-
Single-Unit Trucks	0	6	0	0		6	1	0	0	0		1	0	13	0	0		13	0	0	0	0		0	-
Single-Unit Trucks %	0%	0.4%	0%	0%		0.3%	0.5%	0%	0%	0%		0.1%	0%	0.9%	0%	0%		0.7%	0%	0%	0%	0%		0%	-
Buses	2	3	0	0		5	4	6	0	0		10	0	12	2	0		14	1	8	0	0		9	-
Buses %	3.2%	0.2%	0%	0%		0.3%	1.9%	0.9%	0%	0%		1.1%	0%	0.8%	1.3%	0%		0.8%	0.9%	3%	0%	0%		1.7%	-
Articulated Trucks	0	7	0	0		7	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	-
Articulated Trucks %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	6	-	-	-	-	-	7	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	17.9%		-	-	-	-	21.4%		-	-	-	-	25%		-	-	-	-	21.4%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	10.7%		-	-	-	-	0%		-	-	-	-	3.6%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 07:30 AM - 08:30 AM Weather: Mostly Cloudy (4.6 °C)

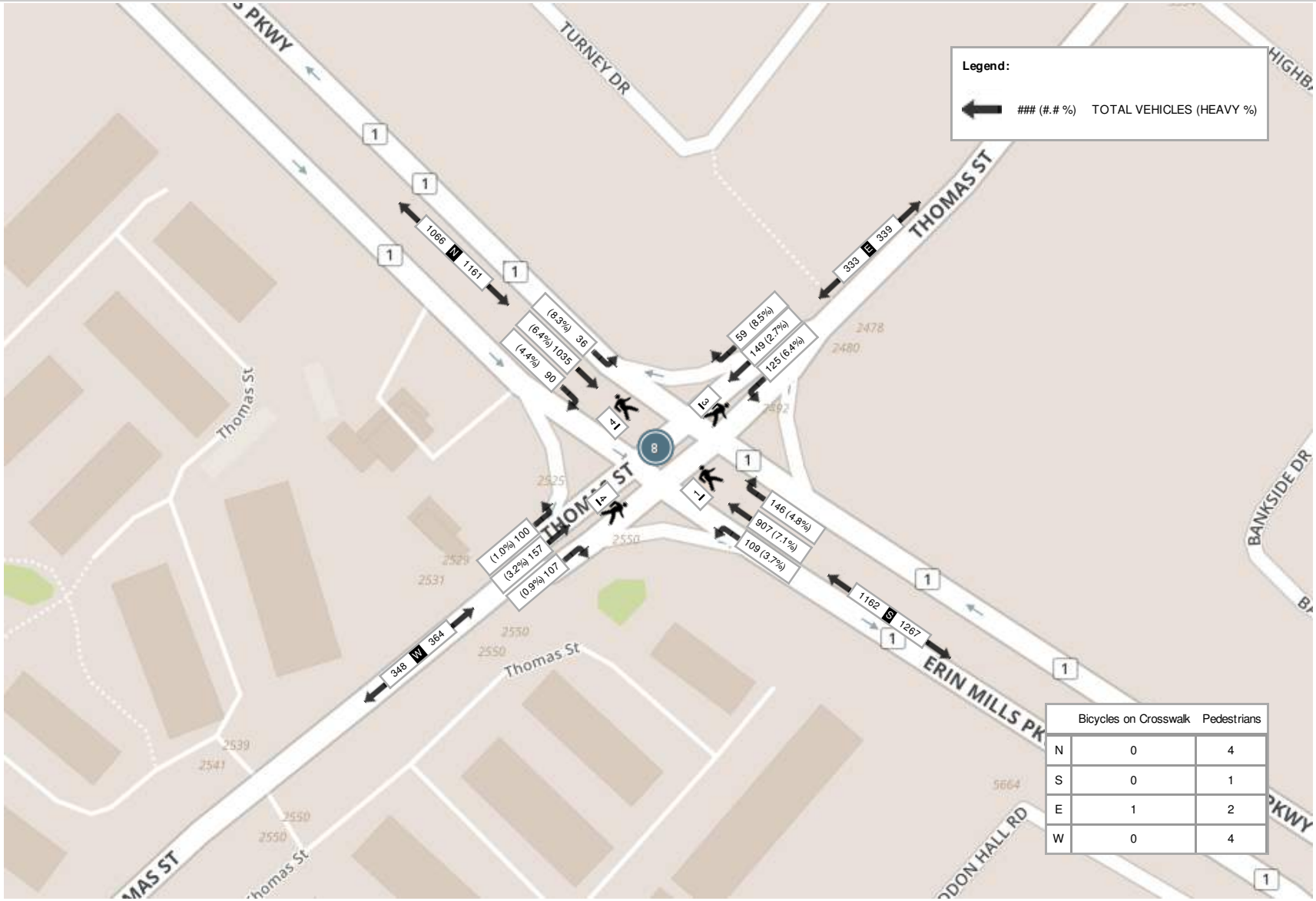


	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	4
E	0	2
W	0	5

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:00 PM - 01:00 PM Weather: Partly Cloudy (11.5 °C)



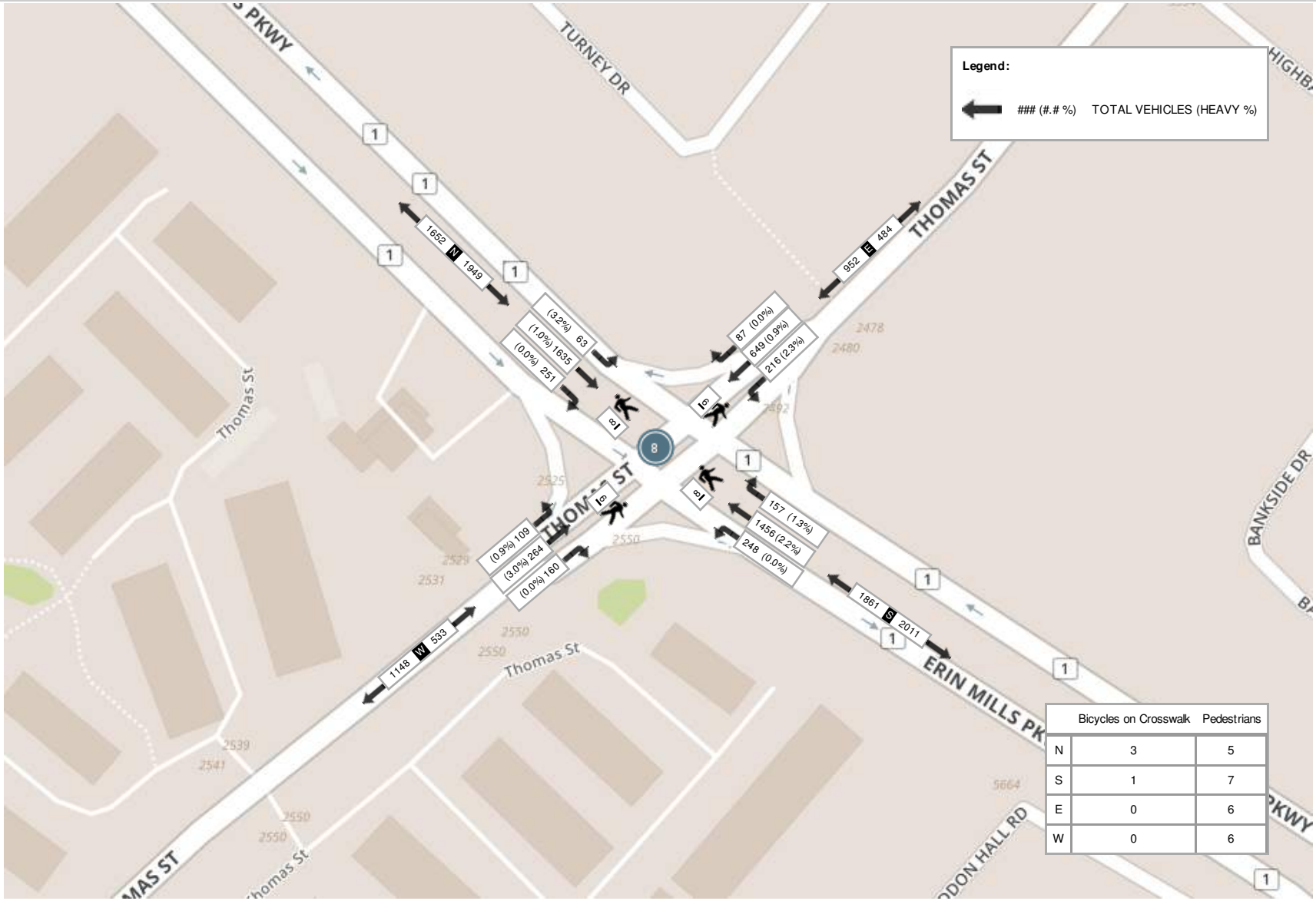
	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	1
E	1	2
W	0	4

Spectrum

Turning Movement Count
Location Name: ERIN MILLS PKWY & THOMAS ST
Date: Wed, Feb 28, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 05:00 PM - 06:00 PM Weather: Clear (16.6 °C)



	Bicycles on Crosswalk	Pedestrians
N	3	5
S	1	7
E	0	6
W	0	6

Turning Movement Count - Details Report

Location..... BATTLEFORD RD @ GLEN ERIN DR

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** BATTLEFORD RD

Count Date..... Tuesday, November 06, 2018

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
07:00	07:15	22	59	8	3	89	7	58	21	0	86	2	55	18	7	75	23	192	7	2	222
07:15	07:30	42	28	15	2	85	13	71	25	5	109	8	32	19	6	59	30	266	8	3	304
07:30	07:45	40	56	8	4	104	13	70	39	5	122	14	54	18	14	86	34	325	20	5	379
07:45	08:00	39	69	8	5	116	25	96	39	10	160	21	82	41	13	144	35	307	18	14	360
08:00	08:15	47	59	13	4	119	19	96	40	2	155	17	118	28	19	163	25	330	10	1	365
08:15	08:30	30	68	8	7	106	17	97	34	1	148	33	66	31	10	130	54	295	12	2	361
08:30	08:45	26	109	7	4	142	18	152	57	5	227	54	103	27	8	184	21	231	11	3	263
08:45	09:00	43	65	4	2	112	35	153	55	9	243	21	41	47	6	109	32	242	12	2	286
Total	.....	289	513	71	31	873	147	793	310	37	1250	170	551	229	83	950	254	2188	98	32	2540

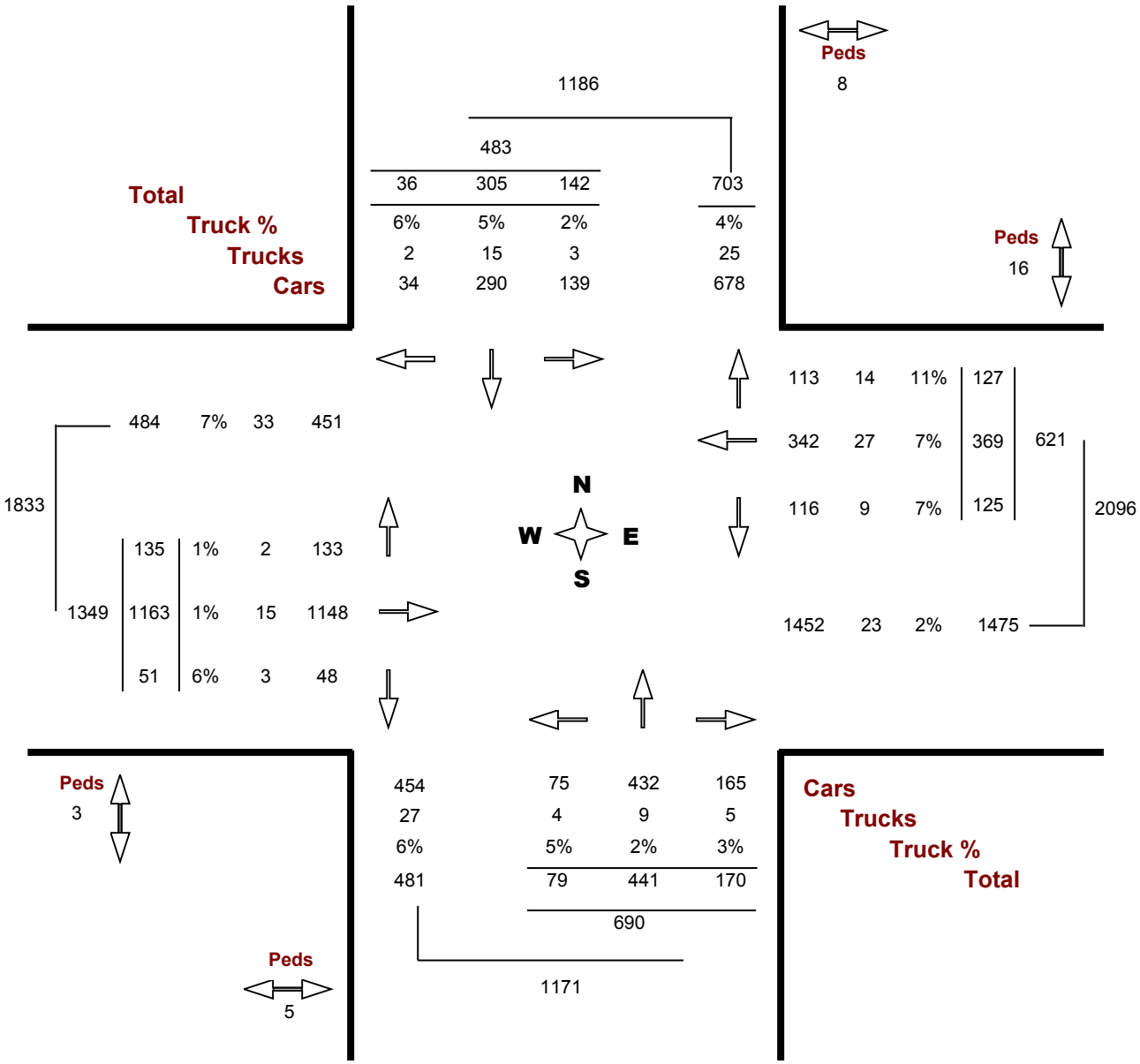
Turning Movements Report - AM Period

Location..... BATTLEFORD RD @ GLEN ERIN DR

Municipality..... Mississauga **GeoID.....** 344153

Count Date..... Tuesday, 06 November, 2018 **Peak Hour.....** 07:45 AM — 08:45 AM

Road 1 GLEN ERIN DR **Road 2** BATTLEFORD RD



Turning Movement Count - Details Report

Location..... BATTLEFORD RD @ GLEN ERIN DR

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** BATTLEFORD RD

Count Date..... Tuesday, November 06, 2018

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
15:00	15:15	42	62	16	10	120	25	37	21	3	83	31	133	18	9	182	19	96	14	3	129
15:15	15:30	24	62	12	3	98	39	81	37	8	157	14	145	26	6	185	11	87	17	6	115
15:30	15:45	41	71	15	6	127	40	60	12	3	112	21	131	53	7	205	13	77	15	8	105
15:45	16:00	42	63	16	5	121	16	56	11	4	83	26	160	35	3	221	10	66	26	3	102
16:00	16:15	43	61	15	5	119	52	47	14	7	113	18	195	56	4	269	12	89	17	3	118
16:15	16:30	45	146	14	7	205	30	106	16	3	152	32	202	63	5	297	20	95	16	2	131
16:30	16:45	50	131	30	3	211	45	85	15	3	145	27	206	38	5	271	16	56	17	0	89
16:45	17:00	39	136	18	0	193	36	96	13	2	145	24	215	57	1	296	18	92	27	5	137
17:00	17:15	47	165	19	4	231	24	106	19	3	149	26	251	54	4	331	9	107	23	2	139
17:15	17:30	46	132	25	2	203	49	115	4	1	168	29	261	41	4	331	15	77	13	0	105
17:30	17:45	26	110	29	2	165	39	84	9	3	132	27	219	24	5	270	13	94	18	0	125
17:45	18:00	31	105	23	2	159	23	120	17	2	160	30	244	37	3	311	10	116	16	2	142
Total	.....	476	1244	232	49	1952	418	993	188	42	1599	305	2362	502	56	3169	166	1052	219	34	1437

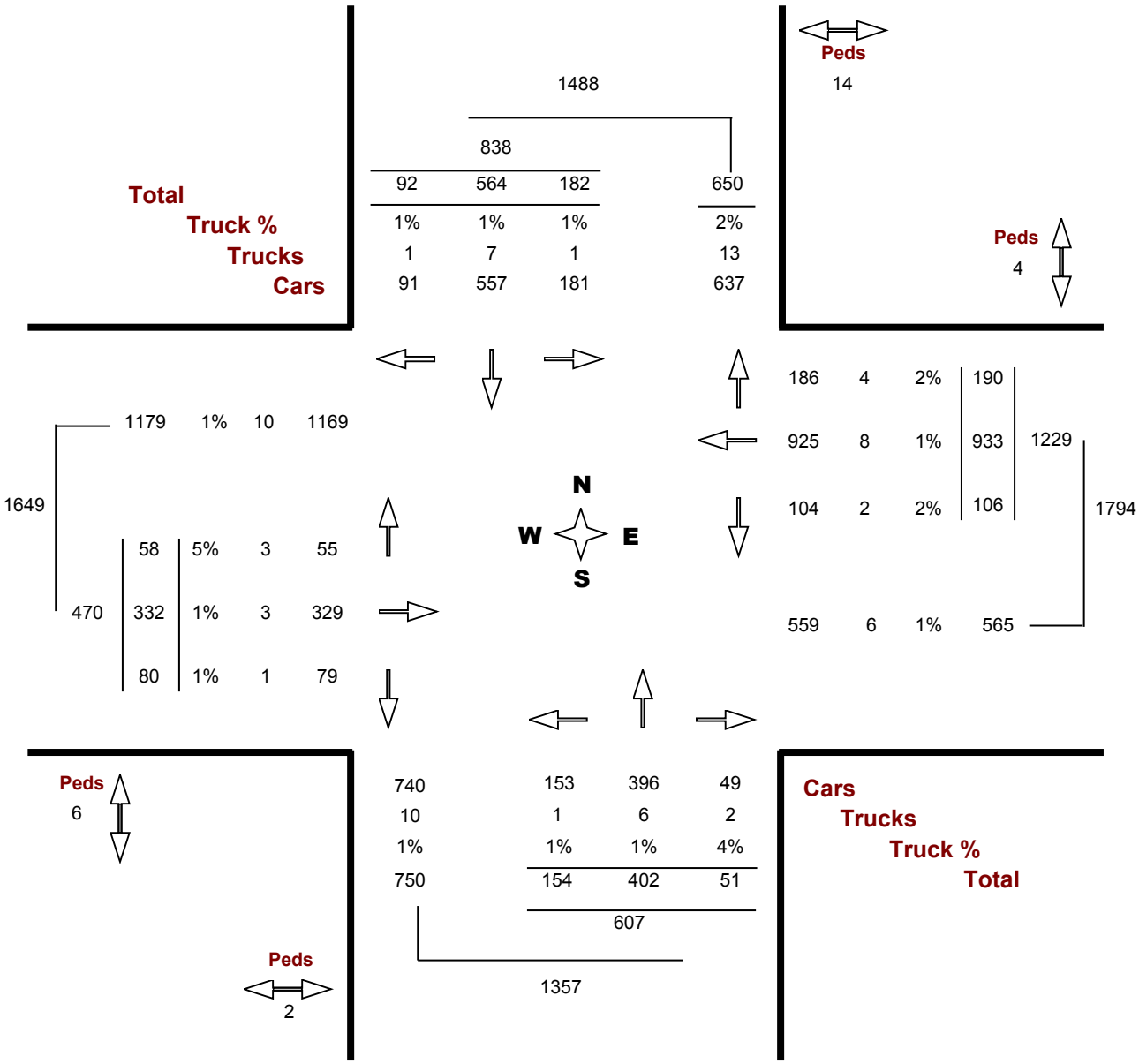
Turning Movements Report - PM Period

Location..... BATTLEFORD RD @ GLEN ERIN DR

Municipality..... Mississauga **GeoID.....** 344153

Count Date..... Tuesday, 06 November, 2018 **Peak Hour.....** 04:30 PM — 05:30 PM

Road 1 GLEN ERIN DR **Road 2** BATTLEFORD RD



Turning Movement Count - Details Report

Location..... EGLINTON AVE W @ GLEN ERIN DR

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** EGLINTON AVE W

Count Date..... Tuesday, September 26, 2017

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
07:00	07:15	17	104	3	3	124	36	44	22	14	102	9	146	4	7	159	8	308	11	14	327
07:15	07:30	39	70	8	3	117	5	26	16	1	47	8	110	4	5	122	11	453	9	11	473
07:30	07:45	67	178	3	8	248	7	124	28	2	159	23	131	10	9	164	14	544	9	13	567
07:45	08:00	57	190	7	5	254	14	184	36	10	234	26	163	21	13	210	27	525	25	9	577
08:00	08:15	108	237	9	8	354	15	193	26	3	234	18	182	26	11	226	26	421	33	12	480
08:15	08:30	149	277	13	6	439	25	170	29	5	224	28	176	11	8	215	27	346	17	9	390
08:30	08:45	87	185	9	5	281	9	97	19	3	125	23	157	11	21	191	13	403	23	12	439
08:45	09:00	60	161	9	4	230	18	115	16	7	149	21	171	12	12	204	14	354	14	19	382
Total	.....	584	1402	61	42	2047	129	953	192	45	1274	156	1236	99	86	1491	140	3354	141	99	3635

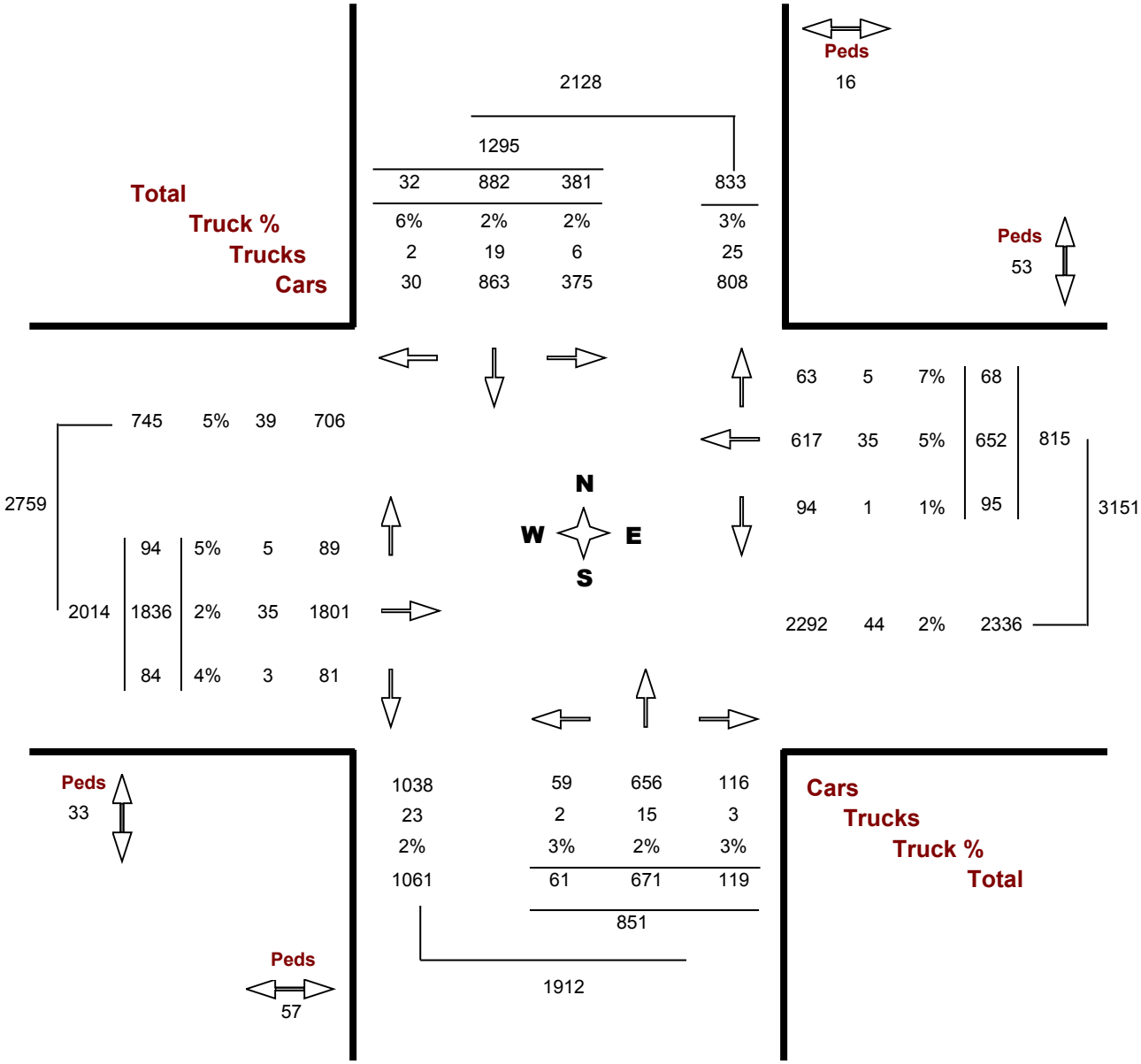
Turning Movements Report - AM Period

Location..... EGLINTON AVE W @ GLEN ERIN DR

Municipality..... Mississauga **GeoID.....** 345311

Count Date..... Tuesday, 26 September, 2017 **Peak Hour.....** 07:30 AM — 08:30 AM

Road 1 GLEN ERIN DR **Road 2** EGLINTON AVE W



Turning Movement Count - Details Report

Location..... EGLINTON AVE W @ GLEN ERIN DR

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** EGLINTON AVE W

Count Date..... Tuesday, September 26, 2017

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
15:00	15:15	44	96	23	5	163	25	92	18	4	135	27	296	18	6	341	18	125	15	8	158
15:15	15:30	64	113	14	2	191	19	138	24	2	181	42	288	30	7	360	18	151	13	12	182
15:30	15:45	40	74	6	2	120	18	103	22	1	143	33	270	34	4	337	24	135	13	6	172
15:45	16:00	46	145	20	8	211	33	158	15	6	206	35	217	24	7	276	23	164	19	10	206
16:00	16:15	42	113	23	4	178	28	134	10	4	172	51	293	44	9	388	27	162	24	5	213
16:15	16:30	38	139	18	0	195	17	168	19	3	204	40	346	50	11	436	27	158	17	8	202
16:30	16:45	39	126	12	2	177	25	190	18	4	233	40	269	39	12	348	33	181	15	5	229
16:45	17:00	54	125	20	2	199	24	154	11	4	189	44	337	57	12	438	27	175	20	9	222
17:00	17:15	34	122	9	4	165	40	196	27	1	263	53	350	34	6	437	17	190	15	6	222
17:15	17:30	55	186	21	2	262	34	291	23	4	348	31	326	45	7	402	46	201	10	4	257
17:30	17:45	68	190	26	1	284	29	223	24	2	276	50	327	48	6	425	25	185	11	2	221
17:45	18:00	60	221	17	3	298	63	232	17	3	312	57	318	42	7	417	31	177	12	4	220
Total	.....	584	1650	209	35	2443	355	2079	228	38	2662	503	3637	465	94	4605	316	2004	184	79	2504

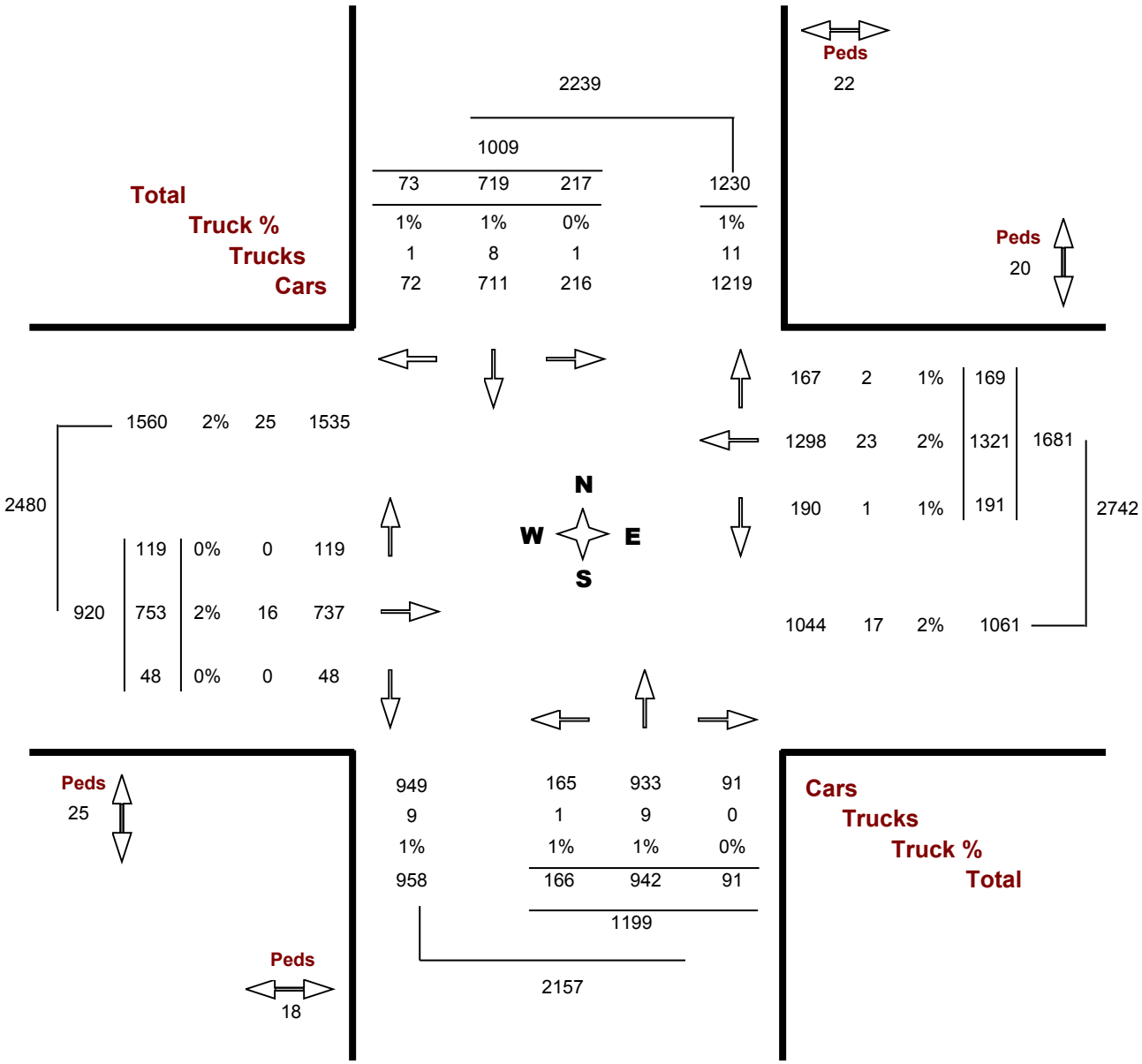
Turning Movements Report - PM Period

Location..... EGLINTON AVE W @ GLEN ERIN DR

Municipality..... Mississauga **GeoID.....** 345311

Count Date..... Tuesday, 26 September, 2017 **Peak Hour.....** 05:00 PM — 06:00 PM

Road 1 GLEN ERIN DR **Road 2** EGLINTON AVE W



Turning Movement Count - Details Report

Location..... GLEN ERIN DR @ THOMAS ST

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** THOMAS ST

Count Date..... Tuesday, November 20, 2018

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
07:00	07:15	20	91	5	6	116	14	47	18	6	79	10	42	6	5	58	13	197	4	3	214
07:15	07:30	34	102	5	5	141	5	83	20	3	108	11	44	10	3	65	18	232	6	2	256
07:30	07:45	52	122	5	7	179	6	51	30	0	87	14	54	15	8	83	14	275	12	6	301
07:45	08:00	49	183	6	8	238	9	84	22	5	115	21	65	12	6	98	11	276	15	5	302
08:00	08:15	20	202	1	11	223	16	208	49	1	273	28	73	18	3	119	17	227	9	5	253
08:15	08:30	16	166	5	7	187	21	190	41	3	252	31	115	25	9	171	17	245	7	7	269
08:30	08:45	20	113	14	4	147	33	153	29	8	215	21	52	26	3	99	33	219	16	16	268
08:45	09:00	15	104	13	0	132	15	121	17	5	153	23	60	11	5	94	23	225	13	6	261
Total	.....	226	1083	54	48	1363	119	937	226	31	1282	159	505	123	42	787	146	1896	82	50	2124

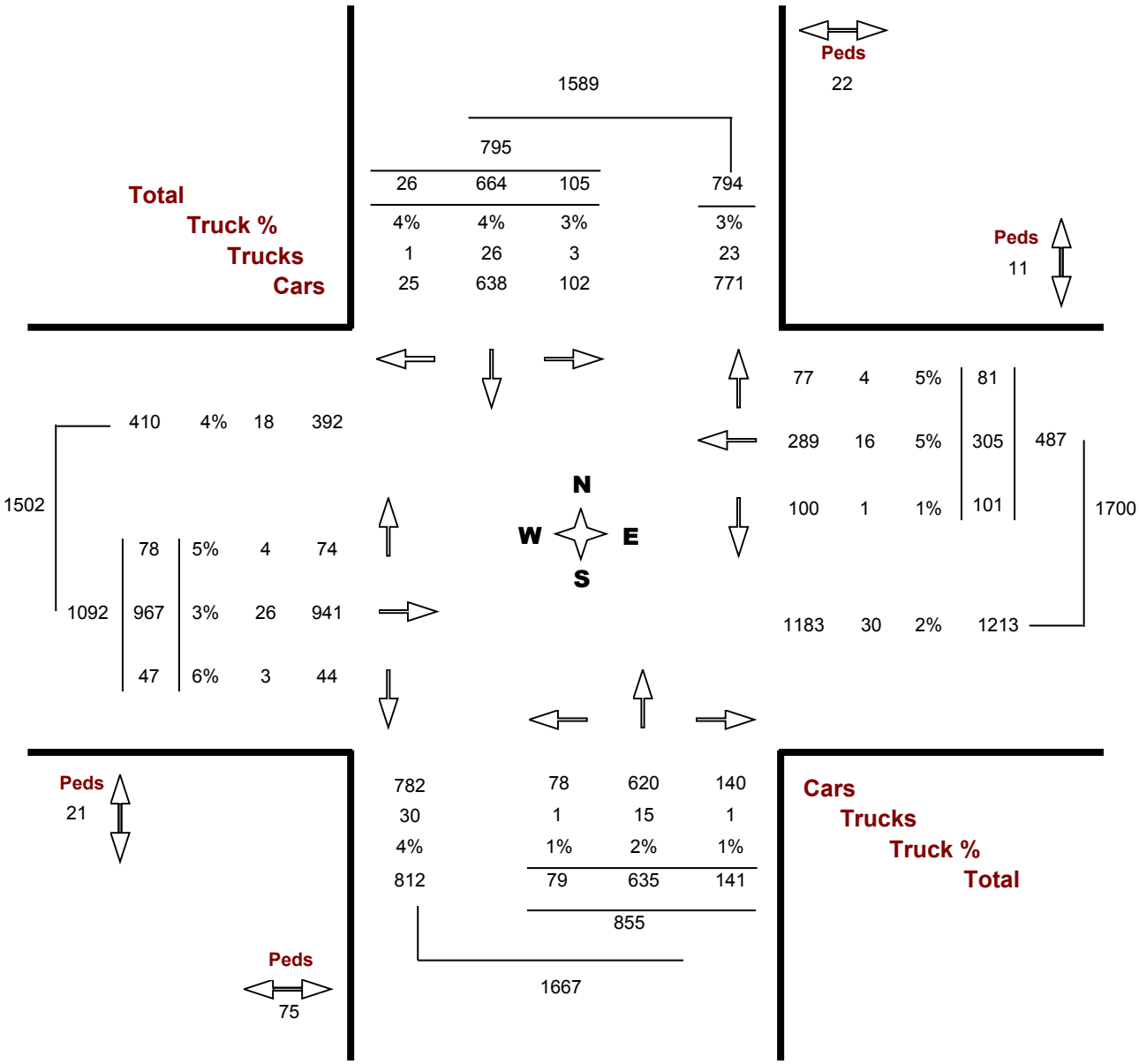
Turning Movements Report - AM Period

Location..... GLEN ERIN DR @ THOMAS ST

Municipality..... Mississauga **GeoID.....** 344813

Count Date..... Tuesday, 20 November, 2018 **Peak Hour.....** 07:45 AM — 08:45 AM

Road 1 GLEN ERIN DR **Road 2** THOMAS ST



Turning Movement Count - Details Report

Location..... GLEN ERIN DR @ THOMAS ST

Municipality..... Mississauga

Road 1 GLEN ERIN DR **Road 2** THOMAS ST

Count Date..... Tuesday, November 20, 2018

		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT	LT	TH	RT	Heavy	TOT
15:00	15:15	26	78	10	1	114	79	207	14	9	300	23	152	19	3	194	27	86	20	9	133
15:15	15:30	31	119	20	3	170	25	104	32	2	161	17	134	28	6	179	14	97	17	10	128
15:30	15:45	36	83	13	8	132	30	141	20	4	191	39	106	20	5	165	9	73	19	1	101
15:45	16:00	20	71	11	3	102	36	109	20	7	165	16	95	11	4	122	9	94	20	9	123
16:00	16:15	19	87	18	4	124	41	155	11	5	207	34	161	18	4	213	21	98	16	5	135
16:15	16:30	25	74	11	3	110	59	137	19	3	215	33	175	26	4	234	12	91	18	1	121
16:30	16:45	13	91	6	3	110	45	156	8	3	209	30	183	22	8	235	11	103	19	5	133
16:45	17:00	26	114	14	8	154	42	104	15	3	161	35	163	15	3	213	17	77	19	2	113
17:00	17:15	17	81	12	3	110	34	163	7	1	204	39	177	20	7	236	10	73	14	4	97
17:15	17:30	19	93	9	3	121	35	135	8	5	178	39	173	18	5	230	9	78	11	5	98
17:30	17:45	16	81	6	4	103	35	135	7	2	177	34	171	14	4	219	8	74	7	4	89
17:45	18:00	16	69	9	6	94	34	130	7	5	171	30	166	17	5	213	6	75	7	4	88
Total	.....	264	1041	139	49	1444	495	1676	168	49	2339	369	1856	228	58	2453	153	1019	187	59	1359

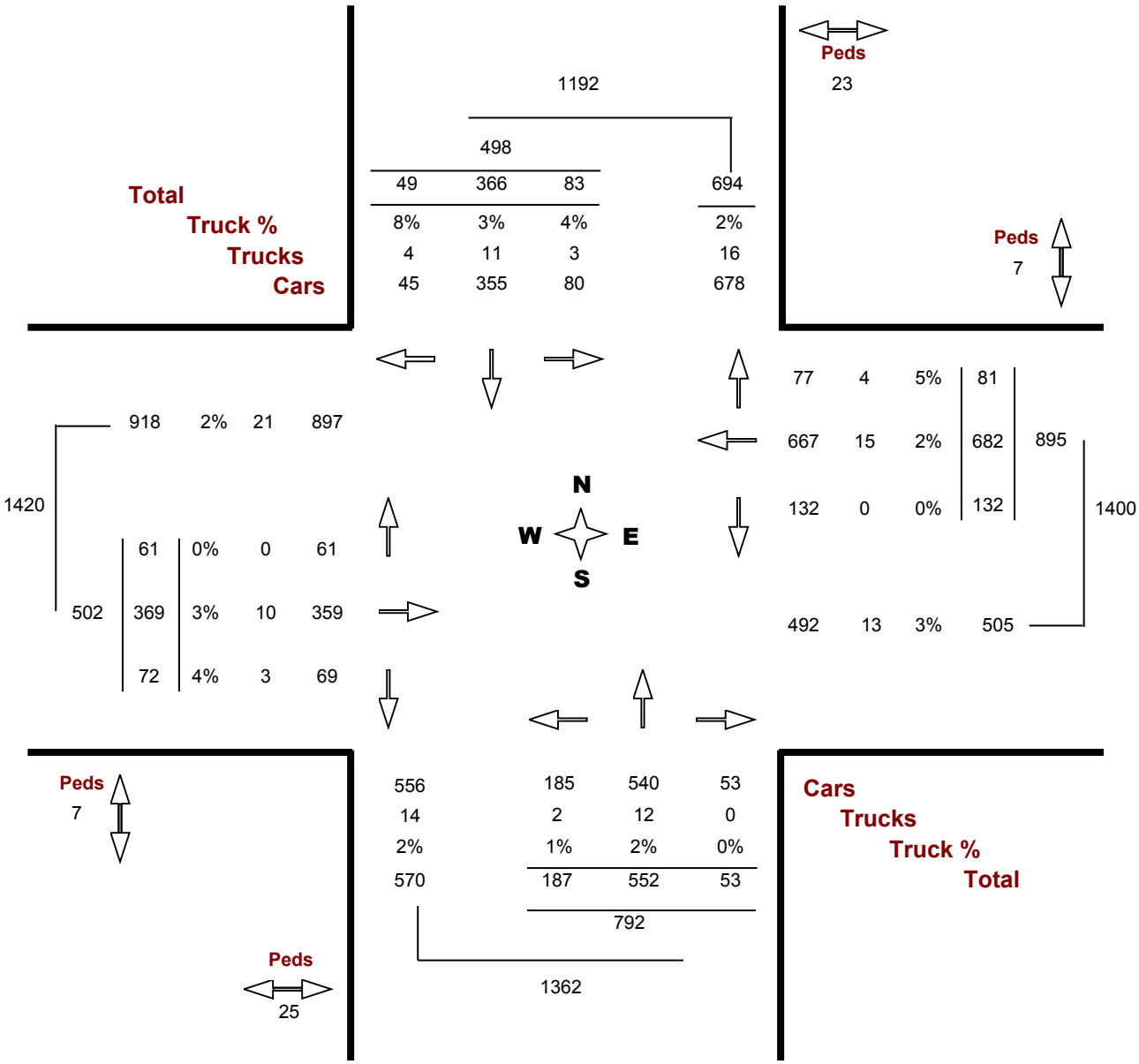
Turning Movements Report - PM Period

Location..... GLEN ERIN DR @ THOMAS ST

Municipality..... Mississauga **GeoID.....** 344813

Count Date..... Tuesday, 20 November, 2018 **Peak Hour.....** 04:00 PM — 05:00 PM

Road 1 GLEN ERIN DR **Road 2** THOMAS ST



Turning Movement Count (16 . GLEN ERIN RD & BRITANNIA RD) CustID: 00307401 MioID: 669996

Start Time	N Approach GLEN ERIN RD						E Approach BRITANNIA RD						S Approach GLEN ERIN RD						W Approach BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	9	27	32	0	1	68	11	52	4	0	0	67	35	25	8	0	4	68	3	260	6	0	4	269	472	
07:15:00	11	47	48	0	2	106	8	62	7	0	0	77	31	27	11	0	2	69	8	302	10	0	3	320	572	
07:30:00	22	69	38	0	1	129	9	66	14	0	3	89	36	42	6	0	4	84	11	395	24	0	2	430	732	
07:45:00	23	73	31	0	4	127	13	86	6	0	2	105	39	54	12	1	5	106	16	371	13	0	5	400	738	2514
08:00:00	20	94	32	0	2	146	21	92	9	0	1	122	51	67	16	0	3	134	15	407	22	0	5	444	846	2888
08:15:00	14	66	28	0	3	108	14	105	14	0	1	133	47	115	21	0	5	183	10	388	21	0	1	419	843	3159
08:30:00	19	70	40	0	1	129	15	83	13	0	0	111	43	99	17	0	3	159	18	371	16	0	3	405	804	3231
08:45:00	12	54	28	0	4	94	18	90	12	0	4	120	38	74	15	0	1	127	13	378	21	0	3	412	753	3246
09:00:00	8	60	31	0	2	99	21	88	5	0	2	114	35	39	16	1	4	91	14	284	10	0	9	308	612	3012
09:15:00	13	75	40	0	3	128	15	71	8	0	7	94	30	44	12	0	5	86	9	225	4	0	5	238	546	2715
09:30:00	20	40	25	0	4	85	23	88	7	0	0	118	30	30	5	0	1	65	11	234	8	0	1	253	521	2432
09:45:00	7	37	34	0	3	78	16	75	10	0	2	101	13	33	10	0	1	56	13	204	10	0	4	227	462	2141
BREAK																										
11:00:00	8	61	20	0	3	89	18	76	7	1	4	102	19	42	11	0	2	72	11	128	10	0	3	149	412	
11:15:00	10	42	20	0	3	72	14	95	6	0	7	115	16	42	12	0	14	70	5	116	11	0	8	132	389	
11:30:00	8	61	28	0	3	97	20	104	15	0	0	139	23	44	9	0	6	76	14	150	4	0	8	168	480	
11:45:00	6	41	21	0	7	68	27	120	22	0	5	169	23	48	15	0	5	86	8	143	9	0	4	160	483	1764
12:00:00	12	45	29	0	1	86	15	106	15	0	4	136	24	43	13	0	7	80	12	125	10	1	8	148	450	1802
12:15:00	13	50	31	0	6	94	14	116	13	0	2	143	22	68	11	0	3	101	16	144	5	0	6	165	503	1916
12:30:00	8	47	29	0	2	84	31	159	17	0	4	207	18	39	10	0	2	67	15	105	4	0	7	124	482	1918
12:45:00	10	39	22	0	7	71	14	142	18	0	11	174	21	51	16	0	8	88	7	142	6	0	5	155	488	1923
13:00:00	10	49	24	0	5	83	19	135	13	0	4	167	25	42	16	0	7	83	9	132	8	0	8	149	482	1955
13:15:00	9	48	23	0	2	80	10	125	17	0	2	152	19	59	8	1	2	87	14	115	5	0	5	134	453	1905
13:30:00	13	25	24	0	6	62	17	118	18	0	5	153	13	47	22	0	5	82	5	124	18	0	3	147	444	1867
13:45:00	13	55	16	0	3	84	22	162	12	3	2	199	24	52	18	0	5	94	11	138	9	0	7	158	535	1914
BREAK																										
16:00:00	19	80	22	0	4	121	26	320	26	0	8	372	23	90	19	0	3	132	14	121	8	0	5	143	768	
16:15:00	20	57	16	0	6	93	36	332	28	0	3	396	24	73	23	0	8	120	15	142	12	0	6	169	778	
16:30:00	23	67	30	0	5	120	29	300	27	1	3	357	22	78	23	0	6	123	17	138	13	0	9	168	768	
16:45:00	25	88	20	0	4	133	37	364	32	0	6	433	32	100	11	0	2	143	15	175	18	0	7	208	917	3231
17:00:00	10	104	30	0	7	144	43	366	31	1	2	441	22	96	27	0	3	145	17	136	9	0	7	162	892	3355

17:15:00	15	102	31	0	8	148	39	357	34	0	7	430	32	108	39	0	8	179	22	122	16	0	10	160	917	3494
17:30:00	16	81	29	0	3	126	49	318	46	0	3	413	19	89	22	0	3	130	15	166	10	0	1	191	860	3586
17:45:00	24	93	22	0	10	139	40	318	27	0	10	385	20	94	19	0	2	133	17	179	15	0	7	211	868	3537
18:00:00	28	88	23	0	2	139	25	311	35	0	3	371	28	87	26	0	2	141	19	161	14	0	6	194	845	3490
18:15:00	14	58	31	0	8	103	27	294	37	0	8	358	17	72	21	0	6	110	23	185	25	0	2	233	804	3377
18:30:00	20	75	28	0	6	123	22	228	34	0	1	284	25	95	25	0	1	145	13	175	14	0	8	202	754	3271
18:45:00	17	77	21	0	3	115	38	275	33	0	1	346	23	65	11	0	3	99	16	169	6	0	8	191	751	3154
Grand Total	529	2245	997	0	144	3771	816	6199	672	6	127	7693	962	2273	576	3	151	3814	471	7250	424	1	193	8146	**23424**	-
Approach%	14%	59.5%	26.4%	0%		-	10.6%	80.6%	8.7%	0.1%		-	25.2%	59.6%	15.1%	0.1%		-	5.8%	89%	5.2%	0%		-	-	-
Totals %	2.3%	9.6%	4.3%	0%		16.1%	3.5%	26.5%	2.9%	0%		32.8%	4.1%	9.7%	2.5%	0%		16.3%	2%	31%	1.8%	0%		34.8%	-	-
Heavy	10	62	30	0		-	17	189	9	0		-	17	49	13	0		-	11	148	11	0		-	-	-
Heavy %	1.9%	2.8%	3%	0%		-	2.1%	3%	1.3%	0%		-	1.8%	2.2%	2.3%	0%		-	2.3%	2%	2.6%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (15.02 °C)

Start Time	N Approach GLEN ERIN RD						E Approach BRITANNIA RD						S Approach GLEN ERIN RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	20	94	32	0	2	146	21	92	9	0	1	122	51	67	16	0	3	134	15	407	22	0	5	444	846
08:15:00	14	66	28	0	3	108	14	105	14	0	1	133	47	115	21	0	5	183	10	388	21	0	1	419	843
08:30:00	19	70	40	0	1	129	15	83	13	0	0	111	43	99	17	0	3	159	18	371	16	0	3	405	804
08:45:00	12	54	28	0	4	94	18	90	12	0	4	120	38	74	15	0	1	127	13	378	21	0	3	412	753
Grand Total	65	284	128	0	10	477	68	370	48	0	6	486	179	355	69	0	12	603	56	1544	80	0	12	1680	**3246**
Approach%	13.6%	59.5%	26.8%	0%		-	14%	76.1%	9.9%	0%		-	29.7%	58.9%	11.4%	0%		-	3.3%	91.9%	4.8%	0%		-	-
Totals %	2%	8.7%	3.9%	0%		14.7%	2.1%	11.4%	1.5%	0%		15%	5.5%	10.9%	2.1%	0%		18.6%	1.7%	47.6%	2.5%	0%		51.8%	-
PHF	0.81	0.76	0.8	0		0.82	0.81	0.88	0.86	0		0.91	0.88	0.77	0.82	0		0.82	0.78	0.95	0.91	0		0.95	-
Heavy	0	17	6	0		23	2	35	2	0		39	4	11	4	0		19	3	22	3	0		28	-
Heavy %	0%	6%	4.7%	0%		4.8%	2.9%	9.5%	4.2%	0%		8%	2.2%	3.1%	5.8%	0%		3.2%	5.4%	1.4%	3.8%	0%		1.7%	-
Lights	65	267	122	0		454	66	335	46	0		447	175	344	65	0		584	53	1522	77	0		1652	-
Lights %	100%	94%	95.3%	0%		95.2%	97.1%	90.5%	95.8%	0%		92%	97.8%	96.9%	94.2%	0%		96.8%	94.6%	98.6%	96.3%	0%		98.3%	-
Single-Unit Trucks	0	2	0	0		2	0	13	0	0		13	1	1	1	0		3	1	7	2	0		10	-
Single-Unit Trucks %	0%	0.7%	0%	0%		0.4%	0%	3.5%	0%	0%		2.7%	0.6%	0.3%	1.4%	0%		0.5%	1.8%	0.5%	2.5%	0%		0.6%	-
Buses	0	15	4	0		19	2	14	2	0		18	3	10	3	0		16	2	12	1	0		15	-
Buses %	0%	5.3%	3.1%	0%		4%	2.9%	3.8%	4.2%	0%		3.7%	1.7%	2.8%	4.3%	0%		2.7%	3.6%	0.8%	1.3%	0%		0.9%	-
Articulated Trucks	0	0	2	0		2	0	8	0	0		8	0	0	0	0		0	0	3	0	0		3	-
Articulated Trucks %	0%	0%	1.6%	0%		0.4%	0%	2.2%	0%	0%		1.6%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	6	-	-	-	-	-	12	-	-	-	-	-	12	-	-
Pedestrians%	-	-	-	-	22.5%		-	-	-	-	15%		-	-	-	-	30%		-	-	-	-	30%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	2.5%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)

Start Time	N Approach GLEN ERIN RD						E Approach BRITANNIA RD						S Approach GLEN ERIN RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	13	50	31	0	6	94	14	116	13	0	2	143	22	68	11	0	3	101	16	144	5	0	6	165	503
12:30:00	8	47	29	0	2	84	31	159	17	0	4	207	18	39	10	0	2	67	15	105	4	0	7	124	482
12:45:00	10	39	22	0	7	71	14	142	18	0	11	174	21	51	16	0	8	88	7	142	6	0	5	155	488
13:00:00	10	49	24	0	5	83	19	135	13	0	4	167	25	42	16	0	7	83	9	132	8	0	8	149	482
Grand Total	41	185	106	0	20	332	78	552	61	0	21	691	86	200	53	0	20	339	47	523	23	0	26	593	**1955**
Approach%	12.3%	55.7%	31.9%	0%		-	11.3%	79.9%	8.8%	0%		-	25.4%	59%	15.6%	0%		-	7.9%	88.2%	3.9%	0%		-	-
Totals %	2.1%	9.5%	5.4%	0%		17%	4%	28.2%	3.1%	0%		35.3%	4.4%	10.2%	2.7%	0%		17.3%	2.4%	26.8%	1.2%	0%		30.3%	-
PHF	0.79	0.93	0.85	0		0.88	0.63	0.87	0.85	0		0.83	0.86	0.74	0.83	0		0.84	0.73	0.91	0.72	0		0.9	-
Heavy	4	5	0	0		9	1	24	2	0		27	2	5	1	0		8	0	14	0	0		14	-
Heavy %	9.8%	2.7%	0%	0%		2.7%	1.3%	4.3%	3.3%	0%		3.9%	2.3%	2.5%	1.9%	0%		2.4%	0%	2.7%	0%	0%		2.4%	-
Lights	37	180	106	0		323	77	528	59	0		664	84	194	52	0		330	47	508	23	0		578	-
Lights %	90.2%	97.3%	100%	0%		97.3%	98.7%	95.7%	96.7%	0%		96.1%	97.7%	97%	98.1%	0%		97.3%	100%	97.1%	100%	0%		97.5%	-
Single-Unit Trucks	4	1	0	0		5	1	15	2	0		18	2	1	1	0		4	0	10	0	0		10	-
Single-Unit Trucks %	9.8%	0.5%	0%	0%		1.5%	1.3%	2.7%	3.3%	0%		2.6%	2.3%	0.5%	1.9%	0%		1.2%	0%	1.9%	0%	0%		1.7%	-
Buses	0	4	0	0		4	0	3	0	0		3	0	4	0	0		4	0	4	0	0		4	-
Buses %	0%	2.2%	0%	0%		1.2%	0%	0.5%	0%	0%		0.4%	0%	2%	0%	0%		1.2%	0%	0.8%	0%	0%		0.7%	-
Articulated Trucks	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.3%	0%	0.2%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	19	-	-	-	-	-	21	-	-	-	-	-	20	-	-	-	-	-	26	-	-
Pedestrians%	-	-	-	-	21.8%		-	-	-	-	24.1%		-	-	-	-	23%		-	-	-	-	29.9%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	1.1%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

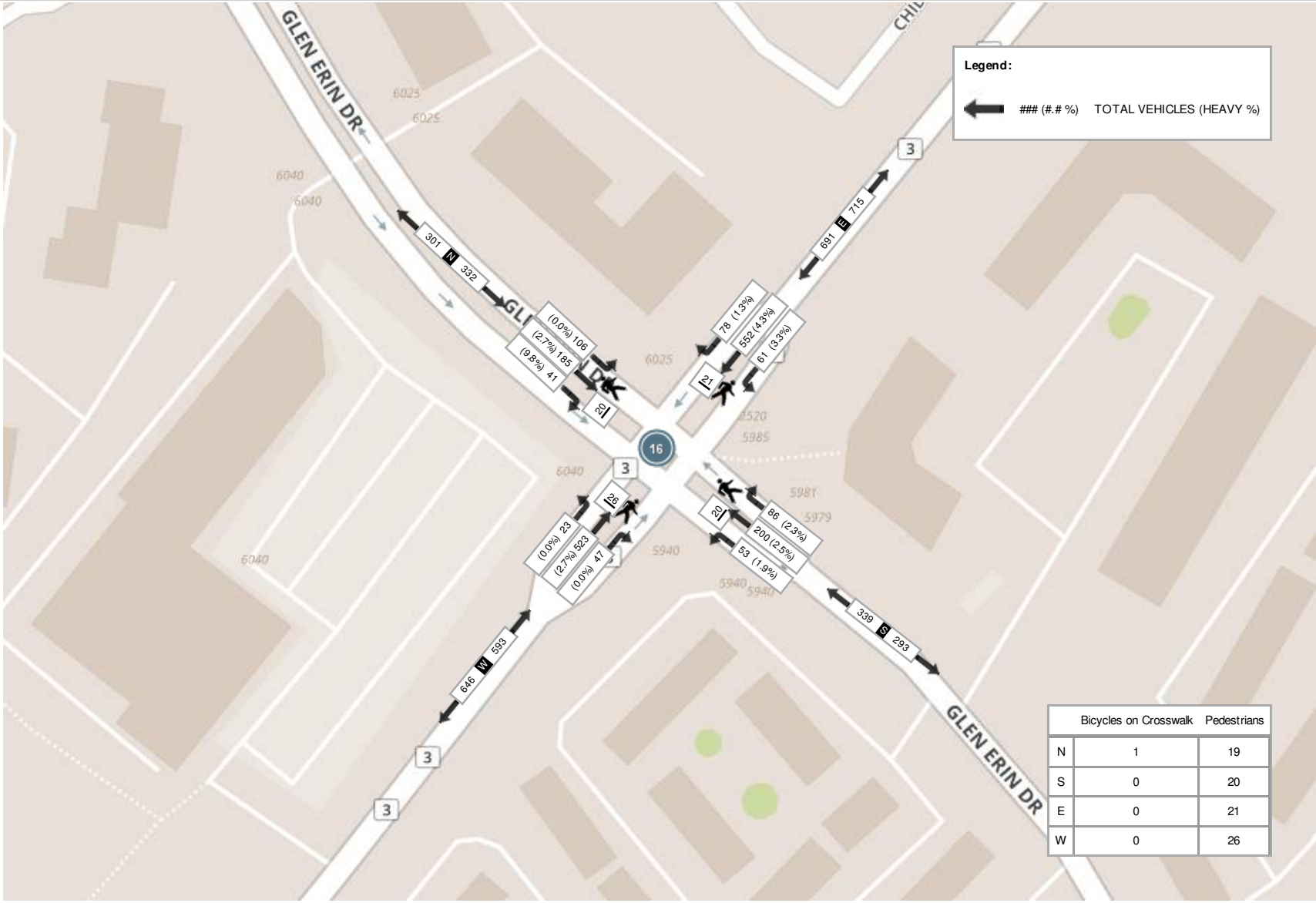
Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (24.34 °C)

Start Time	N Approach GLEN ERIN RD						E Approach BRITANNIA RD						S Approach GLEN ERIN RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	25	88	20	0	4	133	37	364	32	0	6	433	32	100	11	0	2	143	15	175	18	0	7	208	917
17:00:00	10	104	30	0	7	144	43	366	31	1	2	441	22	96	27	0	3	145	17	136	9	0	7	162	892
17:15:00	15	102	31	0	8	148	39	357	34	0	7	430	32	108	39	0	8	179	22	122	16	0	10	160	917
17:30:00	16	81	29	0	3	126	49	318	46	0	3	413	19	89	22	0	3	130	15	166	10	0	1	191	860
Grand Total	66	375	110	0	22	551	168	1405	143	1	18	1717	105	393	99	0	16	597	69	599	53	0	25	721	**3586**
Approach%	12%	68.1%	20%	0%		-	9.8%	81.8%	8.3%	0.1%		-	17.6%	65.8%	16.6%	0%		-	9.6%	83.1%	7.4%	0%		-	-
Totals %	1.8%	10.5%	3.1%	0%		15.4%	4.7%	39.2%	4%	0%		47.9%	2.9%	11%	2.8%	0%		16.6%	1.9%	16.7%	1.5%	0%		20.1%	-
PHF	0.66	0.9	0.89	0		0.93	0.86	0.96	0.78	0.25		0.97	0.82	0.91	0.63	0		0.83	0.78	0.86	0.74	0		0.87	-
Heavy	0	3	0	0		3	0	8	0	0		8	1	4	0	0		5	0	8	0	0		8	-
Heavy %	0%	0.8%	0%	0%		0.5%	0%	0.6%	0%	0%		0.5%	1%	1%	0%	0%		0.8%	0%	1.3%	0%	0%		1.1%	-
Lights	66	371	110	0		547	168	1397	143	1		1709	104	389	99	0		592	69	591	53	0		713	-
Lights %	100%	98.9%	100%	0%		99.3%	100%	99.4%	100%	100%		99.5%	99%	99%	100%	0%		99.2%	100%	98.7%	100%	0%		98.9%	-
Single-Unit Trucks	0	0	0	0		0	0	3	0	0		3	1	1	0	0		2	0	1	0	0		1	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	1%	0.3%	0%	0%		0.3%	0%	0.2%	0%	0%		0.1%	-
Buses	0	3	0	0		3	0	4	0	0		4	0	3	0	0		3	0	7	0	0		7	-
Buses %	0%	0.8%	0%	0%		0.5%	0%	0.3%	0%	0%		0.2%	0%	0.8%	0%	0%		0.5%	0%	1.2%	0%	0%		1%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	17	-	-	-	-	-	11	-	-	-	-	-	20	-	-
Pedestrians%	-	-	-	-	22.2%		-	-	-	-	21%		-	-	-	-	13.6%		-	-	-	-	24.7%		-
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	5	-	-
Bicycles on Crosswalk%	-	-	-	-	4.9%		-	-	-	-	1.2%		-	-	-	-	6.2%		-	-	-	-	6.2%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (15.02 °C)

	Bicycles on Crosswalk	Pedestrians
N	1	9
S	0	12
E	0	6
W	0	12

Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	19
S	0	20
E	0	21
W	0	26

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (24.34 °C)

	Bicycles on Crosswalk	Pedestrians
N	4	18
S	5	11
E	1	17
W	5	20

Turning Movement Count (17 . GLEN ERIN RD & BURNHAMTHORPE RD)

Start Time	N Approach GLEN ERIN RD						E Approach BURNHAMTHORPE RD						S Approach GLEN ERIN RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	4	47	24	0	0	75	6	40	42	0	0	88	61	15	5	0	1	81	18	163	7	0	0	188	432	
07:15:00	13	75	41	0	1	129	12	63	42	0	0	117	49	32	6	0	1	87	20	176	10	0	3	206	539	
07:30:00	12	112	43	0	2	167	42	79	39	0	4	160	63	72	8	1	0	144	25	198	20	0	0	243	714	
07:45:00	14	161	53	0	5	228	49	109	55	0	10	213	49	71	14	0	5	134	73	184	40	0	4	297	872	2557
08:00:00	16	186	38	0	3	240	50	97	40	0	7	187	50	90	16	1	4	157	65	148	35	0	8	248	832	2957
08:15:00	24	226	47	0	3	297	33	82	37	0	2	152	48	91	6	3	3	148	60	148	39	0	13	247	844	3262
08:30:00	30	195	48	0	1	273	40	108	32	1	2	181	54	102	14	1	4	171	54	155	32	1	2	242	867	3415
08:45:00	21	232	75	0	1	328	33	120	50	0	2	203	32	92	16	0	3	140	42	152	21	0	1	215	886	3429
09:00:00	12	74	34	0	1	120	53	85	54	1	1	193	40	45	6	0	1	91	30	174	20	0	2	224	628	3225
09:15:00	8	56	33	0	0	97	38	76	41	1	1	156	44	52	9	0	1	105	20	141	11	0	1	172	530	2911
09:30:00	10	72	23	0	1	105	22	83	50	0	1	155	50	46	15	3	1	114	20	110	8	0	1	138	512	2556
09:45:00	9	81	37	0	1	127	21	84	59	0	2	164	66	54	19	0	3	139	31	123	7	0	4	161	591	2261
BREAK																										
11:00:00	12	53	27	0	2	92	24	79	33	0	2	136	52	50	13	0	5	115	14	108	10	0	1	132	475	
11:15:00	20	65	20	0	1	105	25	102	34	0	3	161	44	48	13	0	4	105	12	109	5	0	2	126	497	
11:30:00	11	72	38	0	0	121	25	97	35	0	1	157	47	67	15	0	3	129	15	108	10	0	7	133	540	
11:45:00	12	68	16	0	5	96	38	112	41	0	2	191	51	58	12	0	3	121	19	113	7	0	3	139	547	2059
12:00:00	14	69	28	0	2	111	16	115	49	0	1	180	46	71	18	1	1	136	27	104	10	0	1	141	568	2152
12:15:00	12	65	24	0	1	101	23	96	37	0	2	156	55	73	18	0	2	146	15	102	13	0	1	130	533	2188
12:30:00	12	47	26	0	1	85	33	112	52	0	1	197	42	55	21	0	1	118	16	123	10	0	0	149	549	2197
12:45:00	11	71	30	0	0	112	32	104	56	0	2	192	42	72	8	0	3	122	21	126	11	0	1	158	584	2234
13:00:00	9	75	38	0	2	122	31	95	52	0	2	178	38	70	12	0	1	120	22	92	9	0	2	123	543	2209
13:15:00	13	70	26	1	10	110	23	115	53	0	2	191	47	68	15	0	2	130	19	112	11	0	3	142	573	2249
13:30:00	9	67	25	0	7	101	15	100	49	0	4	164	47	49	12	1	1	109	10	88	7	0	1	105	479	2179
13:45:00	10	53	30	0	2	93	36	118	63	0	4	217	54	75	15	0	4	144	18	100	8	0	3	126	580	2175
BREAK																										
16:00:00	17	71	34	1	4	123	63	196	30	0	6	289	53	130	34	0	2	217	17	125	11	1	2	154	783	
16:15:00	22	106	20	0	1	148	64	208	48	0	2	320	49	147	21	0	4	217	20	138	18	0	2	176	861	
16:30:00	27	94	35	0	0	156	39	224	61	1	5	325	42	152	20	0	1	214	25	133	23	0	3	181	876	
16:45:00	28	114	35	0	6	177	54	207	50	0	3	311	41	153	22	0	0	216	27	135	22	0	1	184	888	3408
17:00:00	20	137	26	0	5	183	55	218	58	0	1	331	72	208	35	0	5	315	18	116	18	0	7	152	981	3606

17:15:00	34	115	36	0	8	185	84	230	72	0	3	386	64	170	19	0	5	253	30	177	18	0	5	225	1049	3794
17:30:00	23	143	49	0	4	215	65	184	54	0	5	303	57	180	31	1	4	269	28	158	26	0	2	212	999	3917
17:45:00	33	129	39	0	2	201	81	156	53	1	1	291	45	168	18	0	3	231	24	125	23	0	4	172	895	3924
18:00:00	28	99	37	0	2	164	74	177	56	0	2	307	59	133	28	0	6	220	20	141	24	0	2	185	876	3819
18:15:00	20	106	43	0	8	169	75	164	56	0	1	295	55	141	37	0	0	233	19	120	15	0	2	154	851	3621
18:30:00	31	92	34	0	3	157	60	170	45	0	5	275	41	76	13	0	2	130	21	123	15	0	0	159	721	3343
18:45:00	31	91	23	0	5	145	45	129	49	0	1	223	35	118	21	0	6	174	25	115	22	0	4	162	704	3152
Grand Total	632	3590	1235	2	100	5458	1479	4534	1727	5	93	7745	1784	3294	605	12	95	5695	940	4763	596	2	98	6301	**25199**	-
Approach%	11.6%	65.8%	22.6%	0%		-	19.1%	58.5%	22.3%	0.1%		-	31.3%	57.8%	10.6%	0.2%		-	14.9%	75.6%	9.5%	0%		-	-	-
Totals %	2.5%	14.2%	4.9%	0%		21.7%	5.9%	18%	6.9%	0%		30.7%	7.1%	13.1%	2.4%	0%		22.6%	3.7%	18.9%	2.4%	0%		25%	-	-
Heavy	7	41	49	0		-	48	128	36	0		-	65	41	11	0		-	14	102	6	0		-	-	-
Heavy %	1.1%	1.1%	4%	0%		-	3.2%	2.8%	2.1%	0%		-	3.6%	1.2%	1.8%	0%		-	1.5%	2.1%	1%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)

Start Time	N Approach GLEN ERIN RD						E Approach BURNHAMTHORPE RD						S Approach GLEN ERIN RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	16	186	38	0	3	240	50	97	40	0	7	187	50	90	16	1	4	157	65	148	35	0	8	248	832
08:15:00	24	226	47	0	3	297	33	82	37	0	2	152	48	91	6	3	3	148	60	148	39	0	13	247	844
08:30:00	30	195	48	0	1	273	40	108	32	1	2	181	54	102	14	1	4	171	54	155	32	1	2	242	867
08:45:00	21	232	75	0	1	328	33	120	50	0	2	203	32	92	16	0	3	140	42	152	21	0	1	215	886
Grand Total	91	839	208	0	8	1138	156	407	159	1	13	723	184	375	52	5	14	616	221	603	127	1	24	952	**3429**
Approach%	8%	73.7%	18.3%	0%		-	21.6%	56.3%	22%	0.1%		-	29.9%	60.9%	8.4%	0.8%		-	23.2%	63.3%	13.3%	0.1%		-	-
Totals %	2.7%	24.5%	6.1%	0%		33.2%	4.5%	11.9%	4.6%	0%		21.1%	5.4%	10.9%	1.5%	0.1%		18%	6.4%	17.6%	3.7%	0%		27.8%	-
PHF	0.76	0.9	0.69	0		0.87	0.78	0.85	0.8	0.25		0.89	0.85	0.92	0.81	0.42		0.9	0.85	0.97	0.81	0.25		0.96	-
Heavy	4	16	7	0		27	9	22	3	0		34	7	8	4	0		19	3	14	1	0		18	-
Heavy %	4.4%	1.9%	3.4%	0%		2.4%	5.8%	5.4%	1.9%	0%		4.7%	3.8%	2.1%	7.7%	0%		3.1%	1.4%	2.3%	0.8%	0%		1.9%	-
Lights	87	823	201	0		1111	147	384	156	1		688	177	367	48	5		597	218	589	126	1		934	-
Lights %	95.6%	98.1%	96.6%	0%		97.6%	94.2%	94.3%	98.1%	100%		95.2%	96.2%	97.9%	92.3%	100%		96.9%	98.6%	97.7%	99.2%	100%		98.1%	-
Single-Unit Trucks	0	4	1	0		5	2	4	2	0		8	1	1	0	0		2	1	7	0	0		8	-
Single-Unit Trucks %	0%	0.5%	0.5%	0%		0.4%	1.3%	1%	1.3%	0%		1.1%	0.5%	0.3%	0%	0%		0.3%	0.5%	1.2%	0%	0%		0.8%	-
Buses	4	11	6	0		21	6	18	1	0		25	6	7	4	0		17	2	5	1	0		8	-
Buses %	4.4%	1.3%	2.9%	0%		1.8%	3.8%	4.4%	0.6%	0%		3.5%	3.3%	1.9%	7.7%	0%		2.8%	0.9%	0.8%	0.8%	0%		0.8%	-
Articulated Trucks	0	1	0	0		1	1	0	0	0		1	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0.1%	0%	0%		0.1%	0.6%	0%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	11	-	-	-	-	-	11	-	-	-	-	-	22	-	-
Pedestrians%	-	-	-	-	13.6%		-	-	-	-	18.6%		-	-	-	-	18.6%		-	-	-	-	37.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3.4%		-	-	-	-	5.1%		-	-	-	-	3.4%		-

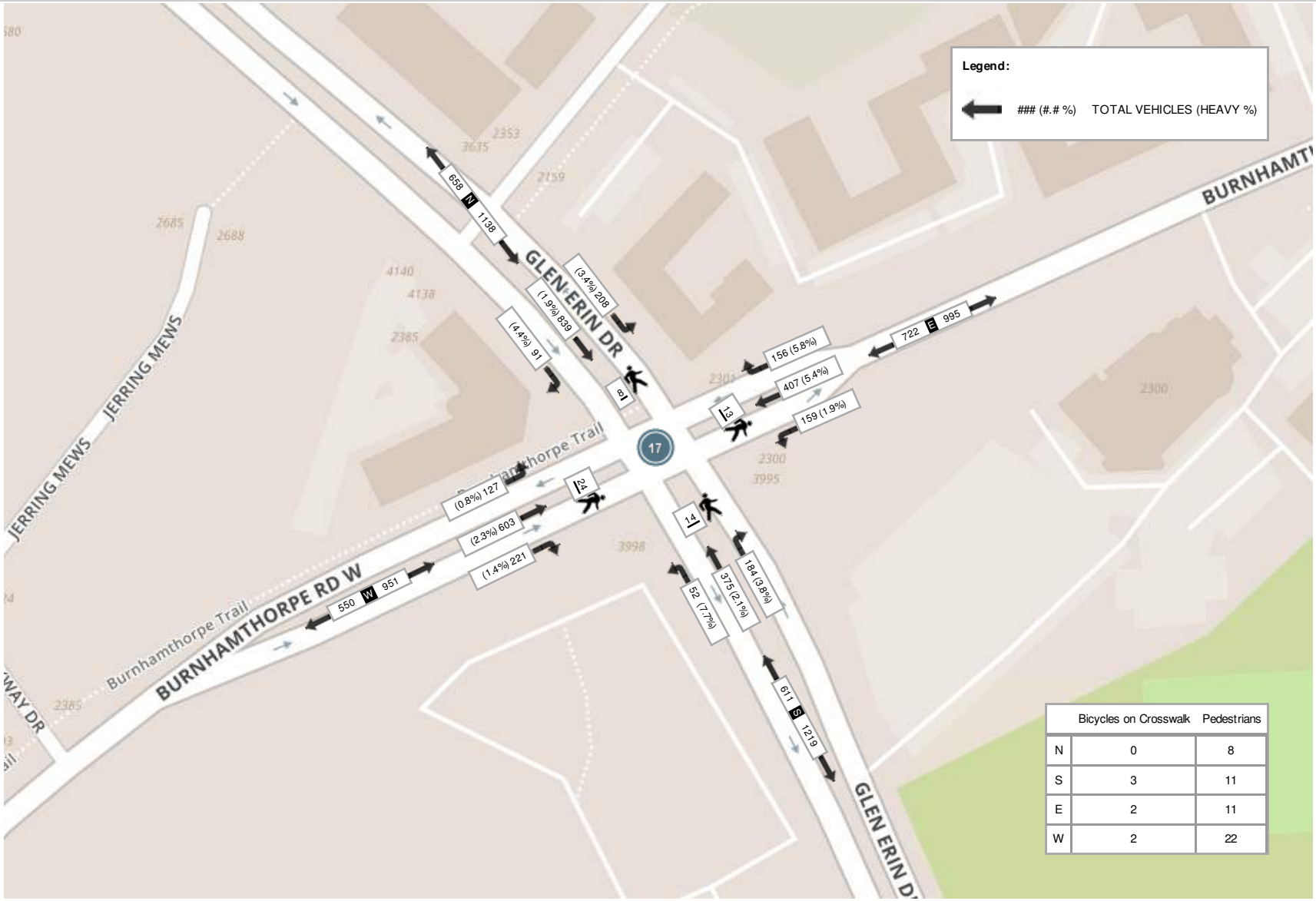
Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach GLEN ERIN RD						E Approach BURNHAMTHORPE RD						S Approach GLEN ERIN RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:30:00	12	47	26	0	1	85	33	112	52	0	1	197	42	55	21	0	1	118	16	123	10	0	0	149	549
12:45:00	11	71	30	0	0	112	32	104	56	0	2	192	42	72	8	0	3	122	21	126	11	0	1	158	584
13:00:00	9	75	38	0	2	122	31	95	52	0	2	178	38	70	12	0	1	120	22	92	9	0	2	123	543
13:15:00	13	70	26	1	10	110	23	115	53	0	2	191	47	68	15	0	2	130	19	112	11	0	3	142	573
Grand Total	45	263	120	1	13	429	119	426	213	0	7	758	169	265	56	0	7	490	78	453	41	0	6	572	**2249**
Approach%	10.5%	61.3%	28%	0.2%		-	15.7%	56.2%	28.1%	0%		-	34.5%	54.1%	11.4%	0%		-	13.6%	79.2%	7.2%	0%		-	-
Totals %	2%	11.7%	5.3%	0%		19.1%	5.3%	18.9%	9.5%	0%		33.7%	7.5%	11.8%	2.5%	0%		21.8%	3.5%	20.1%	1.8%	0%		25.4%	-
PHF	0.87	0.88	0.79	0.25		0.88	0.9	0.93	0.95	0		0.96	0.9	0.92	0.67	0		0.94	0.89	0.9	0.93	0		0.91	-
Heavy	0	1	5	0		6	4	10	8	0		22	7	3	0	0		10	1	15	0	0		16	-
Heavy %	0%	0.4%	4.2%	0%		1.4%	3.4%	2.3%	3.8%	0%		2.9%	4.1%	1.1%	0%	0%		2%	1.3%	3.3%	0%	0%		2.8%	-
Lights	45	262	114	1		422	114	416	205	0		735	161	262	56	0		479	77	438	41	0		556	-
Lights %	100%	99.6%	95%	100%		98.4%	95.8%	97.7%	96.2%	0%		97%	95.3%	98.9%	100%	0%		97.8%	98.7%	96.7%	100%	0%		97.2%	-
Single-Unit Trucks	0	1	3	0		4	0	6	6	0		12	2	3	0	0		5	1	11	0	0		12	-
Single-Unit Trucks %	0%	0.4%	2.5%	0%		0.9%	0%	1.4%	2.8%	0%		1.6%	1.2%	1.1%	0%	0%		1%	1.3%	2.4%	0%	0%		2.1%	-
Buses	0	0	2	0		2	4	4	0	0		8	5	0	0	0		5	0	3	0	0		3	-
Buses %	0%	0%	1.7%	0%		0.5%	3.4%	0.9%	0%	0%		1.1%	3%	0%	0%	0%		1%	0%	0.7%	0%	0%		0.5%	-
Articulated Trucks	0	0	0	0		0	0	0	2	0		2	0	0	0	0		0	0	1	0	0		1	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0.9%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	-
Bicycles on Road	0	0	1	0		1	1	0	0	0		1	1	0	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0.8%	0%		0.2%	0.8%	0%	0%	0%		0.1%	0.6%	0%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	7	-	-	-	-	-	4	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	27.3%		-	-	-	-	21.2%		-	-	-	-	12.1%		-	-	-	-	9.1%		-
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-
Bicycles on Crosswalk%	-	-	-	-	12.1%		-	-	-	-	0%		-	-	-	-	9.1%		-	-	-	-	9.1%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)

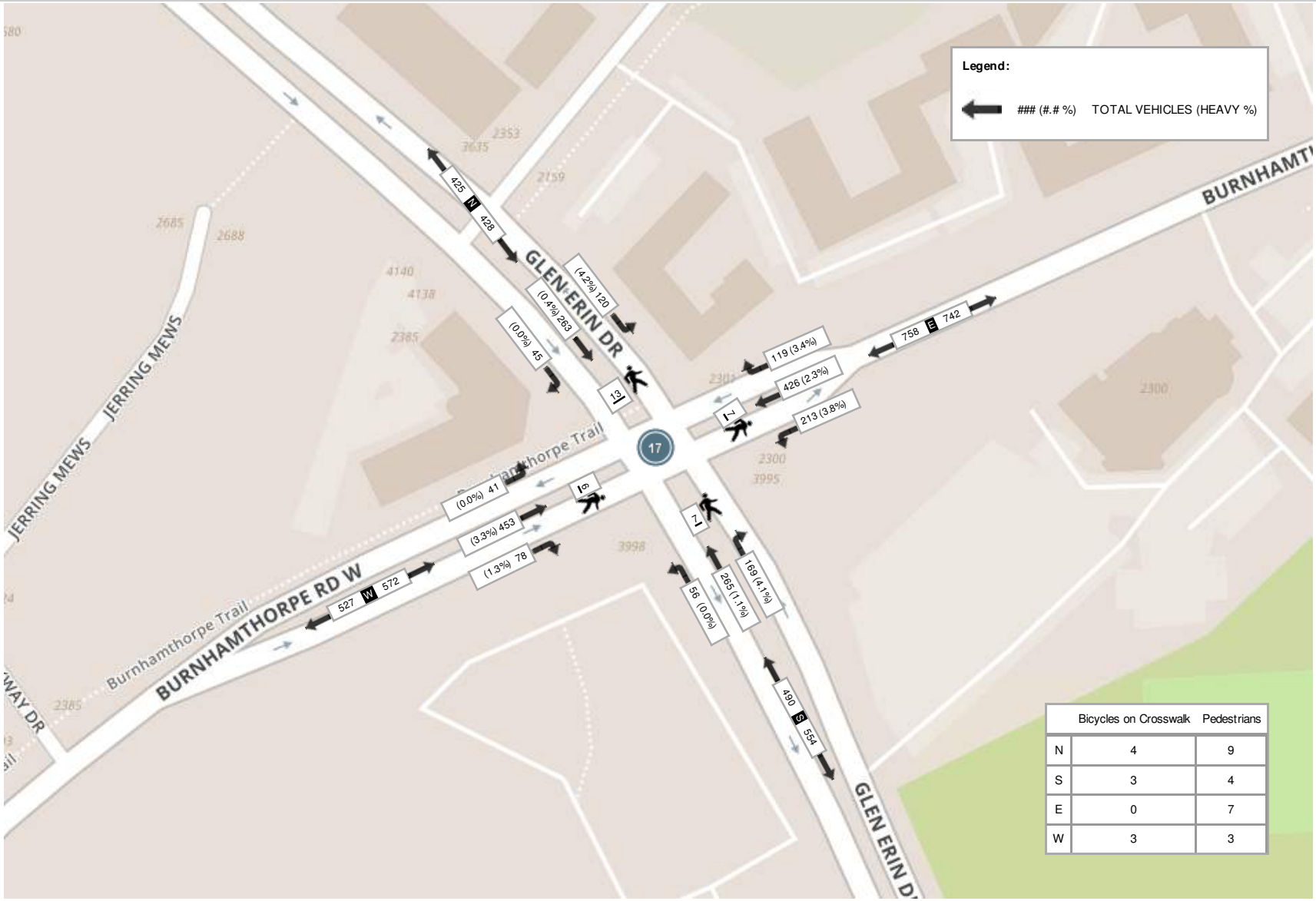
Start Time	N Approach GLEN ERIN RD						E Approach BURNHAMTHORPE RD						S Approach GLEN ERIN RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	20	137	26	0	5	183	55	218	58	0	1	331	72	208	35	0	5	315	18	116	18	0	7	152	981
17:15:00	34	115	36	0	8	185	84	230	72	0	3	386	64	170	19	0	5	253	30	177	18	0	5	225	1049
17:30:00	23	143	49	0	4	215	65	184	54	0	5	303	57	180	31	1	4	269	28	158	26	0	2	212	999
17:45:00	33	129	39	0	2	201	81	156	53	1	1	291	45	168	18	0	3	231	24	125	23	0	4	172	895
Grand Total	110	524	150	0	19	784	285	788	237	1	10	1311	238	726	103	1	17	1068	100	576	85	0	18	761	**3924**
Approach%	14%	66.8%	19.1%	0%		-	21.7%	60.1%	18.1%	0.1%		-	22.3%	68%	9.6%	0.1%		-	13.1%	75.7%	11.2%	0%		-	-
Totals %	2.8%	13.4%	3.8%	0%		20%	7.3%	20.1%	6%	0%		33.4%	6.1%	18.5%	2.6%	0%		27.2%	2.5%	14.7%	2.2%	0%		19.4%	-
PHF	0.81	0.92	0.77	0		0.91	0.85	0.86	0.82	0.25		0.85	0.83	0.87	0.74	0.25		0.85	0.83	0.81	0.82	0		0.85	-
Heavy	0	0	3	0		3	3	6	0	0		9	7	3	0	0		10	1	2	0	0		3	-
Heavy %	0%	0%	2%	0%		0.4%	1.1%	0.8%	0%	0%		0.7%	2.9%	0.4%	0%	0%		0.9%	1%	0.3%	0%	0%		0.4%	-
Lights	110	524	147	0		781	282	781	237	1		1301	231	722	103	1		1057	99	573	85	0		757	-
Lights %	100%	100%	98%	0%		99.6%	98.9%	99.1%	100%	100%		99.2%	97.1%	99.4%	100%	100%		99%	99%	99.5%	100%	0%		99.5%	-
Single-Unit Trucks	0	0	0	0		0	0	2	0	0		2	3	3	0	0		6	1	2	0	0		3	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	1.3%	0.4%	0%	0%		0.6%	1%	0.3%	0%	0%		0.4%	-
Buses	0	0	3	0		3	3	4	0	0		7	4	0	0	0		4	0	0	0	0		0	-
Buses %	0%	0%	2%	0%		0.4%	1.1%	0.5%	0%	0%		0.5%	1.7%	0%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	0%	0.1%	0%	0%		0.1%	0%	0.2%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	9	-	-	-	-	-	13	-	-	-	-	-	17	-	-
Pedestrians%	-	-	-	-	21.9%		-	-	-	-	14.1%		-	-	-	-	20.3%		-	-	-	-	26.6%		-
Bicycles on Crosswalk	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	7.8%		-	-	-	-	1.6%		-	-	-	-	6.3%		-	-	-	-	1.6%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)



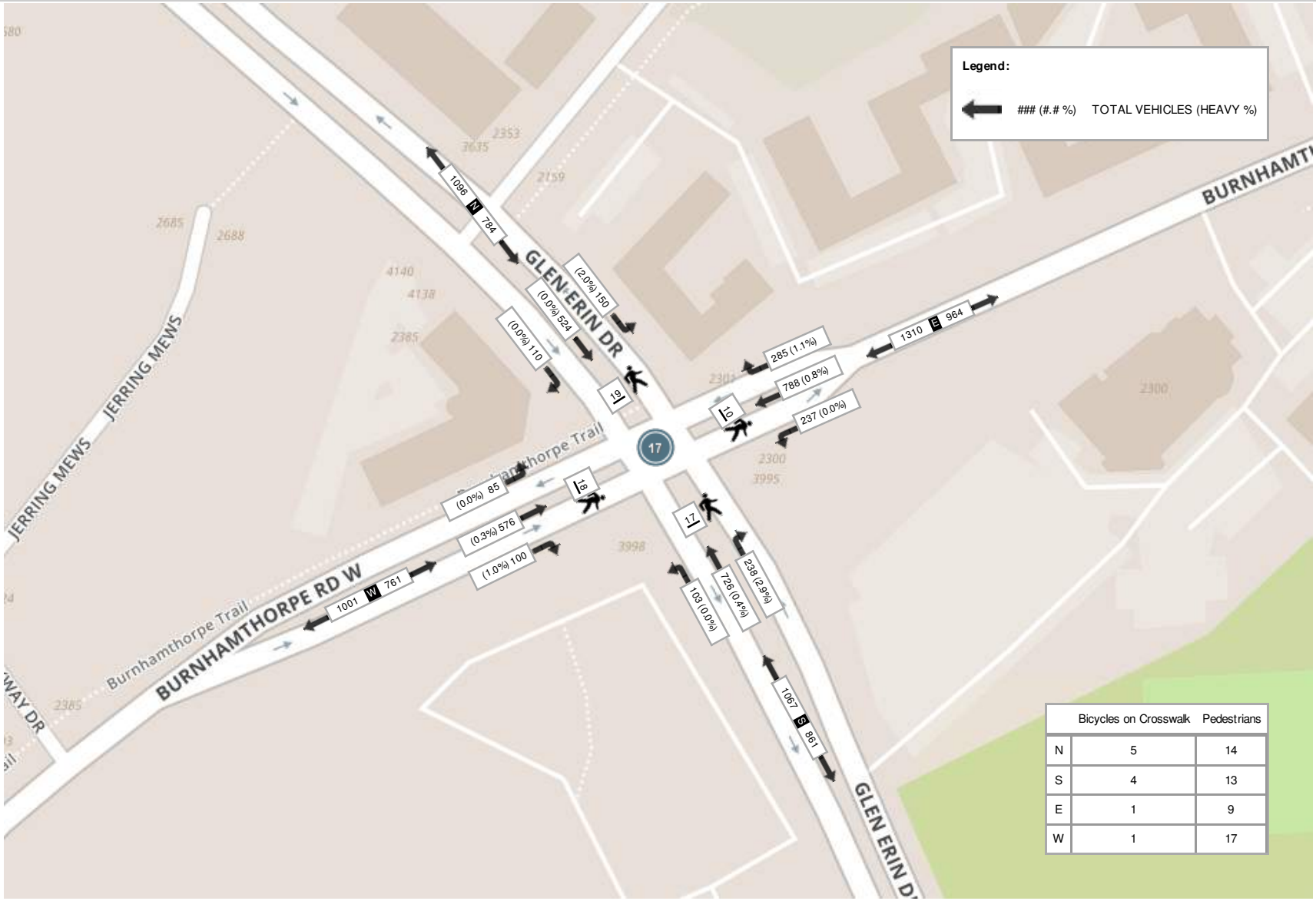
	Bicycles on Crosswalk	Pedestrians
N	0	8
S	3	11
E	2	11
W	2	22

Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	4	9
S	3	4
E	0	7
W	3	3

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	5	14
S	4	13
E	1	9
W	1	17

Turning Movement Count (5 . MISSISSAUGA RD & ARGENTIA RD) CustID: 00111131 MioID: 669914

Start Time	N Approach MISSISSAUGA RD						E Approach ARGENTIA RD						S Approach MISSISSAUGA RD						W Approach ARGENTIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	69	360	130	5	2	564	26	31	17	0	1	74	42	272	6	0	1	320	6	44	41	0	1	91	1049	
07:15:00	87	372	115	2	6	576	62	34	27	0	1	123	59	374	17	0	7	450	4	58	40	0	7	102	1251	
07:30:00	130	314	144	2	11	590	65	28	22	0	1	115	41	554	15	0	4	610	10	60	55	0	5	125	1440	
07:45:00	151	412	166	9	1	738	66	63	29	0	3	158	58	497	21	0	2	576	6	46	53	0	3	105	1577	5317
08:00:00	150	326	146	3	1	625	86	56	55	0	4	197	58	494	22	0	15	574	5	72	69	0	13	146	1542	5810
08:15:00	167	345	179	4	0	695	49	42	29	0	2	120	63	530	22	0	0	615	11	52	64	0	6	127	1557	6116
08:30:00	185	391	178	4	5	758	63	60	38	0	6	161	64	446	23	0	10	533	12	73	71	1	6	157	1609	6285
08:45:00	199	314	151	6	4	670	56	55	32	0	4	143	68	506	25	0	6	599	7	57	56	0	3	120	1532	6240
09:00:00	168	344	162	7	3	681	65	42	38	0	0	145	58	415	24	0	2	497	6	47	36	0	4	89	1412	6110
09:15:00	128	299	111	6	1	544	62	50	36	0	1	148	44	330	13	0	6	387	8	55	50	0	4	113	1192	5745
09:30:00	98	236	117	2	1	453	46	41	41	0	0	128	37	281	23	0	0	341	9	42	58	0	1	109	1031	5167
09:45:00	80	266	73	4	1	423	55	30	22	0	12	107	26	296	12	0	1	334	6	21	38	0	1	65	929	4564
BREAK																										
11:00:00	36	238	71	2	0	347	56	3	24	0	0	83	22	274	11	0	3	307	16	19	32	0	0	67	804	
11:15:00	31	260	54	3	0	348	57	24	25	0	1	106	19	252	7	0	0	278	12	23	33	0	0	68	800	
11:30:00	38	273	47	3	0	361	60	40	37	0	0	137	24	247	7	0	0	278	14	27	31	1	0	73	849	
11:45:00	41	289	59	1	2	390	63	31	49	0	2	143	20	259	18	0	1	297	19	35	30	0	1	84	914	3367
12:00:00	45	290	39	3	7	377	84	64	64	0	5	212	21	229	12	0	0	262	16	35	70	0	1	121	972	3535
12:15:00	25	201	63	1	3	290	88	27	31	0	3	146	36	267	16	1	1	320	19	47	41	1	1	108	864	3599
12:30:00	25	229	63	2	1	319	82	39	39	0	3	160	40	249	18	1	3	308	21	28	46	0	0	95	882	3632
12:45:00	32	235	68	3	4	338	68	46	37	0	3	151	59	264	22	1	2	346	20	45	46	0	1	111	946	3664
13:00:00	23	225	75	0	3	323	87	24	42	0	4	153	42	312	18	0	3	372	14	39	44	0	0	97	945	3637
13:15:00	42	266	80	2	7	390	49	37	37	0	2	123	44	281	8	0	5	333	16	40	46	0	2	102	948	3721
13:30:00	36	211	52	1	3	300	71	29	35	0	0	135	38	304	14	0	0	356	9	43	46	0	0	98	889	3728
13:45:00	34	261	72	3	0	370	57	29	25	0	4	111	44	288	16	0	2	348	10	39	33	0	0	82	911	3693
BREAK																										
16:00:00	33	438	57	3	2	531	170	74	77	0	5	321	23	386	9	0	0	418	18	40	117	0	3	175	1445	
16:15:00	30	408	55	4	2	497	166	81	79	0	6	326	27	318	7	0	7	352	20	45	110	0	0	175	1350	
16:30:00	30	452	62	4	7	548	189	79	102	0	8	370	26	383	8	1	2	418	21	46	134	0	1	201	1537	
16:45:00	41	521	79	5	15	646	171	76	97	0	12	344	25	335	15	1	4	376	15	46	133	0	1	194	1560	5892
17:00:00	31	489	69	0	14	589	187	99	92	0	8	378	26	365	7	0	1	398	30	93	133	0	13	256	1621	6068

17:15:00	45	542	97	2	5	686	195	70	94	0	10	359	26	394	8	0	2	428	22	58	117	0	0	197	1670	6388
17:30:00	45	501	100	1	5	647	136	73	81	0	11	290	28	305	12	0	8	345	20	47	111	0	0	178	1460	6311
17:45:00	37	409	61	1	2	508	106	58	73	0	4	237	45	315	9	0	1	369	26	53	81	0	2	160	1274	6025
18:00:00	32	494	75	7	3	608	112	48	62	0	5	222	25	386	26	0	4	437	14	47	83	0	1	144	1411	5815
18:15:00	29	415	52	3	0	499	72	52	65	0	1	189	28	315	15	1	3	359	18	56	82	1	1	157	1204	5349
18:30:00	22	327	37	3	2	389	80	39	57	0	2	176	26	342	13	0	4	381	17	35	65	0	0	117	1063	4952
18:45:00	30	383	58	4	3	475	69	37	36	0	1	142	20	312	10	0	10	342	17	57	69	0	14	143	1102	4780
Grand Total	2425	12336	3217	115	126	18093	3176	1711	1746	0	135	6633	1352	12377	529	6	120	14264	514	1670	2364	4	96	4552	**43542**	-
Approach%	13.4%	68.2%	17.8%	0.6%		-	47.9%	25.8%	26.3%	0%		-	9.5%	86.8%	3.7%	0%		-	11.3%	36.7%	51.9%	0.1%		-	-	-
Totals %	5.6%	28.3%	7.4%	0.3%		41.6%	7.3%	3.9%	4%	0%		15.2%	3.1%	28.4%	1.2%	0%		32.8%	1.2%	3.8%	5.4%	0%		10.5%	-	-
Heavy	61	856	137	0		-	127	83	48	0		-	30	907	8	1		-	15	101	66	0		-	-	-
Heavy %	2.5%	6.9%	4.3%	0%		-	4%	4.9%	2.7%	0%		-	2.2%	7.3%	1.5%	16.7%		-	2.9%	6%	2.8%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (15.02 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach ARGENTIA RD						S Approach MISSISSAUGA RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	151	412	166	9	1	738	66	63	29	0	3	158	58	497	21	0	2	576	6	46	53	0	3	105	1577
08:00:00	150	326	146	3	1	625	86	56	55	0	4	197	58	494	22	0	15	574	5	72	69	0	13	146	1542
08:15:00	167	345	179	4	0	695	49	42	29	0	2	120	63	530	22	0	0	615	11	52	64	0	6	127	1557
08:30:00	185	391	178	4	5	758	63	60	38	0	6	161	64	446	23	0	10	533	12	73	71	1	6	157	1609
Grand Total	653	1474	669	20	7	2816	264	221	151	0	15	636	243	1967	88	0	27	2298	34	243	257	1	28	535	**6285**
Approach%	23.2%	52.3%	23.8%	0.7%		-	41.5%	34.7%	23.7%	0%		-	10.6%	85.6%	3.8%	0%		-	6.4%	45.4%	48%	0.2%		-	-
Totals %	10.4%	23.5%	10.6%	0.3%		44.8%	4.2%	3.5%	2.4%	0%		10.1%	3.9%	31.3%	1.4%	0%		36.6%	0.5%	3.9%	4.1%	0%		8.5%	-
PHF	0.88	0.89	0.93	0.56		0.93	0.77	0.88	0.69	0		0.81	0.95	0.93	0.96	0		0.93	0.71	0.83	0.9	0.25		0.85	-
Heavy	6	99	13	0		118	21	9	4	0		34	2	78	0	0		80	1	12	12	0		25	-
Heavy %	0.9%	6.7%	1.9%	0%		4.2%	8%	4.1%	2.6%	0%		5.3%	0.8%	4%	0%	0%		3.5%	2.9%	4.9%	4.7%	0%		4.7%	-
Lights	647	1375	656	20		2698	243	211	147	0		601	241	1889	88	0		2218	33	231	245	1		510	-
Lights %	99.1%	93.3%	98.1%	100%		95.8%	92%	95.5%	97.4%	0%		94.5%	99.2%	96%	100%	0%		96.5%	97.1%	95.1%	95.3%	100%		95.3%	-
Single-Unit Trucks	1	40	8	0		49	16	0	3	0		19	1	45	0	0		46	1	1	7	0		9	-
Single-Unit Trucks %	0.2%	2.7%	1.2%	0%		1.7%	6.1%	0%	2%	0%		3%	0.4%	2.3%	0%	0%		2%	2.9%	0.4%	2.7%	0%		1.7%	-
Buses	3	18	0	0		21	0	9	0	0		9	0	10	0	0		10	0	11	2	0		13	-
Buses %	0.5%	1.2%	0%	0%		0.7%	0%	4.1%	0%	0%		1.4%	0%	0.5%	0%	0%		0.4%	0%	4.5%	0.8%	0%		2.4%	-
Articulated Trucks	2	41	5	0		48	5	0	1	0		6	1	23	0	0		24	0	0	3	0		3	-
Articulated Trucks %	0.3%	2.8%	0.7%	0%		1.7%	1.9%	0%	0.7%	0%		0.9%	0.4%	1.2%	0%	0%		1%	0%	0%	1.2%	0%		0.6%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	14	-	-	-	-	-	26	-	-	-	-	-	28	-	-
Pedestrians%	-	-	-	-	7.8%		-	-	-	-	18.2%		-	-	-	-	33.8%		-	-	-	-	36.4%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	1.3%		-	-	-	-	1.3%		-	-	-	-	1.3%		-	-	-	-	0%		-

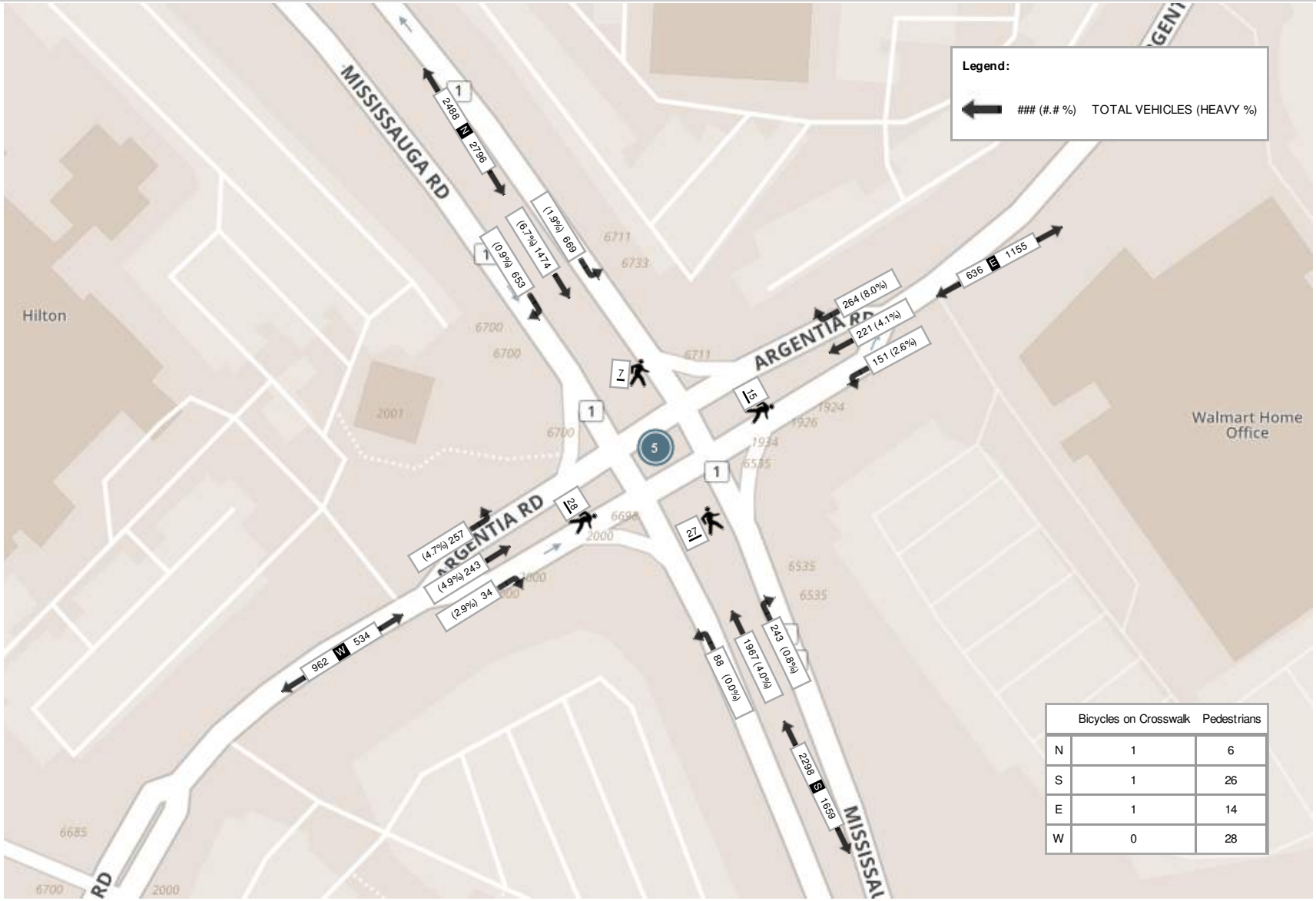
Peak Hour: 12:45 PM - 01:45 PM Weather: Broken Clouds (21.3 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach ARGENTIA RD						S Approach MISSISSAUGA RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:45:00	32	235	68	3	4	338	68	46	37	0	3	151	59	264	22	1	2	346	20	45	46	0	1	111	946
13:00:00	23	225	75	0	3	323	87	24	42	0	4	153	42	312	18	0	3	372	14	39	44	0	0	97	945
13:15:00	42	266	80	2	7	390	49	37	37	0	2	123	44	281	8	0	5	333	16	40	46	0	2	102	948
13:30:00	36	211	52	1	3	300	71	29	35	0	0	135	38	304	14	0	0	356	9	43	46	0	0	98	889
Grand Total	133	937	275	6	17	1351	275	136	151	0	9	562	183	1161	62	1	10	1407	59	167	182	0	3	408	**3728**
Approach%	9.8%	69.4%	20.4%	0.4%		-	48.9%	24.2%	26.9%	0%		-	13%	82.5%	4.4%	0.1%		-	14.5%	40.9%	44.6%	0%		-	-
Totals %	3.6%	25.1%	7.4%	0.2%		36.2%	7.4%	3.6%	4.1%	0%		15.1%	4.9%	31.1%	1.7%	0%		37.7%	1.6%	4.5%	4.9%	0%		10.9%	-
PHF	0.79	0.88	0.86	0.5		0.87	0.79	0.74	0.9	0		0.92	0.78	0.93	0.7	0.25		0.95	0.74	0.93	0.99	0		0.92	-
Heavy	12	107	19	0		138	17	11	3	0		31	6	122	4	1		133	4	11	17	0		32	-
Heavy %	9%	11.4%	6.9%	0%		10.2%	6.2%	8.1%	2%	0%		5.5%	3.3%	10.5%	6.5%	100%		9.5%	6.8%	6.6%	9.3%	0%		7.8%	-
Lights	121	830	256	6		1213	258	125	148	0		531	177	1039	58	0		1274	55	155	165	0		375	-
Lights %	91%	88.6%	93.1%	100%		89.8%	93.8%	91.9%	98%	0%		94.5%	96.7%	89.5%	93.5%	0%		90.5%	93.2%	92.8%	90.7%	0%		91.9%	-
Single-Unit Trucks	10	47	12	0		69	11	6	2	0		19	4	53	2	1		60	3	3	8	0		14	-
Single-Unit Trucks %	7.5%	5%	4.4%	0%		5.1%	4%	4.4%	1.3%	0%		3.4%	2.2%	4.6%	3.2%	100%		4.3%	5.1%	1.8%	4.4%	0%		3.4%	-
Buses	0	10	1	0		11	0	5	0	0		5	1	15	0	0		16	0	7	3	0		10	-
Buses %	0%	1.1%	0.4%	0%		0.8%	0%	3.7%	0%	0%		0.9%	0.5%	1.3%	0%	0%		1.1%	0%	4.2%	1.6%	0%		2.5%	-
Articulated Trucks	2	50	6	0		58	6	0	1	0		7	1	54	2	0		57	1	1	6	0		8	-
Articulated Trucks %	1.5%	5.3%	2.2%	0%		4.3%	2.2%	0%	0.7%	0%		1.2%	0.5%	4.7%	3.2%	0%		4.1%	1.7%	0.6%	3.3%	0%		2%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	8	-	-	-	-	-	8	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	43.6%		-	-	-	-	20.5%		-	-	-	-	20.5%		-	-	-	-	7.7%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	2.6%		-	-	-	-	5.1%		-	-	-	-	0%		-

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (24.34 °C)

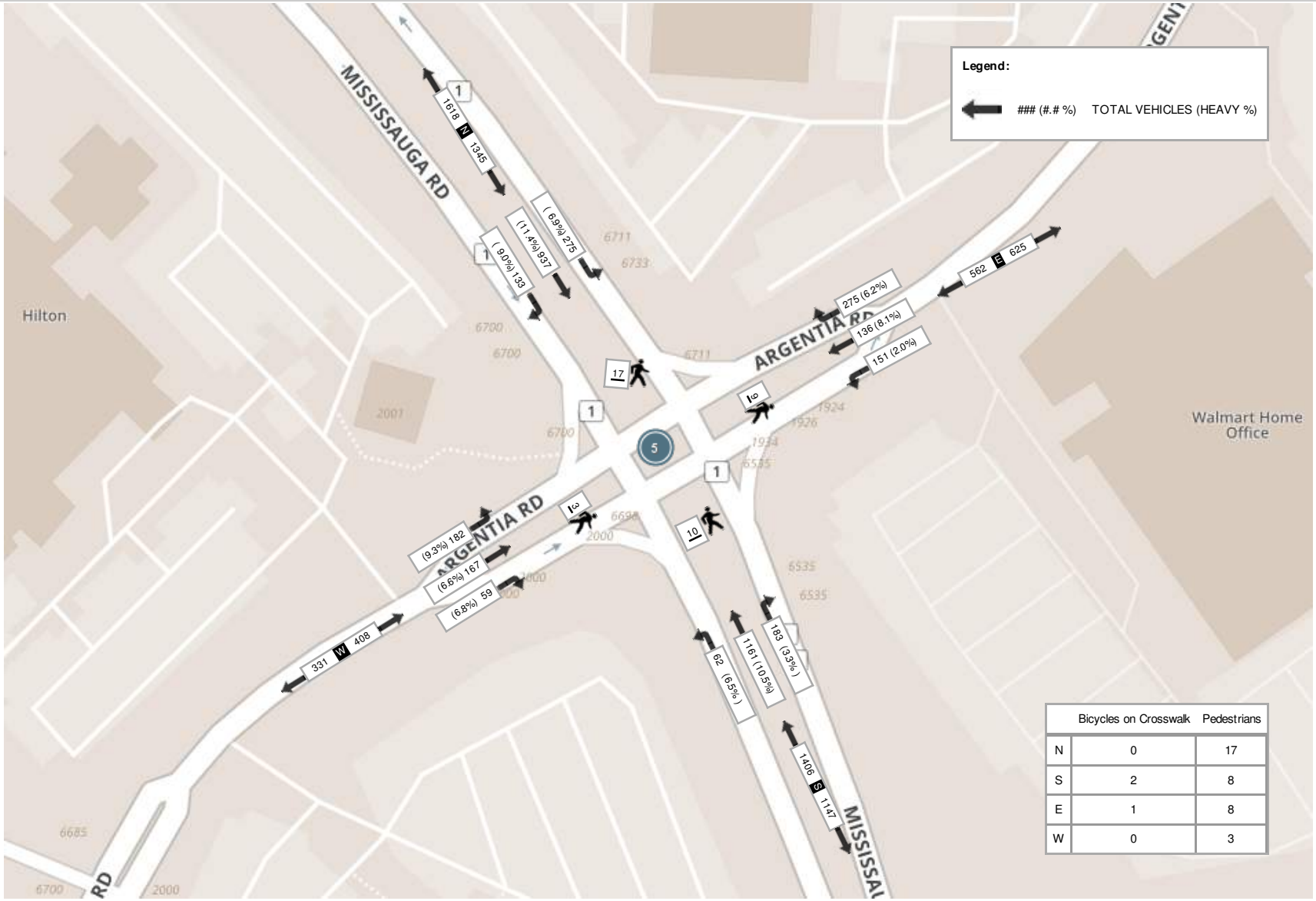
Start Time	N Approach MISSISSAUGA RD						E Approach ARGENTIA RD						S Approach MISSISSAUGA RD						W Approach ARGENTIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	30	452	62	4	7	548	189	79	102	0	8	370	26	383	8	1	2	418	21	46	134	0	1	201	1537
16:45:00	41	521	79	5	15	646	171	76	97	0	12	344	25	335	15	1	4	376	15	46	133	0	1	194	1560
17:00:00	31	489	69	0	14	589	187	99	92	0	8	378	26	365	7	0	1	398	30	93	133	0	13	256	1621
17:15:00	45	542	97	2	5	686	195	70	94	0	10	359	26	394	8	0	2	428	22	58	117	0	0	197	1670
Grand Total	147	2004	307	11	41	2469	742	324	385	0	38	1451	103	1477	38	2	9	1620	88	243	517	0	15	848	**6388**
Approach%	6%	81.2%	12.4%	0.4%		-	51.1%	22.3%	26.5%	0%		-	6.4%	91.2%	2.3%	0.1%		-	10.4%	28.7%	61%	0%		-	-
Totals %	2.3%	31.4%	4.8%	0.2%		38.7%	11.6%	5.1%	6%	0%		22.7%	1.6%	23.1%	0.6%	0%		25.4%	1.4%	3.8%	8.1%	0%		13.3%	-
PHF	0.82	0.92	0.79	0.55		0.9	0.95	0.82	0.94	0		0.96	0.99	0.94	0.63	0.5		0.95	0.73	0.65	0.96	0		0.83	-
Heavy	4	71	19	0		94	8	9	6	0		23	1	87	1	0		89	0	10	2	0		12	-
Heavy %	2.7%	3.5%	6.2%	0%		3.8%	1.1%	2.8%	1.6%	0%		1.6%	1%	5.9%	2.6%	0%		5.5%	0%	4.1%	0.4%	0%		1.4%	-
Lights	143	1933	288	11		2375	734	315	379	0		1428	102	1390	37	2		1531	88	233	515	0		836	-
Lights %	97.3%	96.5%	93.8%	100%		96.2%	98.9%	97.2%	98.4%	0%		98.4%	99%	94.1%	97.4%	100%		94.5%	100%	95.9%	99.6%	0%		98.6%	-
Single-Unit Trucks	1	27	12	0		40	6	1	5	0		12	0	38	1	0		39	0	3	1	0		4	-
Single-Unit Trucks %	0.7%	1.3%	3.9%	0%		1.6%	0.8%	0.3%	1.3%	0%		0.8%	0%	2.6%	2.6%	0%		2.4%	0%	1.2%	0.2%	0%		0.5%	-
Buses	1	9	1	0		11	0	8	0	0		8	1	7	0	0		8	0	7	0	0		7	-
Buses %	0.7%	0.4%	0.3%	0%		0.4%	0%	2.5%	0%	0%		0.6%	1%	0.5%	0%	0%		0.5%	0%	2.9%	0%	0%		0.8%	-
Articulated Trucks	2	35	6	0		43	2	0	1	0		3	0	42	0	0		42	0	0	1	0		1	-
Articulated Trucks %	1.4%	1.7%	2%	0%		1.7%	0.3%	0%	0.3%	0%		0.2%	0%	2.8%	0%	0%		2.6%	0%	0%	0.2%	0%		0.1%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	41	-	-	-	-	-	37	-	-	-	-	-	7	-	-	-	-	-	15	-	-
Pedestrians%	-	-	-	-	39.8%		-	-	-	-	35.9%		-	-	-	-	6.8%		-	-	-	-	14.6%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	1%		-	-	-	-	1.9%		-	-	-	-	0%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (15.02 °C)



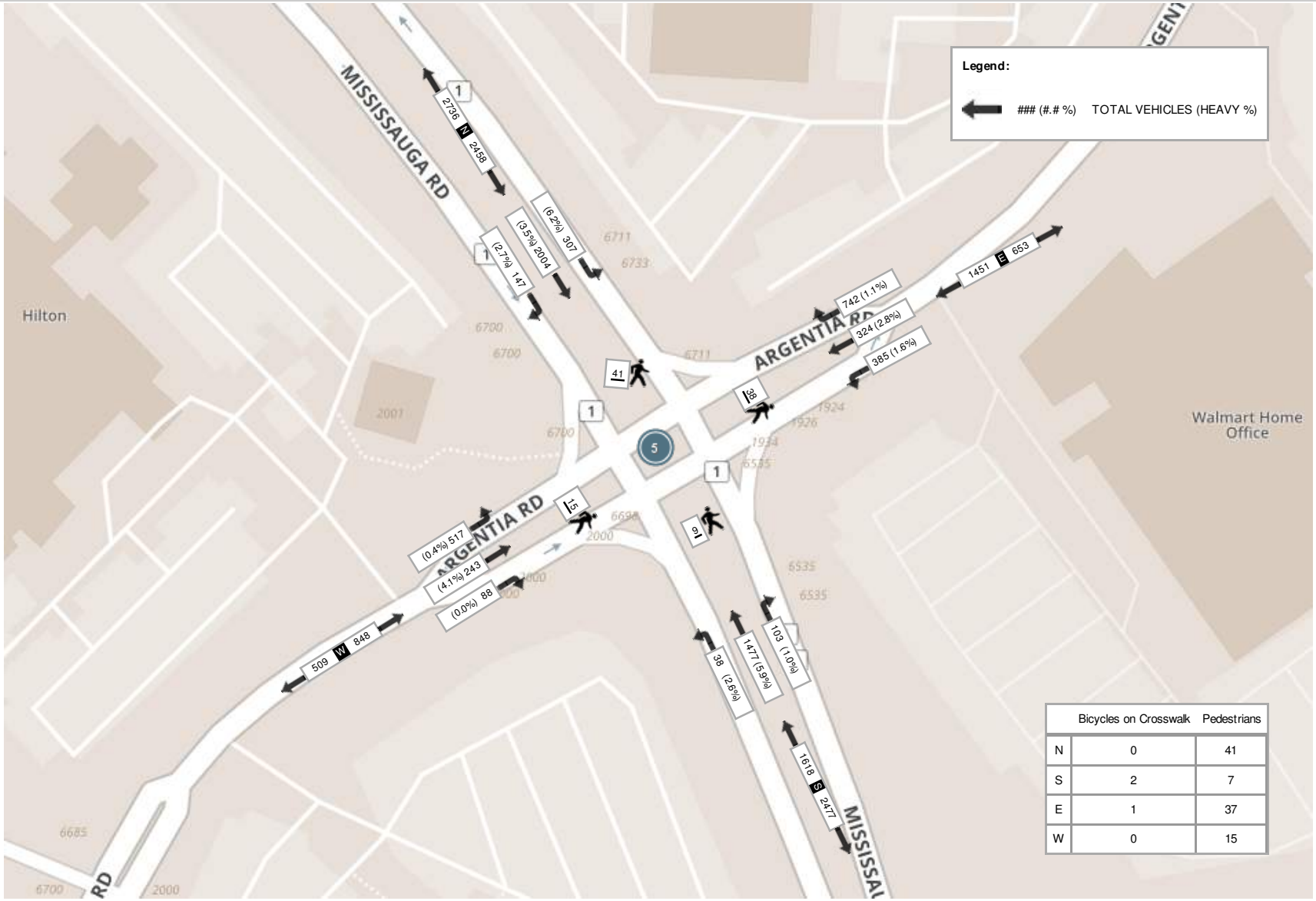
	Bicycles on Crosswalk	Pedestrians
N	1	6
S	1	26
E	1	14
W	0	28

Peak Hour: 12:45 PM - 01:45 PM Weather: Broken Clouds (21.3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	17
S	2	8
E	1	8
W	0	3

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (24.34 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	41
S	2	7
E	1	37
W	0	15

Turning Movement Count (13 . MISSISSAUGA RD & BARBERTOWN RD / ROTHERSAY CT)

Start Time	N Approach MISSISSAUGA RD						E Approach BARBERTOWN RD						S Approach MISSISSAUGA RD						W Approach ROTHERSAY CT						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	0	73	1	0	0	74	1	1	2	0	0	4	3	47	0	0	0	50	1	1	2	0	2	4	132	
07:15:00	0	90	2	0	0	92	0	0	3	0	0	3	1	60	0	0	0	61	2	0	3	0	0	5	161	
07:30:00	0	98	4	0	0	102	1	0	8	0	0	9	2	121	0	0	0	123	1	0	1	0	0	2	236	
07:45:00	2	139	4	0	1	145	3	0	4	0	2	7	1	99	0	0	0	100	2	0	0	0	0	2	254	783
08:00:00	0	159	3	0	3	162	3	0	4	0	2	7	3	125	0	0	0	128	2	0	2	0	0	4	301	952
08:15:00	0	159	4	0	1	163	6	0	3	0	2	9	7	109	1	0	0	117	4	0	1	0	0	5	294	1085
08:30:00	2	140	8	0	0	150	3	0	5	0	0	8	5	103	0	0	0	108	3	0	3	0	1	6	272	1121
08:45:00	0	120	3	0	0	123	3	0	6	0	0	9	4	131	3	0	0	138	0	0	2	0	2	2	272	1139
09:00:00	2	103	3	0	0	108	0	0	4	0	0	4	6	93	2	0	0	101	1	1	2	0	1	4	217	1055
09:15:00	1	87	4	0	0	92	3	1	6	0	0	10	4	80	1	0	0	85	3	0	0	0	0	3	190	951
09:30:00	2	90	2	0	0	94	0	0	5	0	1	5	6	56	1	0	0	63	5	0	0	0	1	5	167	846
09:45:00	1	78	8	0	0	87	3	0	6	0	0	9	5	86	2	0	0	93	2	0	3	0	1	5	194	768
BREAK																										
11:00:00	1	77	0	0	0	78	0	0	4	0	0	4	2	81	4	0	0	87	0	0	0	0	2	0	169	
11:15:00	0	73	1	0	0	74	1	0	5	0	0	6	1	85	0	0	0	86	2	0	1	0	2	3	169	
11:30:00	1	79	2	0	0	82	7	1	9	0	0	17	6	101	0	0	0	107	1	0	1	0	0	2	208	
11:45:00	0	93	1	0	0	94	2	0	3	0	0	5	3	75	3	0	0	81	6	0	2	0	1	8	188	734
12:00:00	1	83	0	0	0	84	2	0	5	0	2	7	5	94	0	0	0	99	2	0	1	0	0	3	193	758
12:15:00	1	84	1	0	0	86	4	1	4	0	0	9	4	95	0	0	0	99	3	0	0	0	0	3	197	786
12:30:00	3	93	1	0	0	97	5	0	8	0	1	13	6	84	0	0	0	90	5	0	0	0	1	5	205	783
12:45:00	0	93	3	1	0	97	3	0	4	0	1	7	6	85	4	0	0	95	3	0	0	0	2	3	202	797
13:00:00	0	85	2	0	0	87	4	1	1	0	0	6	8	81	1	0	1	90	2	0	0	0	2	2	185	789
13:15:00	1	81	1	0	0	83	1	0	5	0	0	6	6	74	2	0	0	82	2	0	0	0	0	2	173	765
13:30:00	2	78	2	0	0	82	1	1	5	0	0	7	4	87	2	0	0	93	0	1	1	0	1	2	184	744
13:45:00	1	90	0	0	0	91	2	1	6	0	0	9	5	79	2	0	0	86	0	0	1	0	1	1	187	729
BREAK																										
16:00:00	2	115	1	0	0	118	3	0	5	0	1	8	1	133	2	0	2	136	4	0	2	0	0	6	268	
16:15:00	1	116	0	0	0	117	1	0	7	0	2	8	5	147	2	0	0	154	2	0	1	0	0	3	282	
16:30:00	2	98	3	0	0	103	7	1	2	1	1	11	3	157	2	0	0	162	1	0	0	0	1	1	277	
16:45:00	0	115	2	0	0	117	5	0	4	0	0	9	3	148	3	0	0	154	1	0	1	0	0	2	282	1109
17:00:00	2	164	0	0	0	166	2	1	3	0	0	6	6	157	1	0	0	164	1	0	0	0	3	1	337	1178

17:15:00	0	132	3	0	0	135	4	0	5	0	0	9	5	153	3	0	0	161	1	0	0	0	0	1	306	1202
17:30:00	1	121	4	0	0	126	4	0	7	0	2	11	6	156	3	0	0	165	1	0	1	0	1	2	304	1229
17:45:00	0	109	4	0	0	113	3	1	3	0	1	7	6	152	1	0	0	159	1	2	0	0	1	3	282	1229
18:00:00	1	117	0	0	0	118	3	1	2	0	1	6	6	143	3	0	0	152	1	0	0	0	0	1	277	1169
18:15:00	2	110	5	0	0	117	3	0	5	0	3	8	7	128	2	0	0	137	2	0	3	0	1	5	267	1130
18:30:00	2	103	5	0	1	110	2	0	2	0	0	4	2	110	1	0	0	113	1	0	0	0	0	1	228	1054
18:45:00	2	97	3	0	0	102	3	0	5	0	0	8	12	98	3	0	0	113	0	0	1	0	1	1	224	996
Grand Total	36	3742	90	1	6	3869	98	11	165	1	22	275	165	3813	54	0	3	4032	68	5	35	0	28	108	**8284**	-
Approach%	0.9%	96.7%	2.3%	0%		-	35.6%	4%	60%	0.4%		-	4.1%	94.6%	1.3%	0%		-	63%	4.6%	32.4%	0%		-	-	-
Totals %	0.4%	45.2%	1.1%	0%		46.7%	1.2%	0.1%	2%	0%		3.3%	2%	46%	0.7%	0%		48.7%	0.8%	0.1%	0.4%	0%		1.3%	-	-
Heavy	0	139	2	0		-	5	2	24	0		-	23	122	0	0		-	1	0	0	0		-	-	-
Heavy %	0%	3.7%	2.2%	0%		-	5.1%	18.2%	14.5%	0%		-	13.9%	3.2%	0%	0%		-	1.5%	0%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (17.06 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach BARBERTOWN RD						S Approach MISSISSAUGA RD						W Approach ROTHERSAY CT						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	0	159	3	0	3	162	3	0	4	0	2	7	3	125	0	0	0	128	2	0	2	0	0	4	301
08:15:00	0	159	4	0	1	163	6	0	3	0	2	9	7	109	1	0	0	117	4	0	1	0	0	5	294
08:30:00	2	140	8	0	0	150	3	0	5	0	0	8	5	103	0	0	0	108	3	0	3	0	1	6	272
08:45:00	0	120	3	0	0	123	3	0	6	0	0	9	4	131	3	0	0	138	0	0	2	0	2	2	272
Grand Total	2	578	18	0	4	598	15	0	18	0	4	33	19	468	4	0	0	491	9	0	8	0	3	17	**1139**
Approach%	0.3%	96.7%	3%	0%		-	45.5%	0%	54.5%	0%		-	3.9%	95.3%	0.8%	0%		-	52.9%	0%	47.1%	0%		-	-
Totals %	0.2%	50.7%	1.6%	0%		52.5%	1.3%	0%	1.6%	0%		2.9%	1.7%	41.1%	0.4%	0%		43.1%	0.8%	0%	0.7%	0%		1.5%	-
PHF	0.25	0.91	0.56	0		0.92	0.63	0	0.75	0		0.92	0.68	0.89	0.33	0		0.89	0.56	0	0.67	0		0.71	-
Heavy	0	28	1	0		29	2	0	4	0		6	3	12	0	0		15	0	0	0	0		0	-
Heavy %	0%	4.8%	5.6%	0%		4.8%	13.3%	0%	22.2%	0%		18.2%	15.8%	2.6%	0%	0%		3.1%	0%	0%	0%	0%		0%	-
Lights	2	550	17	0		569	13	0	14	0		27	16	456	4	0		476	9	0	8	0		17	-
Lights %	100%	95.2%	94.4%	0%		95.2%	86.7%	0%	77.8%	0%		81.8%	84.2%	97.4%	100%	0%		96.9%	100%	0%	100%	0%		100%	-
Single-Unit Trucks	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Buses	0	23	1	0		24	2	0	0	0		2	3	7	0	0		10	0	0	0	0		0	-
Buses %	0%	4%	5.6%	0%		4%	13.3%	0%	0%	0%		6.1%	15.8%	1.5%	0%	0%		2%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	3	0	0		3	0	0	4	0		4	0	3	0	0		3	0	0	0	0		0	-
Articulated Trucks %	0%	0.5%	0%	0%		0.5%	0%	0%	22.2%	0%		12.1%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	36.4%		-	-	-	-	36.4%		-	-	-	-	0%		-	-	-	-	27.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

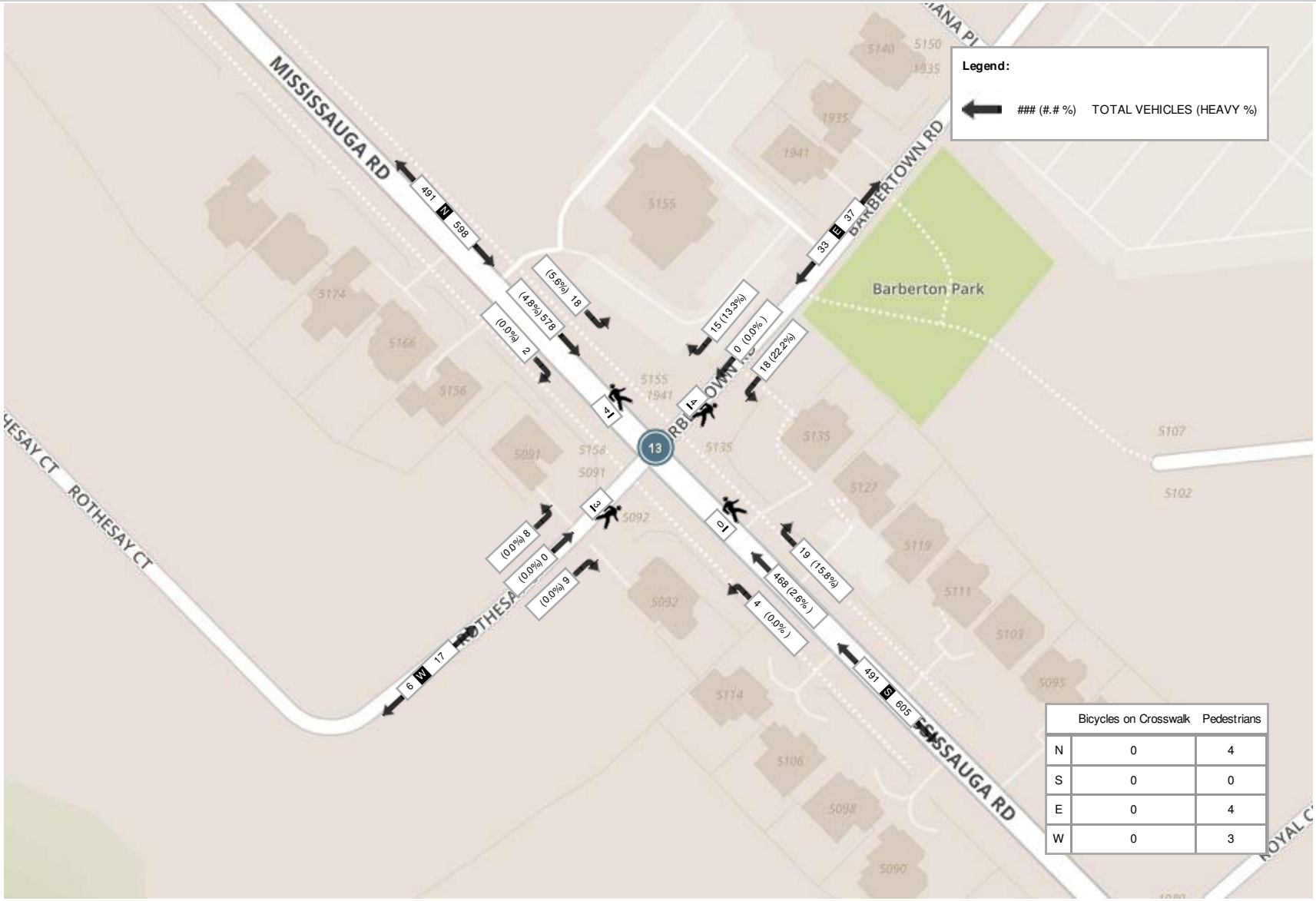
Peak Hour: 12:00 PM - 01:00 PM Weather:

Start Time	N Approach MISSISSAUGA RD						E Approach BARBERTOWN RD						S Approach MISSISSAUGA RD						W Approach ROTHERSAY CT						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:00:00	1	83	0	0	0	84	2	0	5	0	2	7	5	94	0	0	0	99	2	0	1	0	0	3	193
12:15:00	1	84	1	0	0	86	4	1	4	0	0	9	4	95	0	0	0	99	3	0	0	0	0	3	197
12:30:00	3	93	1	0	0	97	5	0	8	0	1	13	6	84	0	0	0	90	5	0	0	0	1	5	205
12:45:00	0	93	3	1	0	97	3	0	4	0	1	7	6	85	4	0	0	95	3	0	0	0	2	3	202
Grand Total	5	353	5	1	0	364	14	1	21	0	4	36	21	358	4	0	0	383	13	0	1	0	3	14	**797**
Approach%	1.4%	97%	1.4%	0.3%		-	38.9%	2.8%	58.3%	0%		-	5.5%	93.5%	1%	0%		-	92.9%	0%	7.1%	0%		-	-
Totals %	0.6%	44.3%	0.6%	0.1%		45.7%	1.8%	0.1%	2.6%	0%		4.5%	2.6%	44.9%	0.5%	0%		48.1%	1.6%	0%	0.1%	0%		1.8%	-
PHF	0.42	0.95	0.42	0.25		0.94	0.7	0.25	0.66	0		0.69	0.88	0.94	0.25	0		0.97	0.65	0	0.25	0		0.7	-
Heavy	0	15	0	0		15	0	1	2	0		3	2	12	0	0		14	1	0	0	0		1	-
Heavy %	0%	4.2%	0%	0%		4.1%	0%	100%	9.5%	0%		8.3%	9.5%	3.4%	0%	0%		3.7%	7.7%	0%	0%	0%		7.1%	-
Lights	5	337	5	1		348	14	0	19	0		33	19	345	4	0		368	12	0	1	0		13	-
Lights %	100%	95.5%	100%	100%		95.6%	100%	0%	90.5%	0%		91.7%	90.5%	96.4%	100%	0%		96.1%	92.3%	0%	100%	0%		92.9%	-
Single-Unit Trucks	0	5	0	0		5	0	1	1	0		2	0	2	0	0		2	0	0	0	0		0	-
Single-Unit Trucks %	0%	1.4%	0%	0%		1.4%	0%	100%	4.8%	0%		5.6%	0%	0.6%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Buses	0	5	0	0		5	0	0	0	0		0	0	7	0	0		7	1	0	0	0		1	-
Buses %	0%	1.4%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	2%	0%	0%		1.8%	7.7%	0%	0%	0%		7.1%	-
Articulated Trucks	0	5	0	0		5	0	0	1	0		1	2	3	0	0		5	0	0	0	0		0	-
Articulated Trucks %	0%	1.4%	0%	0%		1.4%	0%	0%	4.8%	0%		2.8%	9.5%	0.8%	0%	0%		1.3%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	14.3%		-	-	-	-	0%		-	-	-	-	42.9%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	42.9%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 05:00 PM - 06:00 PM Weather:

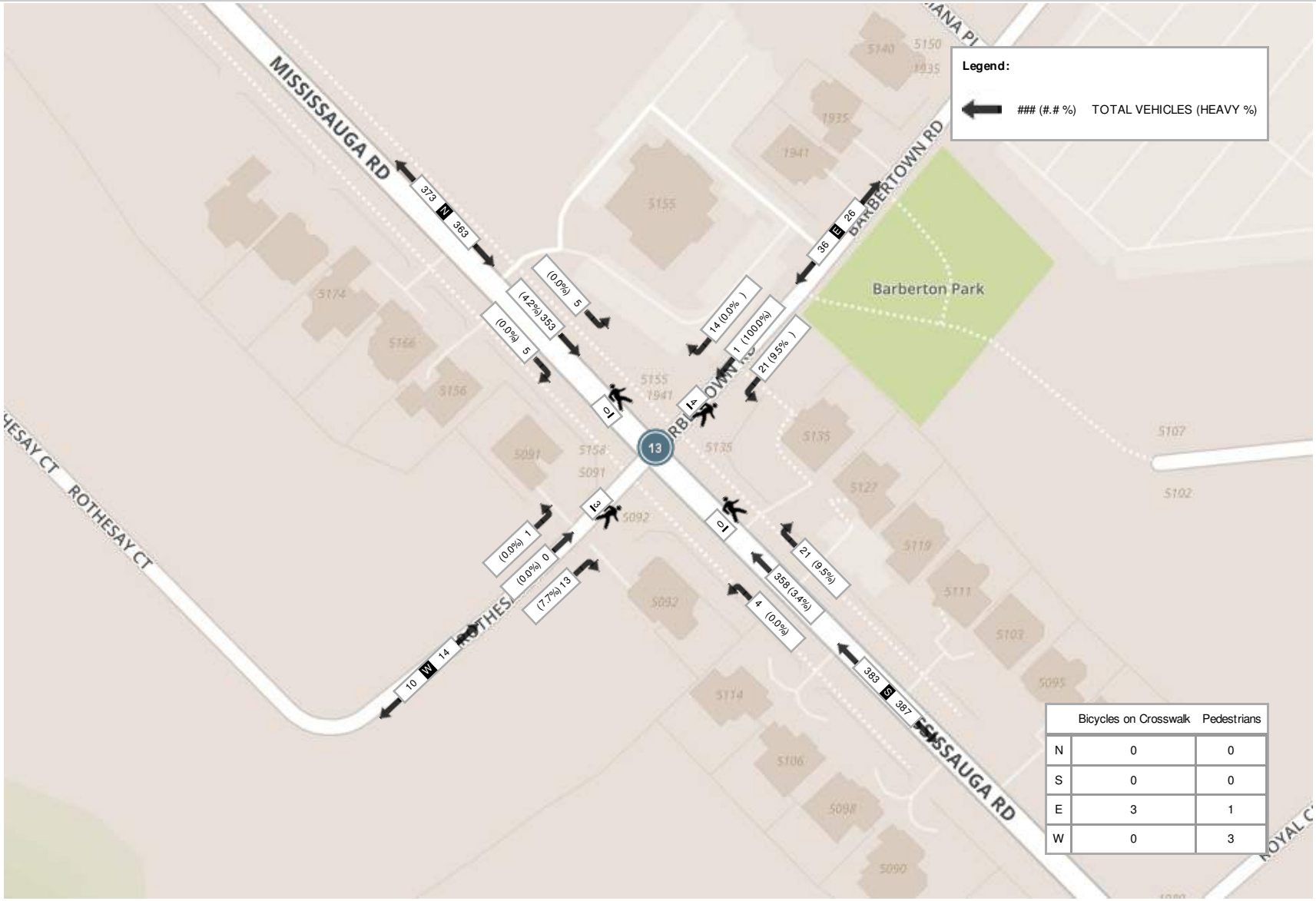
Start Time	N Approach MISSISSAUGA RD						E Approach BARBERTOWN RD						S Approach MISSISSAUGA RD						W Approach ROTHERSAY CT						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	2	164	0	0	0	166	2	1	3	0	0	6	6	157	1	0	0	164	1	0	0	0	3	1	337
17:15:00	0	132	3	0	0	135	4	0	5	0	0	9	5	153	3	0	0	161	1	0	0	0	0	1	306
17:30:00	1	121	4	0	0	126	4	0	7	0	2	11	6	156	3	0	0	165	1	0	1	0	1	2	304
17:45:00	0	109	4	0	0	113	3	1	3	0	1	7	6	152	1	0	0	159	1	2	0	0	1	3	282
Grand Total	3	526	11	0	0	540	13	2	18	0	3	33	23	618	8	0	0	649	4	2	1	0	5	7	**1229**
Approach%	0.6%	97.4%	2%	0%		-	39.4%	6.1%	54.5%	0%		-	3.5%	95.2%	1.2%	0%		-	57.1%	28.6%	14.3%	0%		-	-
Totals %	0.2%	42.8%	0.9%	0%		43.9%	1.1%	0.2%	1.5%	0%		2.7%	1.9%	50.3%	0.7%	0%		52.8%	0.3%	0.2%	0.1%	0%		0.6%	-
PHF	0.38	0.8	0.69	0		0.81	0.81	0.5	0.64	0		0.75	0.96	0.98	0.67	0		0.98	1	0.25	0.25	0		0.58	-
Heavy	0	10	1	0		11	0	0	3	0		3	0	10	0	0		10	0	0	0	0		0	-
Heavy %	0%	1.9%	9.1%	0%		2%	0%	0%	16.7%	0%		9.1%	0%	1.6%	0%	0%		1.5%	0%	0%	0%	0%		0%	-
Lights	3	515	10	0		528	13	2	15	0		30	23	607	8	0		638	4	2	1	0		7	-
Lights %	100%	97.9%	90.9%	0%		97.8%	100%	100%	83.3%	0%		90.9%	100%	98.2%	100%	0%		98.3%	100%	100%	100%	0%		100%	-
Single-Unit Trucks	0	0	1	0		1	0	0	1	0		1	0	3	0	0		3	0	0	0	0		0	-
Single-Unit Trucks %	0%	0%	9.1%	0%		0.2%	0%	0%	5.6%	0%		3%	0%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	-
Buses	0	8	0	0		8	0	0	0	0		0	0	7	0	0		7	0	0	0	0		0	-
Buses %	0%	1.5%	0%	0%		1.5%	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		1.1%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	2	0	0		2	0	0	2	0		2	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0.4%	0%	0%		0.4%	0%	0%	11.1%	0%		6.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	37.5%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	37.5%		-	-	-	-	0%		-	-	-	-	25%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Light Rain (17.06 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	4
S	0	0
E	0	4
W	0	3

Peak Hour: 12:00 PM - 01:00 PM Weather:



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	3	1
W	0	3

Peak Hour: 05:00 PM - 06:00 PM Weather:

	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	3	0
W	2	3

Turning Movement Count (15 . MISSISSAUGA RD & BURNHAMTHORPE RD)

Start Time	N Approach MISSISSAUGA RD						E Approach BURNHAMTHORPE RD						S Approach MISSISSAUGA RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	6	32	15	0	3	53	6	78	24	0	0	108	18	22	10	0	1	50	16	201	9	0	1	226	437	
07:15:00	13	34	9	0	5	56	9	118	19	0	1	146	19	46	13	0	1	78	28	247	5	0	1	280	560	
07:30:00	10	65	11	0	6	86	6	133	33	0	3	172	39	66	12	0	3	117	21	243	12	0	2	276	651	
07:45:00	21	81	20	0	9	122	9	181	44	0	1	234	40	52	18	0	1	110	25	287	14	0	0	326	792	2440
08:00:00	22	83	34	0	4	139	12	131	44	0	4	187	40	75	18	0	0	133	17	233	12	0	0	262	721	2724
08:15:00	16	88	18	0	10	122	13	183	55	0	4	251	45	69	19	0	2	133	31	308	16	0	1	355	861	3025
08:30:00	15	98	26	0	7	139	11	159	66	0	6	236	50	87	23	0	1	160	45	259	19	0	1	323	858	3232
08:45:00	22	95	18	0	7	135	16	206	83	0	5	305	69	48	37	0	2	154	57	265	17	0	1	339	933	3373
09:00:00	14	64	23	0	2	101	14	143	40	0	4	197	57	59	21	0	3	137	20	211	10	0	2	241	676	3328
09:15:00	9	59	19	0	2	87	10	124	29	0	4	163	30	41	14	0	1	85	30	217	7	0	3	254	589	3056
09:30:00	13	50	20	0	6	83	10	149	36	0	7	195	34	53	18	0	1	105	24	211	10	0	1	245	628	2826
09:45:00	15	50	11	0	1	76	12	114	27	0	0	153	31	29	19	0	0	79	37	202	15	0	1	254	562	2455
BREAK																										
11:00:00	15	45	17	0	6	77	9	128	31	0	1	168	52	51	30	0	0	133	20	187	12	0	0	219	597	
11:15:00	16	33	9	0	5	58	12	162	39	0	7	213	54	46	27	0	2	127	23	166	15	0	1	204	602	
11:30:00	20	32	13	0	3	65	8	140	41	0	2	189	46	53	29	0	2	128	27	150	16	0	1	193	575	
11:45:00	13	48	10	0	5	71	13	182	45	0	3	240	44	44	21	0	4	109	31	158	13	0	0	202	622	2396
12:00:00	10	56	14	0	1	80	11	155	38	0	2	204	47	49	23	0	2	119	35	138	11	0	1	184	587	2386
12:15:00	13	39	14	0	1	66	12	144	42	1	1	199	48	52	29	0	1	129	31	157	15	0	0	203	597	2381
12:30:00	19	70	11	0	6	100	12	190	58	0	9	260	40	64	25	0	3	129	28	154	11	0	0	193	682	2488
12:45:00	17	46	12	0	0	75	23	184	42	0	3	249	63	50	26	0	2	139	28	181	18	0	3	227	690	2556
13:00:00	9	59	17	0	0	85	16	181	29	0	1	226	54	67	31	0	3	152	20	163	11	0	1	194	657	2626
13:15:00	8	36	8	0	3	52	17	217	36	0	3	270	43	42	18	0	3	103	24	145	7	0	1	176	601	2630
13:30:00	18	56	18	0	1	92	15	170	33	0	0	218	33	62	21	0	1	116	24	145	10	1	0	180	606	2554
13:45:00	16	31	20	0	2	67	13	219	35	0	0	267	44	41	17	0	0	102	11	166	10	0	0	187	623	2487
BREAK																										
16:00:00	15	73	13	0	4	101	14	387	42	0	3	443	49	78	35	0	2	162	9	204	15	0	1	228	934	
16:15:00	23	88	14	0	6	125	14	405	46	0	3	465	48	100	35	0	2	183	20	211	19	0	0	250	1023	
16:30:00	28	73	12	0	7	113	20	383	41	1	4	445	55	91	28	0	1	174	28	194	20	0	1	242	974	
16:45:00	25	59	24	0	5	108	24	395	53	0	5	472	49	103	31	0	1	183	14	173	29	0	0	216	979	3910
17:00:00	29	90	25	0	5	144	19	388	56	0	1	463	50	86	39	0	1	175	18	166	13	0	0	197	979	3955

17:15:00	26	90	19	0	11	135	23	392	44	0	4	459	48	93	33	0	0	174	18	217	24	0	0	259	1027	3959
17:30:00	26	82	24	0	2	132	31	328	45	1	2	405	49	105	30	0	1	184	21	187	16	0	0	224	945	3930
17:45:00	25	70	19	0	6	114	20	282	34	0	3	336	40	74	29	0	2	143	24	222	22	0	1	268	861	3812
18:00:00	22	76	22	0	6	120	21	312	39	0	1	372	51	83	20	0	0	154	27	183	19	0	1	229	875	3708
18:15:00	30	82	19	0	2	132	22	315	41	0	1	378	59	63	21	0	2	143	19	197	19	0	1	235	888	3569
18:30:00	17	56	14	0	1	87	20	288	41	0	2	349	59	77	25	0	4	161	18	188	22	0	5	228	825	3449
18:45:00	24	77	15	0	8	116	23	166	38	0	3	227	63	77	32	0	4	172	27	190	19	0	0	236	751	3339
Grand Total	640	2266	607	0	159	3514	540	7832	1489	3	103	9864	1660	2298	877	0	59	4835	896	7126	532	1	32	8555	**26768**	-
Approach%	18.2%	64.5%	17.3%	0%		-	5.5%	79.4%	15.1%	0%		-	34.3%	47.5%	18.1%	0%		-	10.5%	83.3%	6.2%	0%		-	-	-
Totals %	2.4%	8.5%	2.3%	0%		13.1%	2%	29.3%	5.6%	0%		36.8%	6.2%	8.6%	3.3%	0%		18.1%	3.3%	26.6%	2%	0%		32%	-	-
Heavy	13	64	16	0		-	7	255	25	1		-	28	60	30	0		-	30	225	17	0		-	-	-
Heavy %	2%	2.8%	2.6%	0%		-	1.3%	3.3%	1.7%	33.3%		-	1.7%	2.6%	3.4%	0%		-	3.3%	3.2%	3.2%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach BURNHAMTHORPE RD						S Approach MISSISSAUGA RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	22	83	34	0	4	139	12	131	44	0	4	187	40	75	18	0	0	133	17	233	12	0	0	262	721
08:15:00	16	88	18	0	10	122	13	183	55	0	4	251	45	69	19	0	2	133	31	308	16	0	1	355	861
08:30:00	15	98	26	0	7	139	11	159	66	0	6	236	50	87	23	0	1	160	45	259	19	0	1	323	858
08:45:00	22	95	18	0	7	135	16	206	83	0	5	305	69	48	37	0	2	154	57	265	17	0	1	339	933
Grand Total	75	364	96	0	28	535	52	679	248	0	19	979	204	279	97	0	5	580	150	1065	64	0	3	1279	**3373**
Approach%	14%	68%	17.9%	0%		-	5.3%	69.4%	25.3%	0%		-	35.2%	48.1%	16.7%	0%		-	11.7%	83.3%	5%	0%		-	-
Totals %	2.2%	10.8%	2.8%	0%		15.9%	1.5%	20.1%	7.4%	0%		29%	6%	8.3%	2.9%	0%		17.2%	4.4%	31.6%	1.9%	0%		37.9%	-
PHF	0.85	0.93	0.71	0		0.96	0.81	0.82	0.75	0		0.8	0.74	0.8	0.66	0		0.91	0.66	0.86	0.84	0		0.9	-
Heavy	3	8	2	0		13	3	33	3	0		39	2	6	6	0		14	3	41	3	0		47	-
Heavy %	4%	2.2%	2.1%	0%		2.4%	5.8%	4.9%	1.2%	0%		4%	1%	2.2%	6.2%	0%		2.4%	2%	3.8%	4.7%	0%		3.7%	-
Lights	71	354	94	0		519	49	645	245	0		939	202	273	91	0		566	147	1024	61	0		1232	-
Lights %	94.7%	97.3%	97.9%	0%		97%	94.2%	95%	98.8%	0%		95.9%	99%	97.8%	93.8%	0%		97.6%	98%	96.2%	95.3%	0%		96.3%	-
Single-Unit Trucks	1	0	1	0		2	1	3	0	0		4	0	0	2	0		2	0	8	1	0		9	-
Single-Unit Trucks %	1.3%	0%	1%	0%		0.4%	1.9%	0.4%	0%	0%		0.4%	0%	0%	2.1%	0%		0.3%	0%	0.8%	1.6%	0%		0.7%	-
Buses	2	8	1	0		11	2	25	2	0		29	2	6	3	0		11	3	31	2	0		36	-
Buses %	2.7%	2.2%	1%	0%		2.1%	3.8%	3.7%	0.8%	0%		3%	1%	2.2%	3.1%	0%		1.9%	2%	2.9%	3.1%	0%		2.8%	-
Articulated Trucks	0	0	0	0		0	0	5	1	0		6	0	0	1	0		1	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.7%	0.4%	0%		0.6%	0%	0%	1%	0%		0.2%	0%	0.2%	0%	0%		0.2%	-
Bicycles on Road	1	2	0	0		3	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	1.3%	0.5%	0%	0%		0.6%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	19	-	-	-	-	-	19	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	34.5%		-	-	-	-	34.5%		-	-	-	-	0%		-	-	-	-	3.6%		-
Bicycles on Crosswalk	-	-	-	-	9	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	16.4%		-	-	-	-	0%		-	-	-	-	9.1%		-	-	-	-	1.8%		-

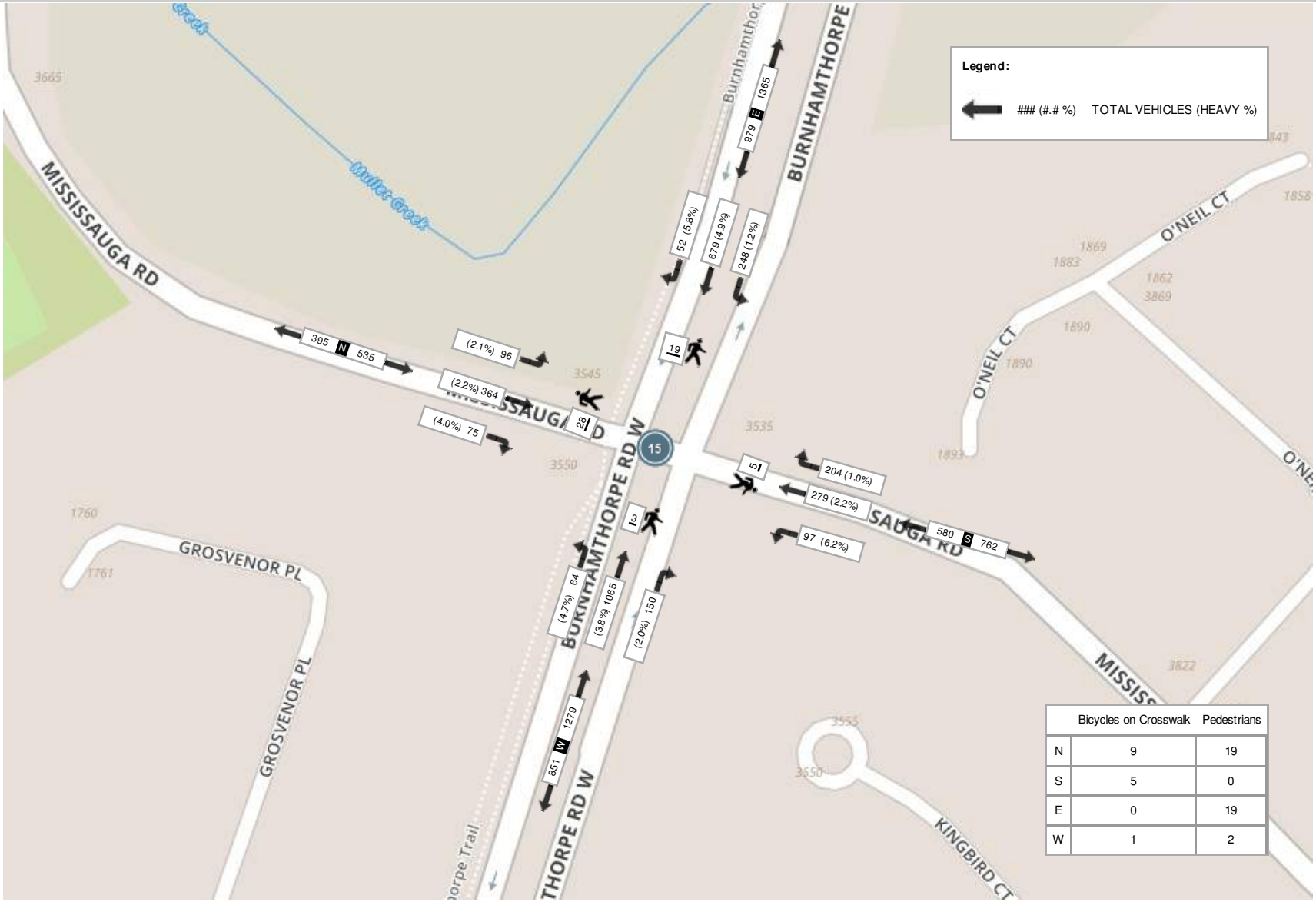
Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach BURNHAMTHORPE RD						S Approach MISSISSAUGA RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:30:00	19	70	11	0	6	100	12	190	58	0	9	260	40	64	25	0	3	129	28	154	11	0	0	193	682
12:45:00	17	46	12	0	0	75	23	184	42	0	3	249	63	50	26	0	2	139	28	181	18	0	3	227	690
13:00:00	9	59	17	0	0	85	16	181	29	0	1	226	54	67	31	0	3	152	20	163	11	0	1	194	657
13:15:00	8	36	8	0	3	52	17	217	36	0	3	270	43	42	18	0	3	103	24	145	7	0	1	176	601
Grand Total	53	211	48	0	9	312	68	772	165	0	16	1005	200	223	100	0	11	523	100	643	47	0	5	790	**2630**
Approach%	17%	67.6%	15.4%	0%		-	6.8%	76.8%	16.4%	0%		-	38.2%	42.6%	19.1%	0%		-	12.7%	81.4%	5.9%	0%		-	-
Totals %	2%	8%	1.8%	0%		11.9%	2.6%	29.4%	6.3%	0%		38.2%	7.6%	8.5%	3.8%	0%		19.9%	3.8%	24.4%	1.8%	0%		30%	-
PHF	0.7	0.75	0.71	0		0.78	0.74	0.89	0.71	0		0.93	0.79	0.83	0.81	0		0.86	0.89	0.89	0.65	0		0.87	-
Heavy	1	6	3	0		10	1	26	7	0		34	7	8	4	0		19	3	30	4	0		37	-
Heavy %	1.9%	2.8%	6.3%	0%		3.2%	1.5%	3.4%	4.2%	0%		3.4%	3.5%	3.6%	4%	0%		3.6%	3%	4.7%	8.5%	0%		4.7%	-
Lights	52	201	45	0		298	66	746	158	0		970	193	214	96	0		503	97	612	42	0		751	-
Lights %	98.1%	95.3%	93.8%	0%		95.5%	97.1%	96.6%	95.8%	0%		96.5%	96.5%	96%	96%	0%		96.2%	97%	95.2%	89.4%	0%		95.1%	-
Single-Unit Trucks	1	2	2	0		5	1	10	4	0		15	2	1	3	0		6	2	12	3	0		17	-
Single-Unit Trucks %	1.9%	0.9%	4.2%	0%		1.6%	1.5%	1.3%	2.4%	0%		1.5%	1%	0.4%	3%	0%		1.1%	2%	1.9%	6.4%	0%		2.2%	-
Buses	0	4	1	0		5	0	14	3	0		17	5	7	1	0		13	0	16	1	0		17	-
Buses %	0%	1.9%	2.1%	0%		1.6%	0%	1.8%	1.8%	0%		1.7%	2.5%	3.1%	1%	0%		2.5%	0%	2.5%	2.1%	0%		2.2%	-
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	1	2	0	0		3	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	1%	0.3%	0%	0%		0.4%	-
Bicycles on Road	0	4	0	0		4	1	0	0	0		1	0	1	0	0		1	0	1	1	0		2	-
Bicycles on Road %	0%	1.9%	0%	0%		1.3%	1.5%	0%	0%	0%		0.1%	0%	0.4%	0%	0%		0.2%	0%	0.2%	2.1%	0%		0.3%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	13	-	-	-	-	-	5	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	14.6%		-	-	-	-	31.7%		-	-	-	-	12.2%		-	-	-	-	12.2%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	6	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	7.3%		-	-	-	-	7.3%		-	-	-	-	14.6%		-	-	-	-	0%		-

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (24.75 °C)

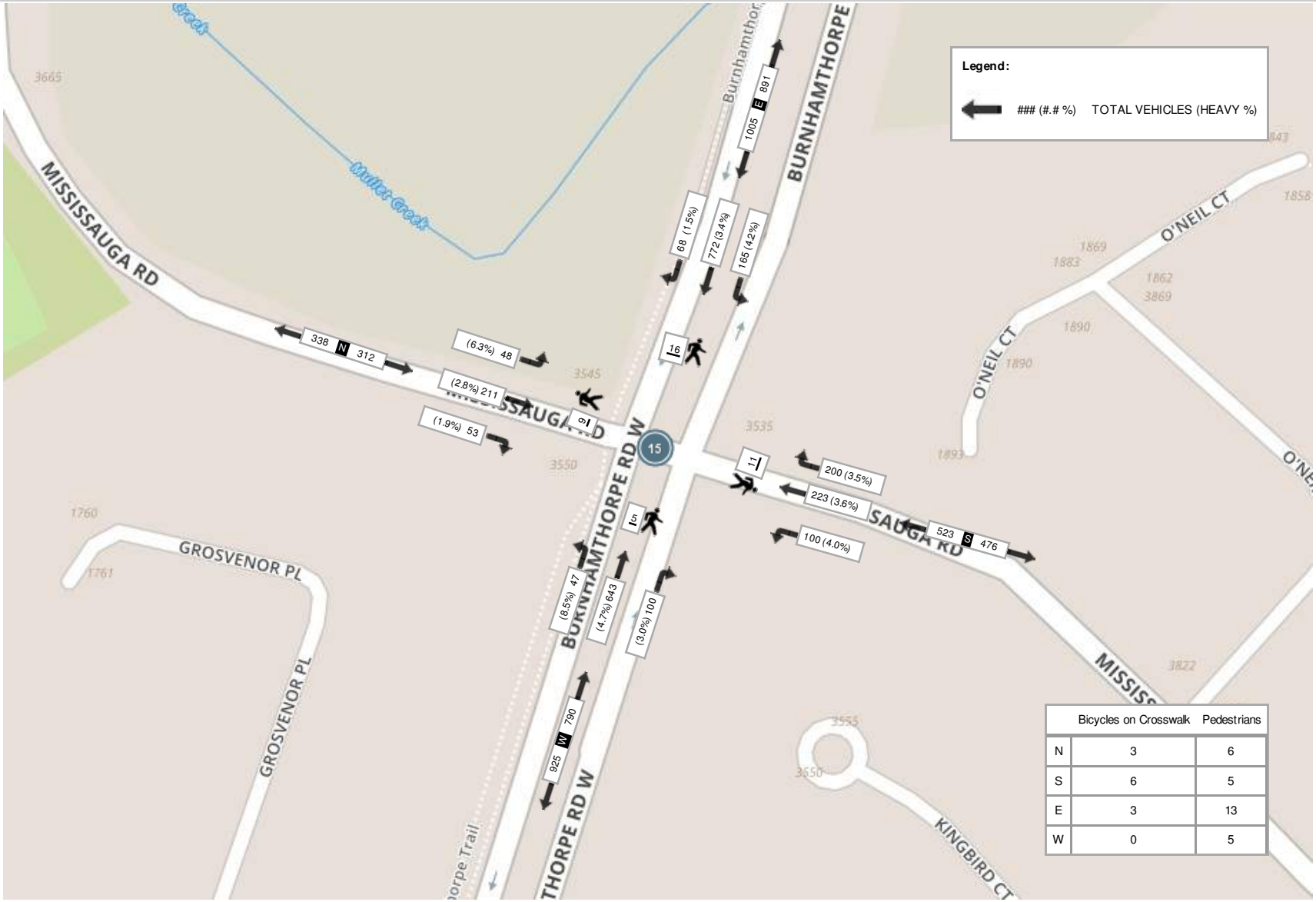
Start Time	N Approach MISSISSAUGA RD						E Approach BURNHAMTHORPE RD						S Approach MISSISSAUGA RD						W Approach BURNHAMTHORPE RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	28	73	12	0	7	113	20	383	41	1	4	445	55	91	28	0	1	174	28	194	20	0	1	242	974
16:45:00	25	59	24	0	5	108	24	395	53	0	5	472	49	103	31	0	1	183	14	173	29	0	0	216	979
17:00:00	29	90	25	0	5	144	19	388	56	0	1	463	50	86	39	0	1	175	18	166	13	0	0	197	979
17:15:00	26	90	19	0	11	135	23	392	44	0	4	459	48	93	33	0	0	174	18	217	24	0	0	259	1027
Grand Total	108	312	80	0	28	500	86	1558	194	1	14	1839	202	373	131	0	3	706	78	750	86	0	1	914	**3959**
Approach%	21.6%	62.4%	16%	0%		-	4.7%	84.7%	10.5%	0.1%		-	28.6%	52.8%	18.6%	0%		-	8.5%	82.1%	9.4%	0%		-	-
Totals %	2.7%	7.9%	2%	0%		12.6%	2.2%	39.4%	4.9%	0%		46.5%	5.1%	9.4%	3.3%	0%		17.8%	2%	18.9%	2.2%	0%		23.1%	-
PHF	0.93	0.87	0.8	0		0.87	0.9	0.99	0.87	0.25		0.97	0.92	0.91	0.84	0		0.96	0.7	0.86	0.74	0		0.88	-
Heavy	0	7	1	0		8	1	17	2	0		20	1	6	0	0		7	0	13	0	0		13	-
Heavy %	0%	2.2%	1.3%	0%		1.6%	1.2%	1.1%	1%	0%		1.1%	0.5%	1.6%	0%	0%		1%	0%	1.7%	0%	0%		1.4%	-
Lights	108	302	79	0		489	85	1540	192	1		1818	201	366	131	0		698	78	737	86	0		901	-
Lights %	100%	96.8%	98.8%	0%		97.8%	98.8%	98.8%	99%	100%		98.9%	99.5%	98.1%	100%	0%		98.9%	100%	98.3%	100%	0%		98.6%	-
Single-Unit Trucks	0	0	1	0		1	0	6	0	0		6	0	2	0	0		2	0	6	0	0		6	-
Single-Unit Trucks %	0%	0%	1.3%	0%		0.2%	0%	0.4%	0%	0%		0.3%	0%	0.5%	0%	0%		0.3%	0%	0.8%	0%	0%		0.7%	-
Buses	0	7	0	0		7	1	8	2	0		11	1	4	0	0		5	0	7	0	0		7	-
Buses %	0%	2.2%	0%	0%		1.4%	1.2%	0.5%	1%	0%		0.6%	0.5%	1.1%	0%	0%		0.7%	0%	0.9%	0%	0%		0.8%	-
Articulated Trucks	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	3	0	0		3	0	1	0	0		1	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	1%	0%	0%		0.6%	0%	0.1%	0%	0%		0.1%	0%	0.3%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	6	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	23.9%		-	-	-	-	13%		-	-	-	-	2.2%		-	-	-	-	2.2%		-
Bicycles on Crosswalk	-	-	-	-	17	-	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	37%		-	-	-	-	17.4%		-	-	-	-	4.3%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)



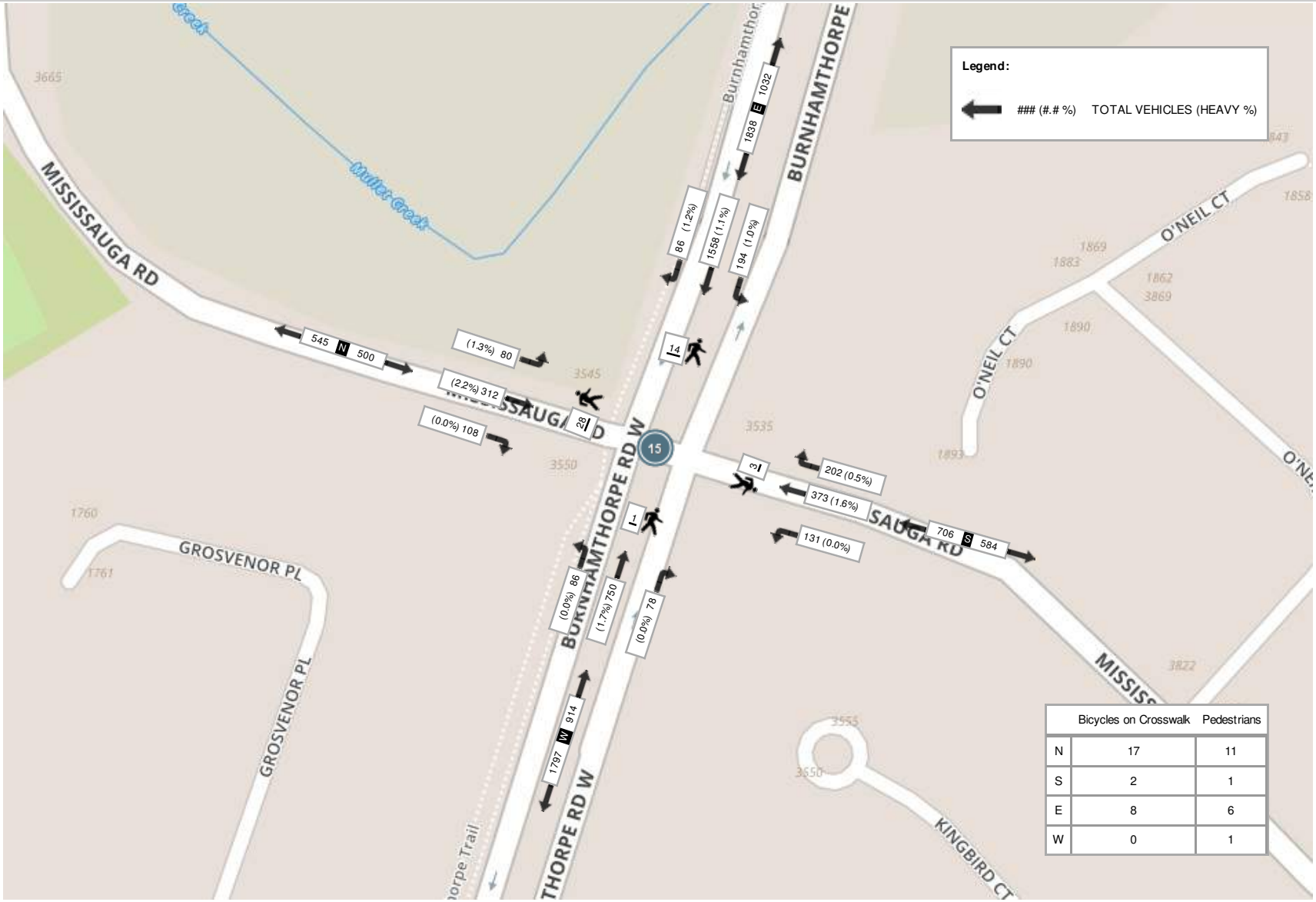
	Bicycles on Crosswalk	Pedestrians
N	9	19
S	5	0
E	0	19
W	1	2

Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	3	6
S	6	5
E	3	13
W	0	5

Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	17	11
S	2	1
E	8	6
W	0	1

Turning Movement Count (14 . MISSISSAUGA RD & EGLINTON AVE)

Start Time	N Approach MISSISSAUGA RD						E Approach EGLINTON AVE						S Approach MISSISSAUGA RD						W Approach EGLINTON AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	13	26	44	0	0	83	13	140	7	0	2	160	28	21	8	0	3	57	12	282	12	0	1	306	606	
07:15:00	26	36	54	0	2	116	17	126	17	0	0	160	30	27	7	0	2	64	14	403	28	0	3	445	785	
07:30:00	23	44	49	0	4	116	31	214	27	0	1	272	34	59	13	0	3	106	38	513	29	0	1	580	1074	
07:45:00	37	65	67	0	5	169	16	195	32	0	0	243	38	51	17	0	1	106	33	468	33	0	2	534	1052	3517
08:00:00	21	58	61	0	2	140	38	239	41	0	0	318	38	53	22	0	1	113	36	511	27	0	0	574	1145	4056
08:15:00	20	63	68	0	6	151	21	240	36	0	3	297	33	62	23	0	1	118	44	474	19	0	5	537	1103	4374
08:30:00	27	76	73	0	5	176	25	218	36	0	0	279	45	64	30	0	4	139	45	501	31	0	4	577	1171	4471
08:45:00	19	56	52	0	4	127	31	271	37	1	3	340	40	46	16	0	2	102	43	519	31	2	2	595	1164	4583
09:00:00	27	41	53	0	5	121	15	204	25	0	1	244	38	47	24	0	0	109	32	362	16	0	4	410	884	4322
09:15:00	23	39	42	0	6	104	16	214	19	0	2	249	27	51	21	0	3	99	33	366	17	0	8	416	868	4087
09:30:00	27	29	40	0	5	96	31	187	18	0	2	236	38	32	23	0	3	93	31	279	15	0	5	325	750	3666
09:45:00	18	22	44	0	0	84	24	212	29	1	1	266	31	36	12	0	0	79	31	265	29	1	2	326	755	3257
BREAK																										
11:00:00	21	43	37	0	5	101	30	216	24	1	2	271	26	42	15	0	2	83	28	202	16	0	4	246	701	
11:15:00	21	22	34	0	4	77	17	205	20	0	1	242	22	34	16	0	5	72	18	210	29	0	1	257	648	
11:30:00	25	33	34	0	4	92	38	189	28	0	7	255	30	38	16	0	8	84	17	195	33	0	2	245	676	
11:45:00	24	36	31	0	1	91	40	237	22	0	0	299	17	34	15	0	3	66	10	248	38	0	4	296	752	2777
12:00:00	19	39	39	0	7	97	33	204	31	0	3	268	21	51	22	0	5	94	25	249	22	0	1	296	755	2831
12:15:00	20	40	44	0	8	104	22	213	25	0	7	260	24	43	18	0	7	85	21	232	20	0	1	273	722	2905
12:30:00	22	43	35	0	6	100	29	257	30	0	3	316	14	35	19	0	4	68	21	216	31	0	4	268	752	2981
12:45:00	33	40	32	0	1	105	30	228	20	0	1	278	31	56	27	0	0	114	33	210	36	0	1	279	776	3005
13:00:00	30	49	53	0	1	132	40	212	22	0	0	274	27	35	20	0	0	82	22	209	29	0	0	260	748	2998
13:15:00	23	35	29	0	2	87	42	231	22	0	0	295	25	47	14	0	1	86	23	243	23	0	4	289	757	3033
13:30:00	25	38	42	0	5	105	35	222	26	0	2	283	16	50	23	0	4	89	29	199	22	1	2	251	728	3009
13:45:00	25	40	27	0	1	92	41	248	20	0	0	309	24	43	10	0	2	77	21	226	23	0	2	270	748	2981
BREAK																										
16:00:00	20	65	36	0	4	121	43	499	39	0	1	581	32	49	38	0	4	119	37	266	32	1	2	336	1157	
16:15:00	17	50	49	0	3	116	43	508	41	0	2	592	33	73	30	0	4	136	19	327	25	0	2	371	1215	
16:30:00	24	62	41	0	1	127	57	583	40	0	1	680	33	74	37	0	1	144	34	235	40	0	5	309	1260	
16:45:00	21	54	44	0	0	119	67	618	48	0	1	733	49	74	29	0	2	152	26	274	21	0	2	321	1325	4957
17:00:00	30	79	43	0	1	152	64	487	48	0	2	599	47	86	33	0	1	166	35	275	36	0	4	346	1263	5063

17:15:00	22	82	56	0	0	160	67	586	49	1	3	703	35	54	37	0	2	126	32	270	39	0	2	341	1330	5178
17:30:00	25	62	39	0	2	126	61	505	34	1	2	601	34	90	40	0	3	164	40	320	30	0	2	390	1281	5199
17:45:00	29	53	48	0	4	130	73	490	42	2	1	607	36	90	42	0	1	168	27	309	24	0	3	360	1265	5139
18:00:00	38	63	44	0	2	145	64	513	46	1	2	624	38	58	24	0	3	120	30	297	30	0	2	357	1246	5122
18:15:00	33	57	42	0	4	132	56	454	56	0	2	566	26	55	32	0	2	113	30	318	24	0	2	372	1183	4975
18:30:00	25	59	48	1	4	133	64	382	45	1	3	492	30	69	24	0	2	123	31	265	30	0	4	326	1074	4768
18:45:00	15	42	28	0	4	85	55	325	48	2	0	430	31	56	25	0	3	112	44	260	35	0	4	339	966	4469
Grand Total	868	1741	1602	1	118	4212	1389	11072	1150	11	61	13622	1121	1885	822	0	92	3828	1045	10998	975	5	97	13023	**34685**	-
Approach%	20.6%	41.3%	38%	0%		-	10.2%	81.3%	8.4%	0.1%		-	29.3%	49.2%	21.5%	0%		-	8%	84.5%	7.5%	0%		-	-	-
Totals %	2.5%	5%	4.6%	0%		12.1%	4%	31.9%	3.3%	0%		39.3%	3.2%	5.4%	2.4%	0%		11%	3%	31.7%	2.8%	0%		37.5%	-	-
Heavy	67	63	72	0		-	58	265	21	1		-	20	51	15	0		-	13	287	71	0		-	-	-
Heavy %	7.7%	3.6%	4.5%	0%		-	4.2%	2.4%	1.8%	9.1%		-	1.8%	2.7%	1.8%	0%		-	1.2%	2.6%	7.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach EGLINTON AVE						S Approach MISSISSAUGA RD						W Approach EGLINTON AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	21	58	61	0	2	140	38	239	41	0	0	318	38	53	22	0	1	113	36	511	27	0	0	574	1145
08:15:00	20	63	68	0	6	151	21	240	36	0	3	297	33	62	23	0	1	118	44	474	19	0	5	537	1103
08:30:00	27	76	73	0	5	176	25	218	36	0	0	279	45	64	30	0	4	139	45	501	31	0	4	577	1171
08:45:00	19	56	52	0	4	127	31	271	37	1	3	340	40	46	16	0	2	102	43	519	31	2	2	595	1164
Grand Total	87	253	254	0	17	594	115	968	150	1	6	1234	156	225	91	0	8	472	168	2005	108	2	11	2283	**4583**
Approach%	14.6%	42.6%	42.8%	0%		-	9.3%	78.4%	12.2%	0.1%		-	33.1%	47.7%	19.3%	0%		-	7.4%	87.8%	4.7%	0.1%		-	-
Totals %	1.9%	5.5%	5.5%	0%		13%	2.5%	21.1%	3.3%	0%		26.9%	3.4%	4.9%	2%	0%		10.3%	3.7%	43.7%	2.4%	0%		49.8%	-
PHF	0.81	0.83	0.87	0		0.84	0.76	0.89	0.91	0.25		0.91	0.87	0.88	0.76	0		0.85	0.93	0.97	0.87	0.25		0.96	-
Heavy	10	12	8	0		30	5	29	3	1		38	2	5	4	0		11	2	50	6	0		58	-
Heavy %	11.5%	4.7%	3.1%	0%		5.1%	4.3%	3%	2%	100%		3.1%	1.3%	2.2%	4.4%	0%		2.3%	1.2%	2.5%	5.6%	0%		2.5%	-
Lights	77	239	246	0		562	110	939	147	0		1196	154	220	87	0		461	166	1955	102	2		2225	-
Lights %	88.5%	94.5%	96.9%	0%		94.6%	95.7%	97%	98%	0%		96.9%	98.7%	97.8%	95.6%	0%		97.7%	98.8%	97.5%	94.4%	100%		97.5%	-
Single-Unit Trucks	7	1	0	0		8	0	5	1	1		7	1	1	1	0		3	0	17	5	0		22	-
Single-Unit Trucks %	8%	0.4%	0%	0%		1.3%	0%	0.5%	0.7%	100%		0.6%	0.6%	0.4%	1.1%	0%		0.6%	0%	0.8%	4.6%	0%		1%	-
Buses	1	11	6	0		18	4	23	2	0		29	1	4	3	0		8	2	29	0	0		31	-
Buses %	1.1%	4.3%	2.4%	0%		3%	3.5%	2.4%	1.3%	0%		2.4%	0.6%	1.8%	3.3%	0%		1.7%	1.2%	1.4%	0%	0%		1.4%	-
Articulated Trucks	2	0	2	0		4	1	1	0	0		2	0	0	0	0		0	0	4	1	0		5	-
Articulated Trucks %	2.3%	0%	0.8%	0%		0.7%	0.9%	0.1%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.2%	0.9%	0%		0.2%	-
Bicycles on Road	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0.8%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	4	-	-	-	-	-	7	-	-	-	-	-	11	-	-
Pedestrians%	-	-	-	-	26.2%		-	-	-	-	9.5%		-	-	-	-	16.7%		-	-	-	-	26.2%		-
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	14.3%		-	-	-	-	4.8%		-	-	-	-	2.4%		-	-	-	-	0%		-

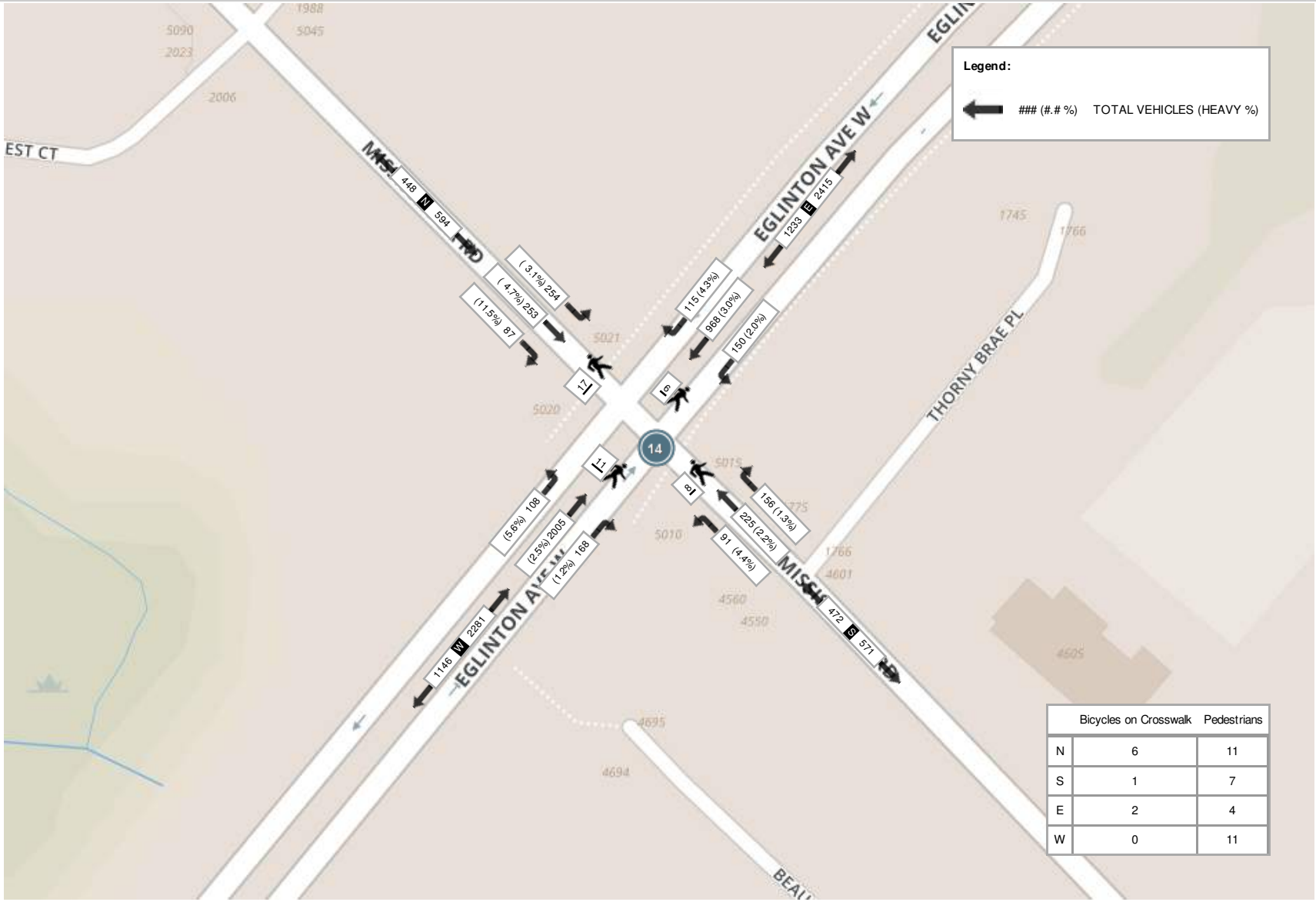
Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach MISSISSAUGA RD						E Approach EGLINTON AVE						S Approach MISSISSAUGA RD						W Approach EGLINTON AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:30:00	22	43	35	0	6	100	29	257	30	0	3	316	14	35	19	0	4	68	21	216	31	0	4	268	752
12:45:00	33	40	32	0	1	105	30	228	20	0	1	278	31	56	27	0	0	114	33	210	36	0	1	279	776
13:00:00	30	49	53	0	1	132	40	212	22	0	0	274	27	35	20	0	0	82	22	209	29	0	0	260	748
13:15:00	23	35	29	0	2	87	42	231	22	0	0	295	25	47	14	0	1	86	23	243	23	0	4	289	757
Grand Total	108	167	149	0	10	424	141	928	94	0	4	1163	97	173	80	0	5	350	99	878	119	0	9	1096	**3033**
Approach%	25.5%	39.4%	35.1%	0%		-	12.1%	79.8%	8.1%	0%		-	27.7%	49.4%	22.9%	0%		-	9%	80.1%	10.9%	0%		-	-
Totals %	3.6%	5.5%	4.9%	0%		14%	4.6%	30.6%	3.1%	0%		38.3%	3.2%	5.7%	2.6%	0%		11.5%	3.3%	28.9%	3.9%	0%		36.1%	-
PHF	0.82	0.85	0.7	0		0.8	0.84	0.9	0.78	0		0.92	0.78	0.77	0.74	0		0.77	0.75	0.9	0.83	0		0.95	-
Heavy	13	6	9	0		28	7	26	1	0		34	3	5	0	0		8	1	31	9	0		41	-
Heavy %	12%	3.6%	6%	0%		6.6%	5%	2.8%	1.1%	0%		2.9%	3.1%	2.9%	0%	0%		2.3%	1%	3.5%	7.6%	0%		3.7%	-
Lights	95	159	140	0		394	134	902	93	0		1129	94	168	80	0		342	98	847	110	0		1055	-
Lights %	88%	95.2%	94%	0%		92.9%	95%	97.2%	98.9%	0%		97.1%	96.9%	97.1%	100%	0%		97.7%	99%	96.5%	92.4%	0%		96.3%	-
Single-Unit Trucks	10	2	4	0		16	4	9	1	0		14	2	0	0	0		2	1	12	5	0		18	-
Single-Unit Trucks %	9.3%	1.2%	2.7%	0%		3.8%	2.8%	1%	1.1%	0%		1.2%	2.1%	0%	0%	0%		0.6%	1%	1.4%	4.2%	0%		1.6%	-
Buses	0	4	2	0		6	2	16	0	0		18	1	5	0	0		6	0	16	0	0		16	-
Buses %	0%	2.4%	1.3%	0%		1.4%	1.4%	1.7%	0%	0%		1.5%	1%	2.9%	0%	0%		1.7%	0%	1.8%	0%	0%		1.5%	-
Articulated Trucks	3	0	3	0		6	1	1	0	0		2	0	0	0	0		0	0	3	4	0		7	-
Articulated Trucks %	2.8%	0%	2%	0%		1.4%	0.7%	0.1%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.3%	3.4%	0%		0.6%	-
Bicycles on Road	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	1.2%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	9	-	-
Pedestrians%	-	-	-	-	32.1%		-	-	-	-	14.3%		-	-	-	-	17.9%		-	-	-	-	32.1%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	3.6%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)

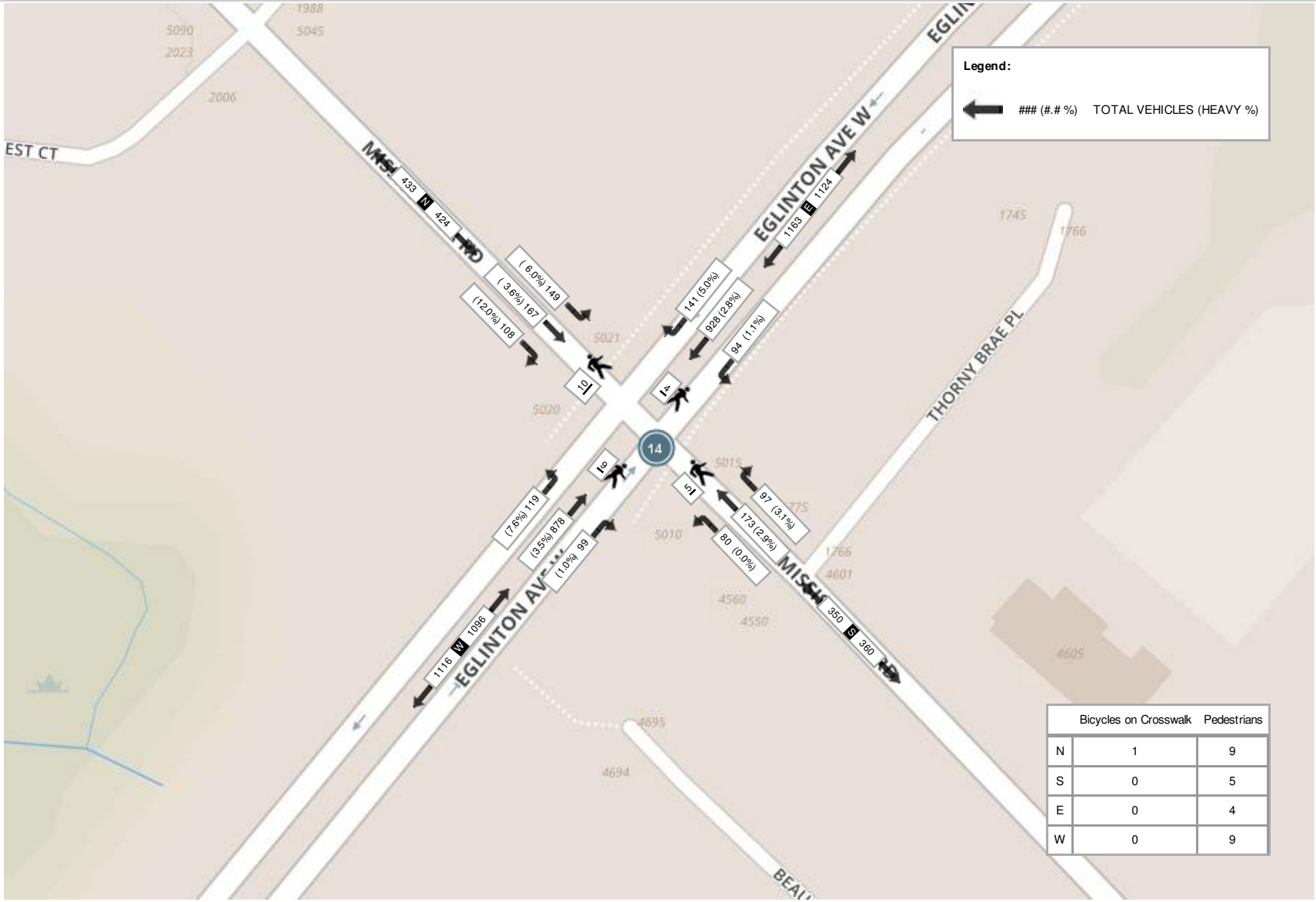
Start Time	N Approach MISSISSAUGA RD						E Approach EGLINTON AVE						S Approach MISSISSAUGA RD						W Approach EGLINTON AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	21	54	44	0	0	119	67	618	48	0	1	733	49	74	29	0	2	152	26	274	21	0	2	321	1325
17:00:00	30	79	43	0	1	152	64	487	48	0	2	599	47	86	33	0	1	166	35	275	36	0	4	346	1263
17:15:00	22	82	56	0	0	160	67	586	49	1	3	703	35	54	37	0	2	126	32	270	39	0	2	341	1330
17:30:00	25	62	39	0	2	126	61	505	34	1	2	601	34	90	40	0	3	164	40	320	30	0	2	390	1281
Grand Total	98	277	182	0	3	557	259	2196	179	2	8	2636	165	304	139	0	8	608	133	1139	126	0	10	1398	**5199**
Approach%	17.6%	49.7%	32.7%	0%		-	9.8%	83.3%	6.8%	0.1%		-	27.1%	50%	22.9%	0%		-	9.5%	81.5%	9%	0%		-	-
Totals %	1.9%	5.3%	3.5%	0%		10.7%	5%	42.2%	3.4%	0%		50.7%	3.2%	5.8%	2.7%	0%		11.7%	2.6%	21.9%	2.4%	0%		26.9%	-
PHF	0.82	0.84	0.81	0		0.87	0.97	0.89	0.91	0.5		0.9	0.84	0.84	0.87	0		0.92	0.83	0.89	0.81	0		0.9	-
Heavy	3	3	4	0		10	4	29	4	0		37	0	6	0	0		6	1	23	4	0		28	-
Heavy %	3.1%	1.1%	2.2%	0%		1.8%	1.5%	1.3%	2.2%	0%		1.4%	0%	2%	0%	0%		1%	0.8%	2%	3.2%	0%		2%	-
Lights	95	272	178	0		545	255	2167	175	2		2599	165	296	139	0		600	132	1116	122	0		1370	-
Lights %	96.9%	98.2%	97.8%	0%		97.8%	98.5%	98.7%	97.8%	100%		98.6%	100%	97.4%	100%	0%		98.7%	99.2%	98%	96.8%	0%		98%	-
Single-Unit Trucks	1	0	0	0		1	0	13	0	0		13	0	2	0	0		2	1	8	2	0		11	-
Single-Unit Trucks %	1%	0%	0%	0%		0.2%	0%	0.6%	0%	0%		0.5%	0%	0.7%	0%	0%		0.3%	0.8%	0.7%	1.6%	0%		0.8%	-
Buses	0	3	3	0		6	4	14	4	0		22	0	4	0	0		4	0	14	1	0		15	-
Buses %	0%	1.1%	1.6%	0%		1.1%	1.5%	0.6%	2.2%	0%		0.8%	0%	1.3%	0%	0%		0.7%	0%	1.2%	0.8%	0%		1.1%	-
Articulated Trucks	2	0	1	0		3	0	2	0	0		2	0	0	0	0		0	0	1	1	0		2	-
Articulated Trucks %	2%	0%	0.5%	0%		0.5%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0.8%	0%		0.1%	-
Bicycles on Road	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Bicycles on Road %	0%	0.7%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	10	-	-
Pedestrians%	-	-	-	-	10.3%		-	-	-	-	24.1%		-	-	-	-	17.2%		-	-	-	-	34.5%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3.4%		-	-	-	-	10.3%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)



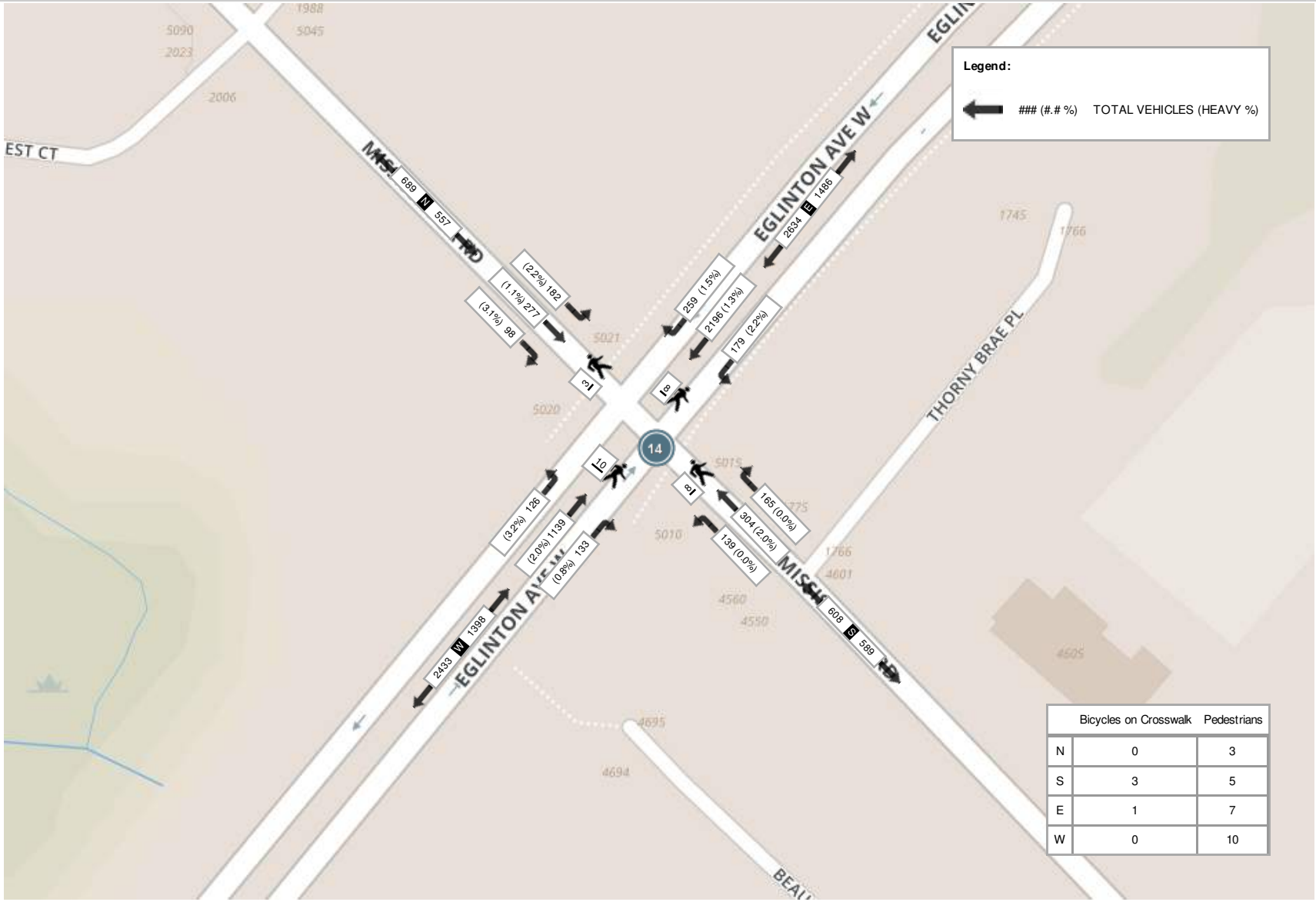
	Bicycles on Crosswalk	Pedestrians
N	6	11
S	1	7
E	2	4
W	0	11

Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	9
S	0	5
E	0	4
W	0	9

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	3	5
E	1	7
W	0	10

Spectrum

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Turning Movement Count (3 . MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD) CustID: 001-10779 MioID: 498784

Start Time	Southbound MISSISSAUGA RD						Westbound MISSISSAUGA RD						Northbound ERIN MILLS PKWY						Eastbound TURNER VALLEY RD						Int. Total (15 min)	Int. Total (1 hr)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total		
07:00:00	61	290	3	0	0	354	8	14	45	0	1	67	28	353	31	1	1	413	1	17	11	0	0	29	863	
07:15:00	65	254	5	0	2	324	12	30	41	0	0	83	34	399	41	0	0	474	9	22	8	0	1	39	920	
07:30:00	46	303	19	0	1	368	9	24	51	0	0	84	64	529	60	2	0	655	5	39	23	0	1	67	1174	
07:45:00	75	332	25	0	0	432	17	45	81	0	0	143	80	503	97	1	1	681	9	46	19	0	0	74	1330	4287
08:00:00	81	304	29	0	3	414	23	67	79	0	0	169	97	462	102	0	0	661	14	48	22	0	0	84	1328	4752
08:15:00	85	272	37	0	1	394	21	66	96	0	1	183	113	528	123	0	0	764	13	48	27	0	0	88	1429	5261
08:30:00	74	256	43	0	3	373	26	102	90	0	1	218	112	440	87	0	1	639	28	72	35	0	2	135	1365	5452
08:45:00	70	255	41	0	2	366	36	104	82	0	1	222	111	402	100	0	0	613	30	52	48	0	1	130	1331	5453
BREAK																										
11:00:00	51	198	2	0	0	251	23	17	42	0	0	82	25	198	20	1	0	244	5	27	19	0	2	51	628	
11:15:00	63	189	5	0	0	257	19	22	48	0	0	89	21	191	30	0	0	242	7	23	29	0	0	59	647	
11:30:00	66	248	5	0	0	319	32	25	64	0	0	121	19	202	34	0	0	255	4	14	29	0	0	47	742	
11:45:00	72	232	9	0	2	313	29	27	60	0	0	116	31	221	43	1	0	296	6	35	45	0	0	86	811	2828
12:00:00	65	209	7	0	5	281	63	27	74	0	0	164	37	187	47	0	1	271	6	50	76	0	1	132	848	3048
12:15:00	60	262	6	0	3	328	38	24	88	0	3	150	38	213	42	1	2	294	8	48	55	0	1	111	883	3284
12:30:00	47	221	2	1	3	271	31	28	86	0	2	145	33	216	60	0	0	309	8	35	44	0	0	87	812	3354
12:45:00	68	220	3	0	0	291	35	40	55	0	3	130	37	207	48	3	1	295	3	33	34	0	1	70	786	3329
13:00:00	60	256	2	0	0	318	36	38	71	0	0	145	44	233	56	0	0	333	3	33	51	0	0	87	883	3364
13:15:00	58	219	12	0	0	289	26	38	78	0	0	142	33	168	48	0	0	249	1	34	36	0	0	71	751	3232
13:30:00	52	252	2	0	1	306	35	30	83	0	0	148	33	217	34	0	0	284	5	33	40	0	0	78	816	3236
13:45:00	50	250	3	0	1	303	26	31	79	0	0	136	42	230	31	0	0	303	8	27	21	0	0	56	798	3248
BREAK																										
15:00:00	68	275	7	1	0	351	33	33	114	0	0	180	39	265	39	0	0	343	9	41	53	0	1	103	977	
15:15:00	59	299	28	0	2	386	37	54	100	0	0	191	41	291	45	0	0	377	4	37	37	0	1	78	1032	
15:30:00	71	273	20	0	0	364	48	54	113	0	1	215	37	318	46	0	1	401	30	58	78	0	0	166	1146	
15:45:00	47	337	15	0	3	399	30	34	79	1	2	144	34	246	26	0	3	306	31	43	67	0	0	141	990	4145
16:00:00	78	438	19	0	1	535	58	44	121	0	1	223	28	291	30	0	0	349	23	66	97	0	0	186	1293	4461
16:15:00	65	423	15	0	5	503	57	44	92	0	3	193	23	240	41	0	2	304	21	57	71	0	2	149	1149	4578
16:30:00	62	451	12	0	1	525	69	47	76	0	0	192	22	313	38	0	0	373	28	92	146	0	0	266	1356	4788
16:45:00	70	474	13	0	0	557	54	39	85	0	0	178	38	241	28	1	0	308	24	64	96	0	0	184	1227	5025
17:00:00	88	455	20	0	3	563	55	71	134	0	1	260	26	267	41	0	1	334	42	121	169	0	3	332	1489	5221
17:15:00	92	576	8	0	1	676	55	54	89	0	0	198	23	316	48	0	0	387	17	83	152	1	0	253	1514	5586

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

17:30:00	81	456	9	0	1	546	45	37	72	0	1	154	29	276	52	0	0	357	19	68	80	0	2	167	1224	5454
17:45:00	84	446	9	2	2	541	55	39	54	0	0	148	30	262	31	1	0	324	17	70	84	0	1	171	1184	5411
Grand Total	2134	9925	435	4	46	12498	1141	1349	2522	1	21	5013	1402	9425	1599	12	14	12438	438	1536	1802	1	20	3777	**33726**	-
Approach%	17.1%	79.4%	3.5%	0%		-	22.8%	26.9%	50.3%	0%		-	11.3%	75.8%	12.9%	0.1%		-	11.6%	40.7%	47.7%	0%		-	-	-
Totals %	6.3%	29.4%	1.3%	0%		37.1%	3.4%	4%	7.5%	0%		14.9%	4.2%	27.9%	4.7%	0%		36.9%	1.3%	4.6%	5.3%	0%		11.2%	-	-
Heavy	152	547	6	0		-	44	18	151	0		-	42	528	60	0		-	9	30	61	0		-	-	-
Heavy %	7.1%	5.5%	1.4%	0%		-	3.9%	1.3%	6%	0%		-	3%	5.6%	3.8%	0%		-	2.1%	2%	3.4%	0%		-	-	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	0	0	0		-	0	1	0	0		-	-	-
Bicycle %	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0%	0%	0%		-	0%	0.1%	0%	0%		-	-	-

Spectrum

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 08:00 AM - 09:00 AM Weather: Clear (0 °C)

Start Time	Southbound MISSISSAUGA RD						Westbound MISSISSAUGA RD						Northbound ERIN MILLS PKWY						Eastbound TURNER VALLEY RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
08:00:00	81	304	29	0	3	414	23	67	79	0	0	169	97	462	102	0	0	661	14	48	22	0	0	84	1328
08:15:00	85	272	37	0	1	394	21	66	96	0	1	183	113	528	123	0	0	764	13	48	27	0	0	88	1429
08:30:00	74	256	43	0	3	373	26	102	90	0	1	218	112	440	87	0	1	639	28	72	35	0	2	135	1365
08:45:00	70	255	41	0	2	366	36	104	82	0	1	222	111	402	100	0	0	613	30	52	48	0	1	130	1331
Grand Total	310	1087	150	0	9	1547	106	339	347	0	3	792	433	1832	412	0	1	2677	85	220	132	0	3	437	**5453**
Approach%	20%	70.3%	9.7%	0%		-	13.4%	42.8%	43.8%	0%		-	16.2%	68.4%	15.4%	0%		-	19.5%	50.3%	30.2%	0%		-	-
Totals %	5.7%	19.9%	2.8%	0%		28.4%	1.9%	6.2%	6.4%	0%		14.5%	7.9%	33.6%	7.6%	0%		49.1%	1.6%	4%	2.4%	0%		8%	-
PHF	0.91	0.89	0.87	0		0.93	0.74	0.81	0.9	0		0.89	0.96	0.87	0.84	0		0.88	0.71	0.76	0.69	0		0.81	-
Heavy	18	73	1	0		92	6	3	14	0		23	7	48	10	0		65	2	2	11	0		15	-
Heavy %	5.8%	6.7%	0.7%	0%		5.9%	5.7%	0.9%	4%	0%		2.9%	1.6%	2.6%	2.4%	0%		2.4%	2.4%	0.9%	8.3%	0%		3.4%	-
Lights	292	1014	149	0		1455	100	336	333	0		769	426	1784	402	0		2612	83	218	121	0		422	-
Lights %	94.2%	93.3%	99.3%	0%		94.1%	94.3%	99.1%	96%	0%		97.1%	98.4%	97.4%	97.6%	0%		97.6%	97.6%	99.1%	91.7%	0%		96.6%	-
Single-Unit Trucks	6	32	0	0		38	6	1	6	0		13	2	19	7	0		28	2	1	3	0		6	-
Single-Unit Trucks %	1.9%	2.9%	0%	0%		2.5%	5.7%	0.3%	1.7%	0%		1.6%	0.5%	1%	1.7%	0%		1%	2.4%	0.5%	2.3%	0%		1.4%	-
Buses	6	16	1	0		23	0	2	1	0		3	5	10	3	0		18	0	0	5	0		5	-
Buses %	1.9%	1.5%	0.7%	0%		1.5%	0%	0.6%	0.3%	0%		0.4%	1.2%	0.5%	0.7%	0%		0.7%	0%	0%	3.8%	0%		1.1%	-
Articulated Trucks	6	25	0	0		31	0	0	7	0		7	0	19	0	0		19	0	1	3	0		4	-
Articulated Trucks %	1.9%	2.3%	0%	0%		2%	0%	0%	2%	0%		0.9%	0%	1%	0%	0%		0.7%	0%	0.5%	2.3%	0%		0.9%	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	56.3%		-	-	-	-	18.8%		-	-	-	-	6.3%		-	-	-	-	18.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear (9.6 °C)

Start Time	Southbound MISSISSAUGA RD						Westbound MISSISSAUGA RD						Northbound ERIN MILLS PKWY						Eastbound TURNER VALLEY RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:15:00	60	262	6	0	3	328	38	24	88	0	3	150	38	213	42	1	2	294	8	48	55	0	1	111	883
12:30:00	47	221	2	1	3	271	31	28	86	0	2	145	33	216	60	0	0	309	8	35	44	0	0	87	812
12:45:00	68	220	3	0	0	291	35	40	55	0	3	130	37	207	48	3	1	295	3	33	34	0	1	70	786
13:00:00	60	256	2	0	0	318	36	38	71	0	0	145	44	233	56	0	0	333	3	33	51	0	0	87	883
Grand Total	235	959	13	1	6	1208	140	130	300	0	8	570	152	869	206	4	3	1231	22	149	184	0	2	355	**3364**
Approach%	19.5%	79.4%	1.1%	0.1%		-	24.6%	22.8%	52.6%	0%		-	12.3%	70.6%	16.7%	0.3%		-	6.2%	42%	51.8%	0%		-	-
Totals %	7%	28.5%	0.4%	0%		35.9%	4.2%	3.9%	8.9%	0%		16.9%	4.5%	25.8%	6.1%	0.1%		36.6%	0.7%	4.4%	5.5%	0%		10.6%	-
PHF	0.86	0.92	0.54	0.25		0.92	0.92	0.81	0.85	0		0.95	0.86	0.93	0.86	0.33		0.92	0.69	0.78	0.84	0		0.8	-
Heavy	21	77	1	0		99	4	3	18	0		25	6	73	13	0		92	0	4	11	0		15	-
Heavy %	8.9%	8%	7.7%	0%		8.2%	2.9%	2.3%	6%	0%		4.4%	3.9%	8.4%	6.3%	0%		7.5%	0%	2.7%	6%	0%		4.2%	-
Lights	214	882	12	1		1109	136	127	282	0		545	146	796	193	4		1139	22	145	173	0		340	-
Lights %	91.1%	92%	92.3%	100%		91.8%	97.1%	97.7%	94%	0%		95.6%	96.1%	91.6%	93.7%	100%		92.5%	100%	97.3%	94%	0%		95.8%	-
Single-Unit Trucks	8	37	1	0		46	3	3	8	0		14	3	41	7	0		51	0	2	3	0		5	-
Single-Unit Trucks %	3.4%	3.9%	7.7%	0%		3.8%	2.1%	2.3%	2.7%	0%		2.5%	2%	4.7%	3.4%	0%		4.1%	0%	1.3%	1.6%	0%		1.4%	-
Buses	5	6	0	0		11	1	0	1	0		2	3	10	3	0		16	0	2	5	0		7	-
Buses %	2.1%	0.6%	0%	0%		0.9%	0.7%	0%	0.3%	0%		0.4%	2%	1.2%	1.5%	0%		1.3%	0%	1.3%	2.7%	0%		2%	-
Articulated Trucks	8	34	0	0		42	0	0	9	0		9	0	22	3	0		25	0	0	3	0		3	-
Articulated Trucks %	3.4%	3.5%	0%	0%		3.5%	0%	0%	3%	0%		1.6%	0%	2.5%	1.5%	0%		2%	0%	0%	1.6%	0%		0.8%	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	8	-	-	-	-	-	3	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	31.6%		-	-	-	-	42.1%		-	-	-	-	15.8%		-	-	-	-	5.3%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	5.3%		-
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

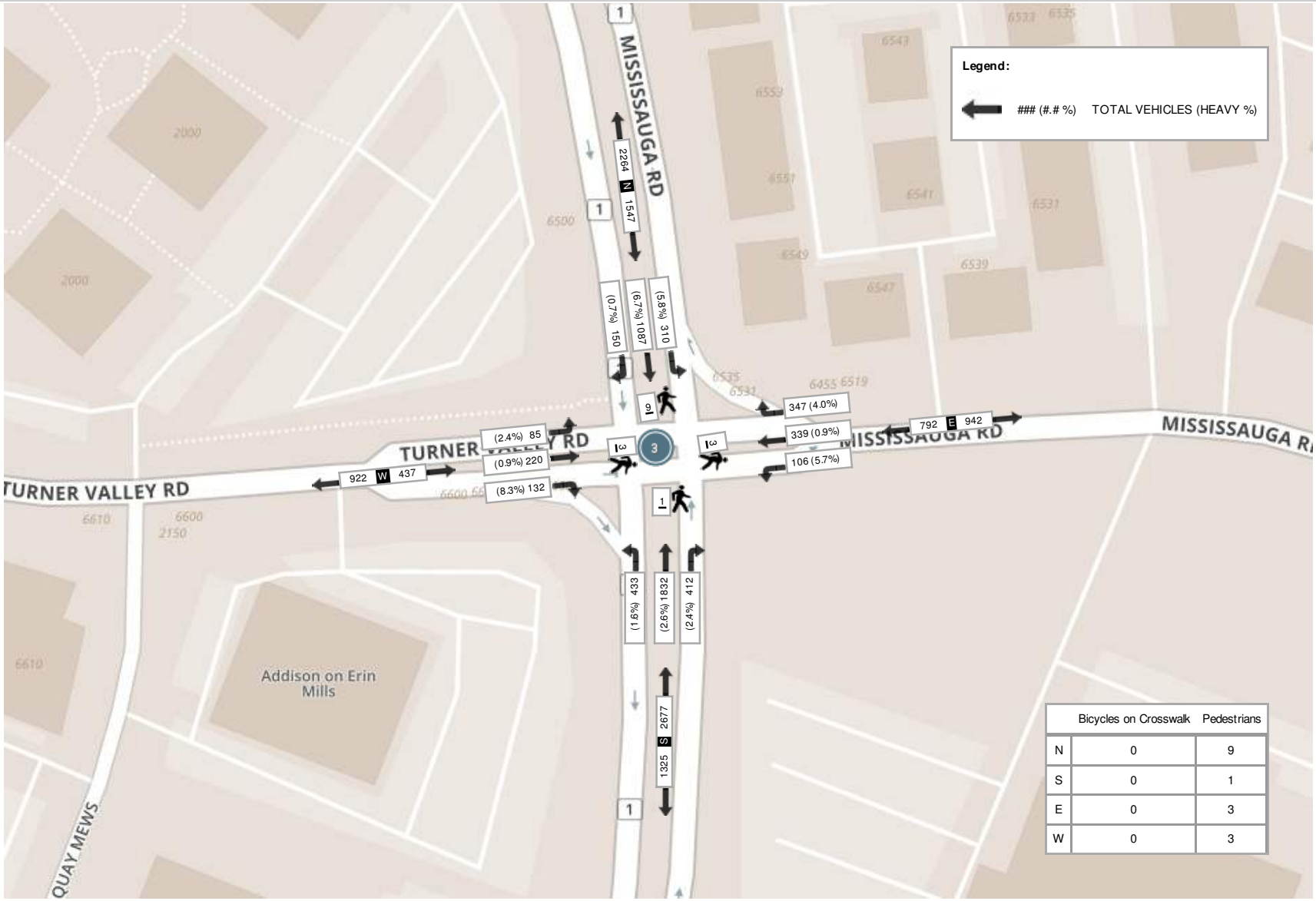
Peak Hour: 04:30 PM - 05:30 PM Weather: Clear (14.1 °C)

Start Time	Southbound MISSISSAUGA RD						Westbound MISSISSAUGA RD						Northbound ERIN MILLS PKWY						Eastbound TURNER VALLEY RD						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
16:30:00	62	451	12	0	1	525	69	47	76	0	0	192	22	313	38	0	0	373	28	92	146	0	0	266	1356
16:45:00	70	474	13	0	0	557	54	39	85	0	0	178	38	241	28	1	0	308	24	64	96	0	0	184	1227
17:00:00	88	455	20	0	3	563	55	71	134	0	1	260	26	267	41	0	1	334	42	121	169	0	3	332	1489
17:15:00	92	576	8	0	1	676	55	54	89	0	0	198	23	316	48	0	0	387	17	83	152	1	0	253	1514
Grand Total	312	1956	53	0	5	2321	233	211	384	0	1	828	109	1137	155	1	1	1402	111	360	563	1	3	1035	**5586**
Approach%	13.4%	84.3%	2.3%	0%		-	28.1%	25.5%	46.4%	0%		-	7.8%	81.1%	11.1%	0.1%		-	10.7%	34.8%	54.4%	0.1%		-	-
Totals %	5.6%	35%	0.9%	0%		41.6%	4.2%	3.8%	6.9%	0%		14.8%	2%	20.4%	2.8%	0%		25.1%	2%	6.4%	10.1%	0%		18.5%	-
PHF	0.85	0.85	0.66	0		0.86	0.84	0.74	0.72	0		0.8	0.72	0.9	0.81	0.25		0.91	0.66	0.74	0.83	0.25		0.78	-
Heavy	16	43	1	0		60	2	2	18	0		22	4	74	8	0		86	0	4	8	0		12	-
Heavy %	5.1%	2.2%	1.9%	0%		2.6%	0.9%	0.9%	4.7%	0%		2.7%	3.7%	6.5%	5.2%	0%		6.1%	0%	1.1%	1.4%	0%		1.2%	-
Lights	296	1913	52	0		2261	231	209	366	0		806	105	1063	147	1		1316	111	356	555	1		1023	-
Lights %	94.9%	97.8%	98.1%	0%		97.4%	99.1%	99.1%	95.3%	0%		97.3%	96.3%	93.5%	94.8%	100%		93.9%	100%	98.9%	98.6%	100%		98.8%	-
Single-Unit Trucks	9	15	1	0		25	0	2	10	0		12	1	25	5	0		31	0	4	5	0		9	-
Single-Unit Trucks %	2.9%	0.8%	1.9%	0%		1.1%	0%	0.9%	2.6%	0%		1.4%	0.9%	2.2%	3.2%	0%		2.2%	0%	1.1%	0.9%	0%		0.9%	-
Buses	0	10	0	0		10	1	0	2	0		3	3	16	1	0		20	0	0	3	0		3	-
Buses %	0%	0.5%	0%	0%		0.4%	0.4%	0%	0.5%	0%		0.4%	2.8%	1.4%	0.6%	0%		1.4%	0%	0%	0.5%	0%		0.3%	-
Articulated Trucks	7	18	0	0		25	1	0	6	0		7	0	33	2	0		35	0	0	0	0		0	-
Articulated Trucks %	2.2%	0.9%	0%	0%		1.1%	0.4%	0%	1.6%	0%		0.8%	0%	2.9%	1.3%	0%		2.5%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	50%		-	-	-	-	10%		-	-	-	-	10%		-	-	-	-	30%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

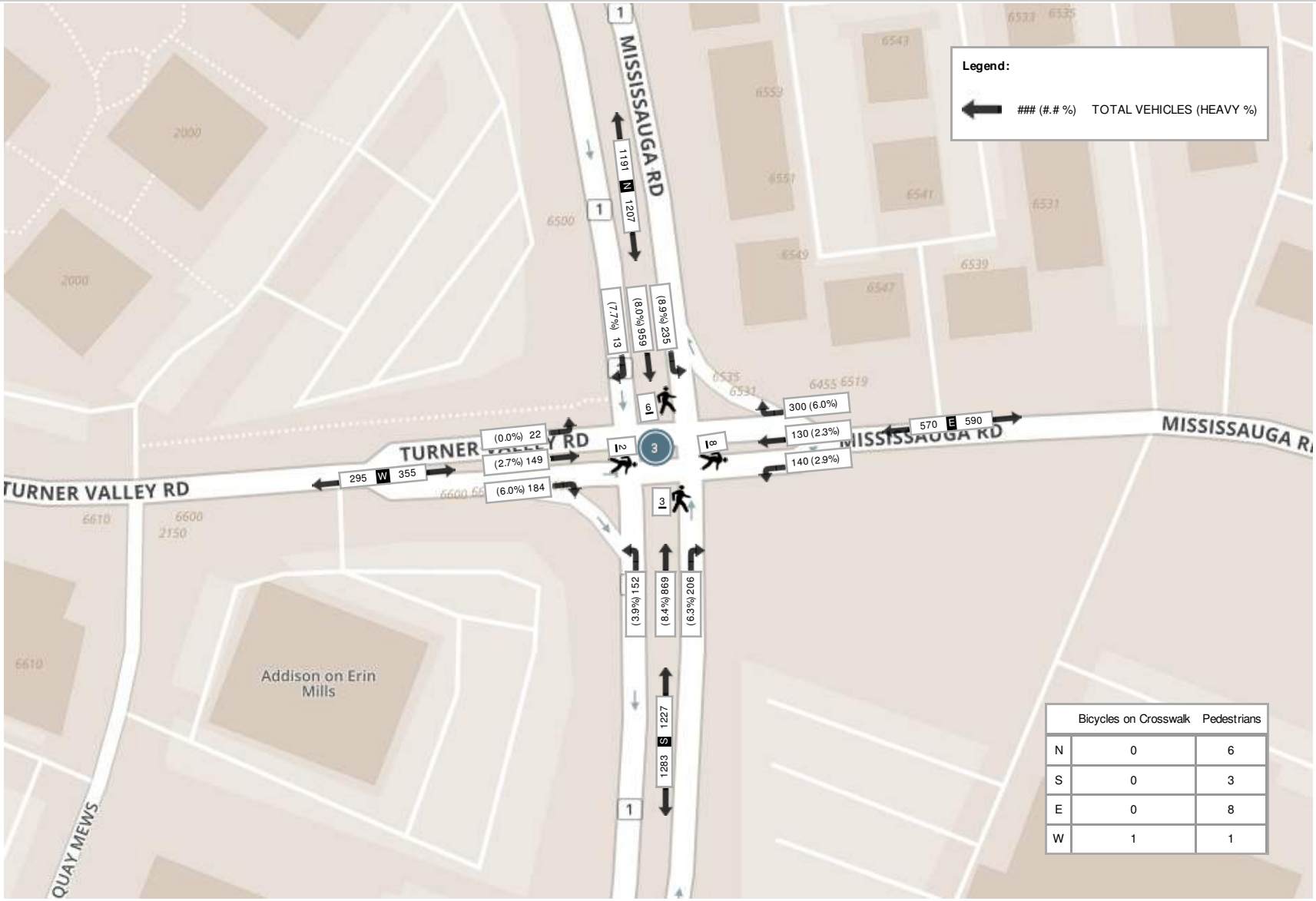
Peak Hour: 08:00 AM - 09:00 AM Weather: Clear (0 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	9
S	0	1
E	0	3
W	0	3

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 12:15 PM - 01:15 PM Weather: Clear (9.6 °C)

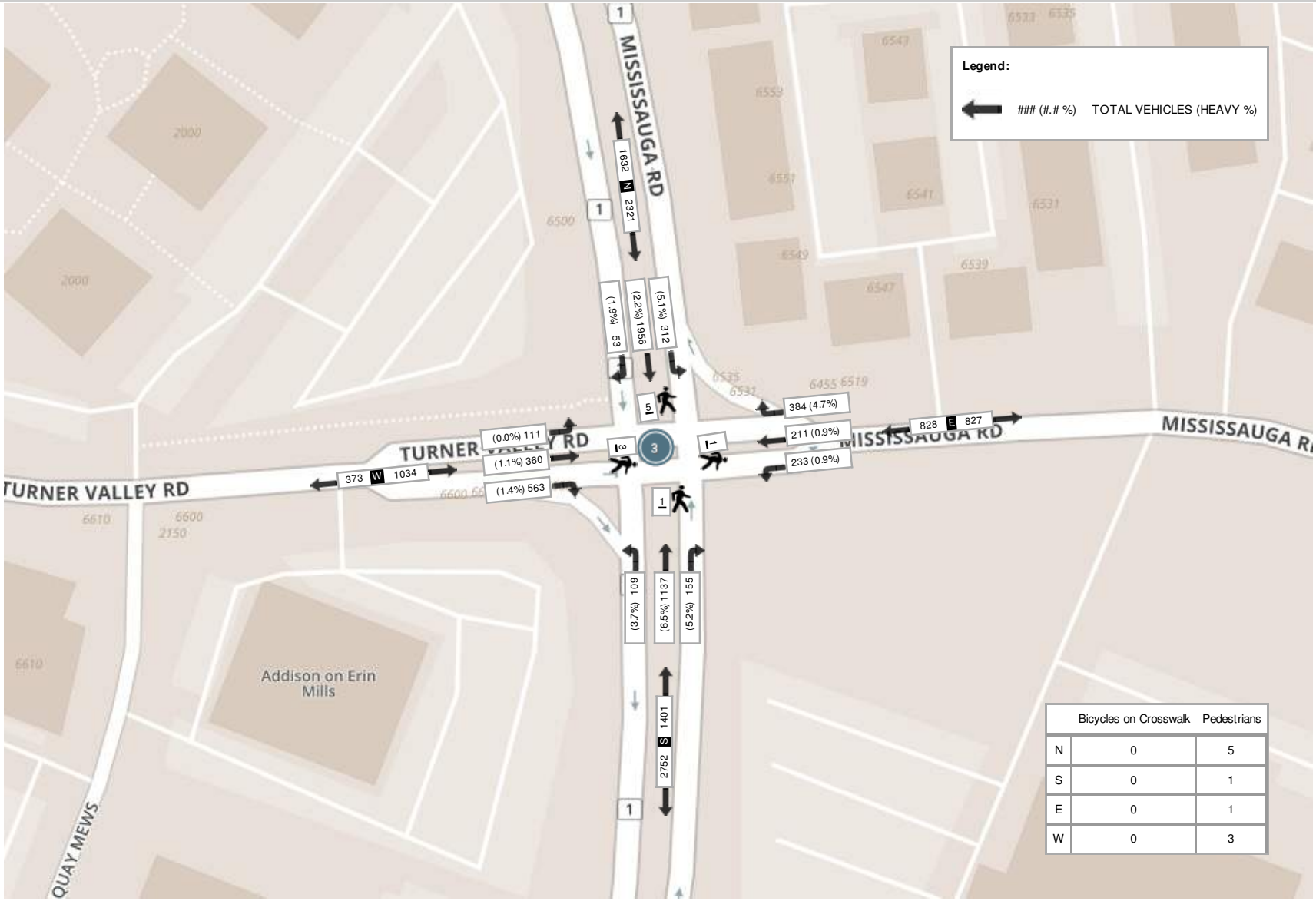


	Bicycles on Crosswalk	Pedestrians
N	0	6
S	0	3
E	0	8
W	1	1

Turning Movement Count
Location Name: MISSISSAUGA RD & TURNER VALLEY RD / MISSISSAUGA RD
Date: Tue, Feb 27, 2018 Deployment Lead: Theo Daglis

Peel Region
10 Peel Centre Drive
Suite B - 4th Floor
Brampton ON, Canada, L6T 4B9

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear (14.1 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	5
S	0	1
E	0	1
W	0	3

Turning Movement Count (11 . QUEEN ST & BRITANNIA RD) CustID: 00305449 MioID: 669927

Start Time	N Approach QUEEN ST						E Approach BRITANNIA RD						S Approach QUEEN ST						W Approach BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	35	37	31	0	0	103	20	108	12	0	0	140	21	45	25	0	3	91	24	334	28	0	0	386	720	
07:15:00	29	42	31	0	0	102	29	120	14	0	0	163	28	70	15	0	3	113	16	390	29	0	0	435	813	
07:30:00	33	46	30	0	3	109	48	154	24	0	1	226	31	72	15	0	3	118	17	435	23	0	0	475	928	
07:45:00	56	61	46	0	7	163	50	174	24	0	0	248	37	92	22	0	3	151	19	381	42	0	0	442	1004	3465
08:00:00	40	70	32	0	6	142	50	154	24	0	2	228	32	96	34	0	1	162	26	413	48	1	2	488	1020	3765
08:15:00	32	51	23	0	7	106	87	195	23	0	0	305	33	124	23	0	3	180	28	398	50	0	2	476	1067	4019
08:30:00	33	68	33	0	0	134	82	152	23	0	0	257	31	131	28	0	3	190	27	375	64	0	1	466	1047	4138
08:45:00	29	59	26	0	2	114	110	190	22	0	1	322	22	102	26	0	4	150	36	429	62	0	0	527	1113	4247
09:00:00	38	60	33	0	5	131	55	144	35	0	0	234	21	85	20	0	1	126	44	305	44	0	0	393	884	4111
09:15:00	25	63	39	0	1	127	42	115	23	0	1	180	22	65	24	0	1	111	29	284	44	0	0	357	775	3819
09:30:00	22	47	25	0	0	94	38	108	22	0	2	168	27	49	17	0	3	93	25	215	26	0	0	266	621	3393
09:45:00	21	62	19	0	2	102	37	102	34	0	0	173	21	48	21	0	2	90	46	271	37	0	0	354	719	2999
BREAK																										
11:00:00	27	47	33	0	1	107	27	141	23	0	1	191	19	68	27	0	1	114	23	142	30	0	0	195	607	
11:15:00	23	69	33	0	4	125	28	143	29	0	1	200	36	60	12	0	1	108	35	187	39	0	1	261	694	
11:30:00	41	70	42	0	4	153	26	132	40	0	0	198	37	75	31	0	1	143	14	153	29	0	1	196	690	
11:45:00	49	56	37	0	1	142	35	149	33	0	1	217	23	74	31	0	1	128	28	193	42	0	0	263	750	2741
12:00:00	39	59	30	0	1	128	17	162	25	0	1	204	33	88	23	0	0	144	37	176	42	0	0	255	731	2865
12:15:00	30	81	38	0	1	149	42	165	34	0	2	241	32	77	38	0	2	147	34	173	35	0	0	242	779	2950
12:30:00	44	64	29	0	0	137	46	199	24	0	0	269	31	79	29	0	2	139	35	154	50	0	2	239	784	3044
12:45:00	28	77	40	0	2	145	54	208	30	0	1	292	26	77	23	0	1	126	38	163	36	0	0	237	800	3094
13:00:00	52	67	26	0	3	145	35	191	26	0	0	252	32	81	31	0	2	144	23	146	27	0	1	196	737	3100
13:15:00	32	48	27	0	1	107	38	178	39	0	1	255	30	77	25	0	2	132	24	170	27	0	0	221	715	3036
13:30:00	39	80	31	0	3	150	39	164	27	0	2	230	42	86	28	0	8	156	26	150	37	0	0	213	749	3001
13:45:00	40	64	33	0	4	137	29	199	39	0	1	267	36	66	34	0	1	136	35	187	20	0	1	242	782	2983
BREAK																										
16:00:00	67	87	67	0	6	221	30	280	35	1	1	346	30	83	41	0	2	154	32	164	43	0	0	239	960	
16:15:00	53	88	59	0	3	200	26	328	27	0	3	381	24	78	42	1	6	145	35	199	37	0	1	271	997	
16:30:00	95	99	67	0	1	261	20	330	16	0	0	366	36	108	33	0	4	177	20	239	36	0	2	295	1099	
16:45:00	87	123	75	0	1	285	32	308	27	0	2	367	35	90	52	0	5	177	36	226	36	0	0	298	1127	4183
17:00:00	112	121	61	0	3	294	25	344	27	0	1	396	52	91	55	0	5	198	44	241	36	0	1	321	1209	4432

17:15:00	111	147	86	0	0	344	19	329	23	0	1	371	26	99	43	0	2	168	34	220	32	0	0	286	1169	4604
17:30:00	100	134	72	0	1	306	20	353	35	0	0	408	49	83	51	0	8	183	28	232	30	0	0	290	1187	4692
17:45:00	76	98	73	0	6	247	22	322	33	0	3	377	32	65	42	0	7	139	28	258	42	0	1	328	1091	4656
18:00:00	69	91	73	0	2	233	28	290	27	0	2	345	39	83	46	0	3	168	32	216	31	0	0	279	1025	4472
18:15:00	62	65	62	0	1	189	23	342	33	0	0	398	35	72	36	0	6	143	35	260	37	0	0	332	1062	4365
18:30:00	35	67	54	0	5	156	26	353	15	0	0	394	35	82	23	0	4	140	41	251	28	0	1	320	1010	4188
18:45:00	34	72	51	0	0	157	33	325	32	0	0	390	36	70	40	0	3	146	29	209	29	0	0	267	960	4057
Grand Total	1738	2640	1567	0	87	5945	1368	7651	979	1	31	9999	1132	2891	1106	1	107	5130	1083	8939	1328	1	17	11351	**32425**	-
Approach%	29.2%	44.4%	26.4%	0%		-	13.7%	76.5%	9.8%	0%		-	22.1%	56.4%	21.6%	0%		-	9.5%	78.8%	11.7%	0%		-	-	-
Totals %	5.4%	8.1%	4.8%	0%		18.3%	4.2%	23.6%	3%	0%		30.8%	3.5%	8.9%	3.4%	0%		15.8%	3.3%	27.6%	4.1%	0%		35%	-	-
Heavy	67	68	51	0		-	55	264	24	0		-	25	81	32	0		-	27	265	50	0		-	-	-
Heavy %	3.9%	2.6%	3.3%	0%		-	4%	3.5%	2.5%	0%		-	2.2%	2.8%	2.9%	0%		-	2.5%	3%	3.8%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (15.02 °C)

Start Time	N Approach QUEEN ST						E Approach BRITANNIA RD						S Approach QUEEN ST						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	40	70	32	0	6	142	50	154	24	0	2	228	32	96	34	0	1	162	26	413	48	1	2	488	1020
08:15:00	32	51	23	0	7	106	87	195	23	0	0	305	33	124	23	0	3	180	28	398	50	0	2	476	1067
08:30:00	33	68	33	0	0	134	82	152	23	0	0	257	31	131	28	0	3	190	27	375	64	0	1	466	1047
08:45:00	29	59	26	0	2	114	110	190	22	0	1	322	22	102	26	0	4	150	36	429	62	0	0	527	1113
Grand Total	134	248	114	0	15	496	329	691	92	0	3	1112	118	453	111	0	11	682	117	1615	224	1	5	1957	**4247**
Approach%	27%	50%	23%	0%		-	29.6%	62.1%	8.3%	0%		-	17.3%	66.4%	16.3%	0%		-	6%	82.5%	11.4%	0.1%		-	-
Totals %	3.2%	5.8%	2.7%	0%		11.7%	7.7%	16.3%	2.2%	0%		26.2%	2.8%	10.7%	2.6%	0%		16.1%	2.8%	38%	5.3%	0%		46.1%	-
PHF	0.84	0.89	0.86	0		0.87	0.75	0.89	0.96	0		0.86	0.89	0.86	0.82	0		0.9	0.81	0.94	0.88	0.25		0.93	-
Heavy	13	8	3	0		24	7	51	2	0		60	2	7	8	0		17	5	37	3	0		45	-
Heavy %	9.7%	3.2%	2.6%	0%		4.8%	2.1%	7.4%	2.2%	0%		5.4%	1.7%	1.5%	7.2%	0%		2.5%	4.3%	2.3%	1.3%	0%		2.3%	-
Lights	121	240	111	0		472	321	640	90	0		1051	116	445	103	0		664	112	1578	221	1		1912	-
Lights %	90.3%	96.8%	97.4%	0%		95.2%	97.6%	92.6%	97.8%	0%		94.5%	98.3%	98.2%	92.8%	0%		97.4%	95.7%	97.7%	98.7%	100%		97.7%	-
Single-Unit Trucks	1	2	3	0		6	2	11	1	0		14	1	0	2	0		3	2	11	0	0		13	-
Single-Unit Trucks %	0.7%	0.8%	2.6%	0%		1.2%	0.6%	1.6%	1.1%	0%		1.3%	0.8%	0%	1.8%	0%		0.4%	1.7%	0.7%	0%	0%		0.7%	-
Buses	9	6	0	0		15	5	32	1	0		38	1	7	6	0		14	3	22	2	0		27	-
Buses %	6.7%	2.4%	0%	0%		3%	1.5%	4.6%	1.1%	0%		3.4%	0.8%	1.5%	5.4%	0%		2.1%	2.6%	1.4%	0.9%	0%		1.4%	-
Articulated Trucks	3	0	0	0		3	0	8	0	0		8	0	0	0	0		0	0	4	1	0		5	-
Articulated Trucks %	2.2%	0%	0%	0%		0.6%	0%	1.2%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.2%	0.4%	0%		0.3%	-
Bicycles on Road	0	0	0	0		0	1	0	0	0		1	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0.3%	0%	0%	0%		0.1%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	38.2%		-	-	-	-	8.8%		-	-	-	-	29.4%		-	-	-	-	14.7%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	5.9%		-	-	-	-	0%		-	-	-	-	2.9%		-	-	-	-	0%		-

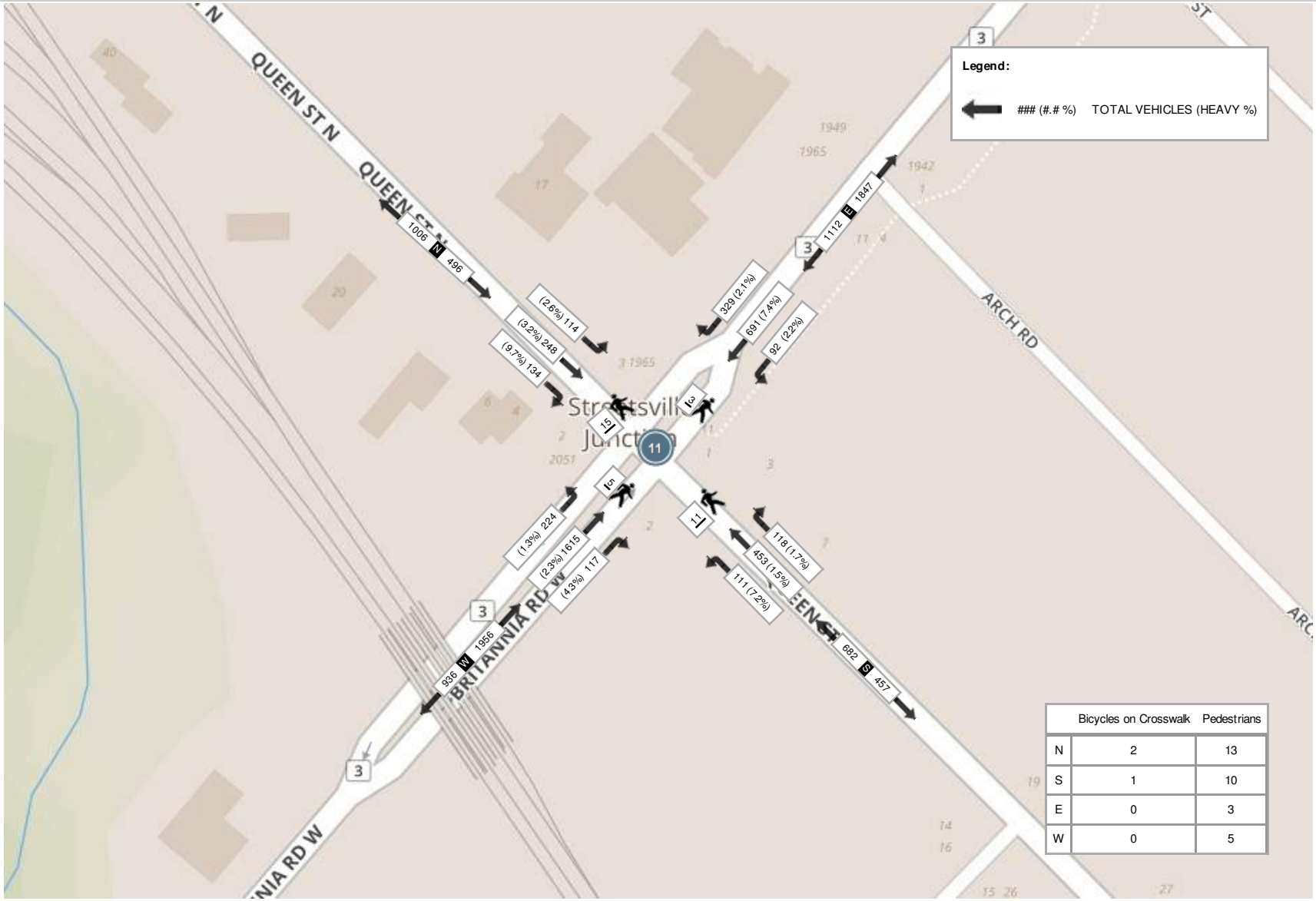
Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)

Start Time	N Approach QUEEN ST						E Approach BRITANNIA RD						S Approach QUEEN ST						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	30	81	38	0	1	149	42	165	34	0	2	241	32	77	38	0	2	147	34	173	35	0	0	242	779
12:30:00	44	64	29	0	0	137	46	199	24	0	0	269	31	79	29	0	2	139	35	154	50	0	2	239	784
12:45:00	28	77	40	0	2	145	54	208	30	0	1	292	26	77	23	0	1	126	38	163	36	0	0	237	800
13:00:00	52	67	26	0	3	145	35	191	26	0	0	252	32	81	31	0	2	144	23	146	27	0	1	196	737
Grand Total	154	289	133	0	6	576	177	763	114	0	3	1054	121	314	121	0	7	556	130	636	148	0	3	914	**3100**
Approach%	26.7%	50.2%	23.1%	0%		-	16.8%	72.4%	10.8%	0%		-	21.8%	56.5%	21.8%	0%		-	14.2%	69.6%	16.2%	0%		-	-
Totals %	5%	9.3%	4.3%	0%		18.6%	5.7%	24.6%	3.7%	0%		34%	3.9%	10.1%	3.9%	0%		17.9%	4.2%	20.5%	4.8%	0%		29.5%	-
PHF	0.74	0.89	0.83	0		0.97	0.82	0.92	0.84	0		0.9	0.95	0.97	0.8	0		0.95	0.86	0.92	0.74	0		0.94	-
Heavy	11	9	6	0		26	14	35	2	0		51	2	10	3	0		15	4	21	10	0		35	-
Heavy %	7.1%	3.1%	4.5%	0%		4.5%	7.9%	4.6%	1.8%	0%		4.8%	1.7%	3.2%	2.5%	0%		2.7%	3.1%	3.3%	6.8%	0%		3.8%	-
Lights	143	279	127	0		549	163	728	112	0		1003	119	304	118	0		541	126	613	138	0		877	-
Lights %	92.9%	96.5%	95.5%	0%		95.3%	92.1%	95.4%	98.2%	0%		95.2%	98.3%	96.8%	97.5%	0%		97.3%	96.9%	96.4%	93.2%	0%		96%	-
Single-Unit Trucks	1	5	4	0		10	7	14	2	0		23	2	6	2	0		10	4	8	2	0		14	-
Single-Unit Trucks %	0.6%	1.7%	3%	0%		1.7%	4%	1.8%	1.8%	0%		2.2%	1.7%	1.9%	1.7%	0%		1.8%	3.1%	1.3%	1.4%	0%		1.5%	-
Buses	10	4	0	0		14	1	9	0	0		10	0	4	1	0		5	0	12	6	0		18	-
Buses %	6.5%	1.4%	0%	0%		2.4%	0.6%	1.2%	0%	0%		0.9%	0%	1.3%	0.8%	0%		0.9%	0%	1.9%	4.1%	0%		2%	-
Articulated Trucks	0	0	2	0		2	6	12	0	0		18	0	0	0	0		0	0	1	2	0		3	-
Articulated Trucks %	0%	0%	1.5%	0%		0.3%	3.4%	1.6%	0%	0%		1.7%	0%	0%	0%	0%		0%	0%	0.2%	1.4%	0%		0.3%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	-
Bicycles on Road %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	7	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	26.3%		-	-	-	-	15.8%		-	-	-	-	36.8%		-	-	-	-	15.8%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	5.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (24.34 °C)

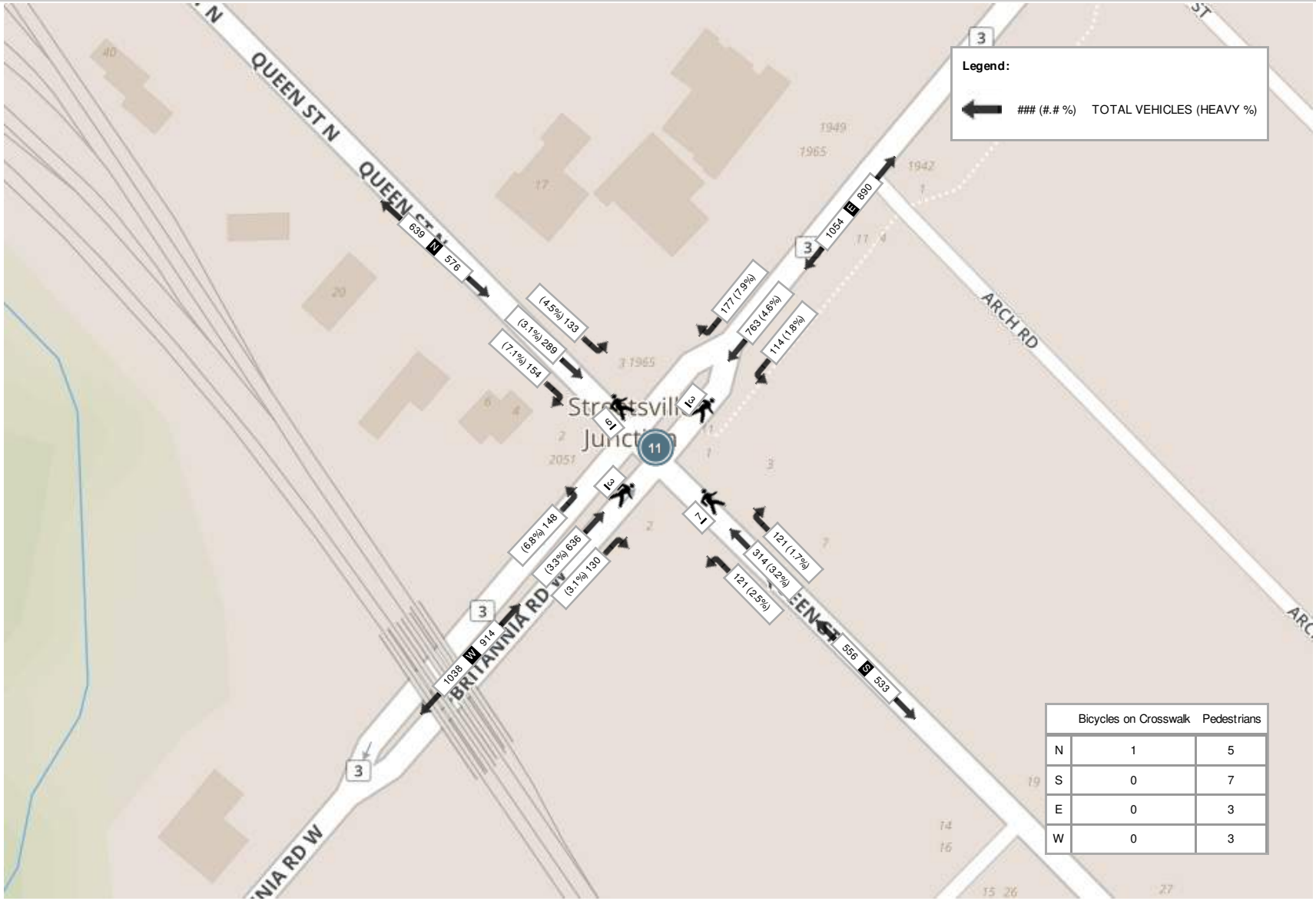
Start Time	N Approach QUEEN ST						E Approach BRITANNIA RD						S Approach QUEEN ST						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	87	123	75	0	1	285	32	308	27	0	2	367	35	90	52	0	5	177	36	226	36	0	0	298	1127
17:00:00	112	121	61	0	3	294	25	344	27	0	1	396	52	91	55	0	5	198	44	241	36	0	1	321	1209
17:15:00	111	147	86	0	0	344	19	329	23	0	1	371	26	99	43	0	2	168	34	220	32	0	0	286	1169
17:30:00	100	134	72	0	1	306	20	353	35	0	0	408	49	83	51	0	8	183	28	232	30	0	0	290	1187
Grand Total	410	525	294	0	5	1229	96	1334	112	0	4	1542	162	363	201	0	20	726	142	919	134	0	1	1195	**4692**
Approach%	33.4%	42.7%	23.9%	0%		-	6.2%	86.5%	7.3%	0%		-	22.3%	50%	27.7%	0%		-	11.9%	76.9%	11.2%	0%		-	-
Totals %	8.7%	11.2%	6.3%	0%		26.2%	2%	28.4%	2.4%	0%		32.9%	3.5%	7.7%	4.3%	0%		15.5%	3%	19.6%	2.9%	0%		25.5%	-
PHF	0.92	0.89	0.85	0		0.89	0.75	0.94	0.8	0		0.94	0.78	0.92	0.91	0		0.92	0.81	0.95	0.93	0		0.93	-
Heavy	1	5	5	0		11	3	12	0	0		15	2	5	2	0		9	2	14	8	0		24	-
Heavy %	0.2%	1%	1.7%	0%		0.9%	3.1%	0.9%	0%	0%		1%	1.2%	1.4%	1%	0%		1.2%	1.4%	1.5%	6%	0%		2%	-
Lights	409	520	289	0		1218	93	1322	112	0		1527	160	358	199	0		717	140	905	126	0		1171	-
Lights %	99.8%	99%	98.3%	0%		99.1%	96.9%	99.1%	100%	0%		99%	98.8%	98.6%	99%	0%		98.8%	98.6%	98.5%	94%	0%		98%	-
Single-Unit Trucks	0	1	1	0		2	3	3	0	0		6	2	2	1	0		5	2	4	3	0		9	-
Single-Unit Trucks %	0%	0.2%	0.3%	0%		0.2%	3.1%	0.2%	0%	0%		0.4%	1.2%	0.6%	0.5%	0%		0.7%	1.4%	0.4%	2.2%	0%		0.8%	-
Buses	1	4	3	0		8	0	7	0	0		7	0	3	1	0		4	0	7	5	0		12	-
Buses %	0.2%	0.8%	1%	0%		0.7%	0%	0.5%	0%	0%		0.5%	0%	0.8%	0.5%	0%		0.6%	0%	0.8%	3.7%	0%		1%	-
Articulated Trucks	0	0	1	0		1	0	2	0	0		2	0	0	0	0		0	0	3	0	0		3	-
Articulated Trucks %	0%	0%	0.3%	0%		0.1%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	10	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	13.3%		-	-	-	-	10%		-	-	-	-	33.3%		-	-	-	-	3.3%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	10	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	3.3%		-	-	-	-	3.3%		-	-	-	-	33.3%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast Clouds (15.02 °C)



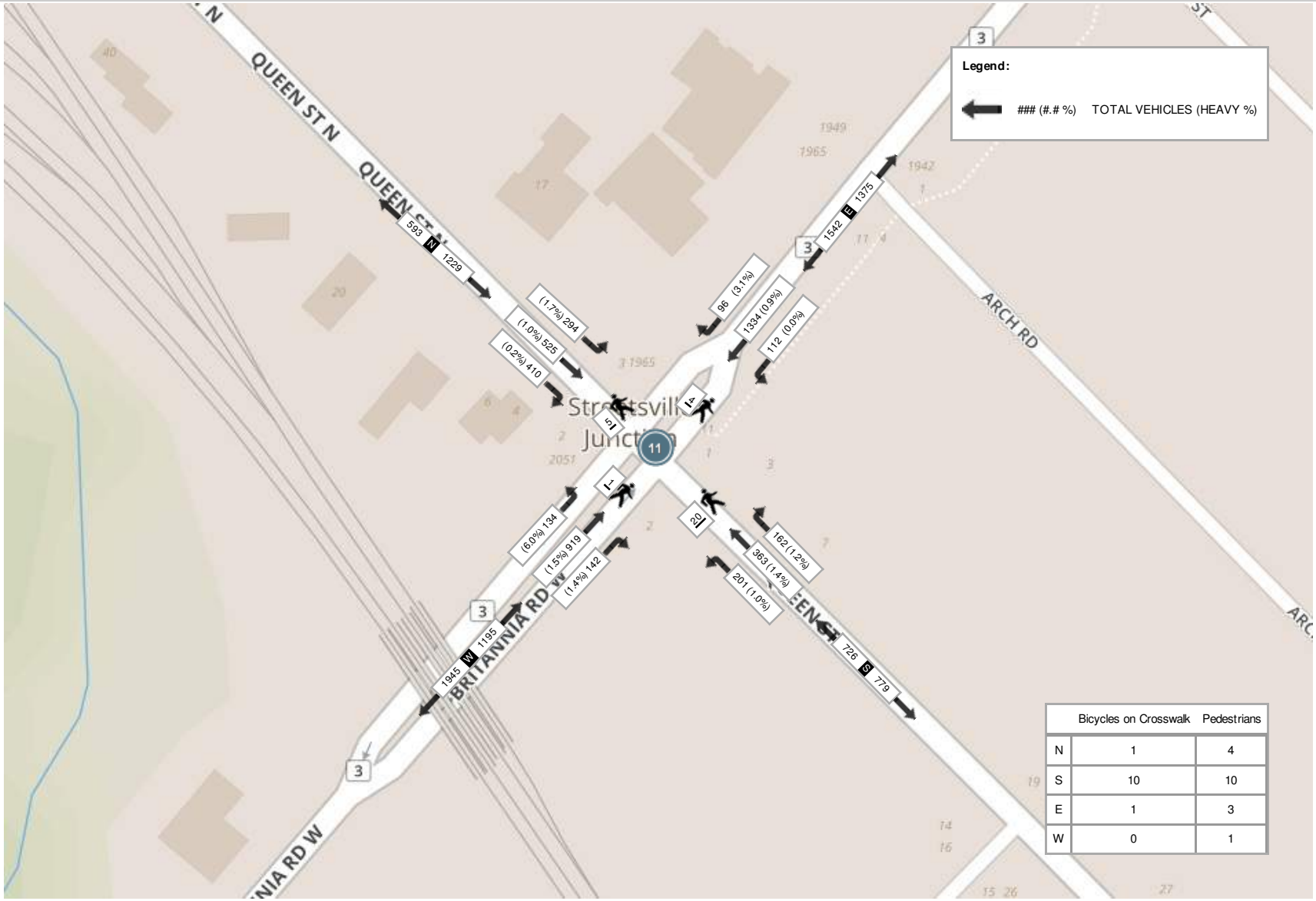
	Bicycles on Crosswalk	Pedestrians
N	2	13
S	1	10
E	0	3
W	0	5

Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	5
S	0	7
E	0	3
W	0	3

Peak Hour: 04:45 PM - 05:45 PM Weather: Broken Clouds (24.34 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	4
S	10	10
E	1	3
W	0	1

Turning Movement Count (12 . QUEEN ST & THOMAS RD)

Start Time	N Approach QUEEN ST					S Approach QUEEN ST					W Approach THOMAS RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	31	49	0	3	80	33	5	0	2	38	31	29	0	4	60	178	
07:15:00	39	61	0	1	100	51	13	0	3	64	23	54	0	5	77	241	
07:30:00	50	85	0	0	135	84	14	0	0	98	29	73	0	0	102	335	
07:45:00	46	72	0	3	118	80	17	1	2	98	23	86	0	1	109	325	1079
08:00:00	46	67	0	2	113	101	15	0	3	116	33	85	0	2	118	347	1248
08:15:00	20	72	0	3	92	97	15	0	1	112	40	86	0	5	126	330	1337
08:30:00	47	70	0	4	117	104	25	0	4	129	49	76	0	8	125	371	1373
08:45:00	31	55	0	5	86	91	19	0	2	110	37	71	0	2	108	304	1352
09:00:00	52	68	0	3	120	76	11	0	1	87	22	67	0	6	89	296	1301
09:15:00	26	59	0	2	85	79	9	0	3	88	23	47	0	8	70	243	1214
09:30:00	24	50	0	2	74	69	13	0	3	82	16	36	0	6	52	208	1051
09:45:00	24	62	0	8	86	73	9	0	6	82	15	34	0	8	49	217	964
BREAK																	
11:00:00	45	64	0	5	109	77	16	0	1	93	28	47	0	9	75	277	
11:15:00	39	69	0	2	108	72	10	0	4	82	21	37	0	5	58	248	
11:30:00	34	80	0	15	114	78	18	0	8	96	19	57	0	6	76	286	
11:45:00	44	61	0	17	105	96	14	0	5	110	19	46	0	7	65	280	1091
12:00:00	34	80	0	6	114	82	15	0	8	97	21	52	0	8	73	284	1098
12:15:00	28	83	0	17	111	79	15	0	10	94	22	40	0	10	62	267	1117
12:30:00	40	74	0	53	114	84	15	0	8	99	21	38	0	30	59	272	1103
12:45:00	27	82	0	16	109	88	16	0	27	104	28	45	0	34	73	286	1109
13:00:00	32	80	0	56	112	88	16	0	16	104	23	49	0	32	72	288	1113
13:15:00	35	86	0	41	121	81	22	0	12	103	25	41	0	18	66	290	1136
13:30:00	24	76	0	14	100	76	15	0	17	91	18	42	0	13	60	251	1115

13:45:00	37	74	0	13	111	64	26	0	9	90	17	36	0	10	53	254	1083
BREAK																	
16:00:00	60	82	0	14	142	88	24	0	7	112	18	30	0	12	48	302	
16:15:00	76	89	0	14	165	89	18	0	4	107	28	42	0	5	70	342	
16:30:00	86	97	0	8	183	93	32	0	7	125	26	50	0	14	76	384	
16:45:00	101	99	0	16	200	105	31	0	1	136	24	40	0	8	64	400	1428
17:00:00	90	117	0	12	207	92	32	0	5	124	30	38	0	11	68	399	1525
17:15:00	74	132	0	15	206	96	29	0	6	125	29	32	0	10	61	392	1575
17:30:00	81	101	1	10	183	96	37	0	15	133	38	38	0	12	76	392	1583
17:45:00	83	115	0	7	198	95	47	0	1	142	49	52	0	5	101	441	1624
18:00:00	72	99	0	1	171	93	39	0	10	132	58	49	0	11	107	410	1635
18:15:00	71	96	0	3	167	86	35	0	5	121	47	46	0	6	93	381	1624
18:30:00	51	89	0	6	140	73	32	0	11	105	54	73	0	13	127	372	1604
18:45:00	52	97	0	13	149	84	25	0	4	109	36	39	0	8	75	333	1496
Grand Total	1752	2892	1	410	4645	2993	744	1	231	3738	1040	1803	0	352	2843	**11226**	-
Approach%	37.7%	62.3%	0%		-	80.1%	19.9%	0%		-	36.6%	63.4%	0%		-	-	-
Totals %	15.6%	25.8%	0%		41.4%	26.7%	6.6%	0%		33.3%	9.3%	16.1%	0%		25.3%	-	-
Heavy	38	84	0		-	84	37	0		-	44	39	0		-	-	-
Heavy %	2.2%	2.9%	0%		-	2.8%	5%	0%		-	4.2%	2.2%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)

Start Time	N Approach QUEEN ST					S Approach QUEEN ST					W Approach THOMAS RD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
07:45:00	46	72	0	3	118	80	17	1	2	98	23	86	0	1	109	325
08:00:00	46	67	0	2	113	101	15	0	3	116	33	85	0	2	118	347
08:15:00	20	72	0	3	92	97	15	0	1	112	40	86	0	5	126	330
08:30:00	47	70	0	4	117	104	25	0	4	129	49	76	0	8	125	371
Grand Total	159	281	0	12	440	382	72	1	10	455	145	333	0	16	478	**1373**
Approach%	36.1%	63.9%	0%		-	84%	15.8%	0.2%		-	30.3%	69.7%	0%		-	-
Totals %	11.6%	20.5%	0%		32%	27.8%	5.2%	0.1%		33.1%	10.6%	24.3%	0%		34.8%	-
PHF	0.85	0.98	0		0.93	0.92	0.72	0.25		0.88	0.74	0.97	0		0.95	-
Heavy	7	13	0		20	10	6	0		16	11	12	0		23	-
Heavy %	4.4%	4.6%	0%		4.5%	2.6%	8.3%	0%		3.5%	7.6%	3.6%	0%		4.8%	-
Lights	152	267	0		419	371	66	1		438	134	321	0		455	-
Lights %	95.6%	95%	0%		95.2%	97.1%	91.7%	100%		96.3%	92.4%	96.4%	0%		95.2%	-
Single-Unit Trucks	2	4	0		6	2	0	0		2	1	3	0		4	-
Single-Unit Trucks %	1.3%	1.4%	0%		1.4%	0.5%	0%	0%		0.4%	0.7%	0.9%	0%		0.8%	-
Buses	5	9	0		14	8	6	0		14	10	9	0		19	-
Buses %	3.1%	3.2%	0%		3.2%	2.1%	8.3%	0%		3.1%	6.9%	2.7%	0%		4%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	0	1	0		1	1	0	0		1	0	0	0		0	-
Bicycles on Road %	0%	0.4%	0%		0.2%	0.3%	0%	0%		0.2%	0%	0%	0%		0%	-
Pedestrians	-	-	-	12	-	-	-	-	6	-	-	-	-	15	-	-
Pedestrians%	-	-	-	31.6%		-	-	-	15.8%		-	-	-	39.5%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	4	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	10.5%		-	-	-	2.6%		-

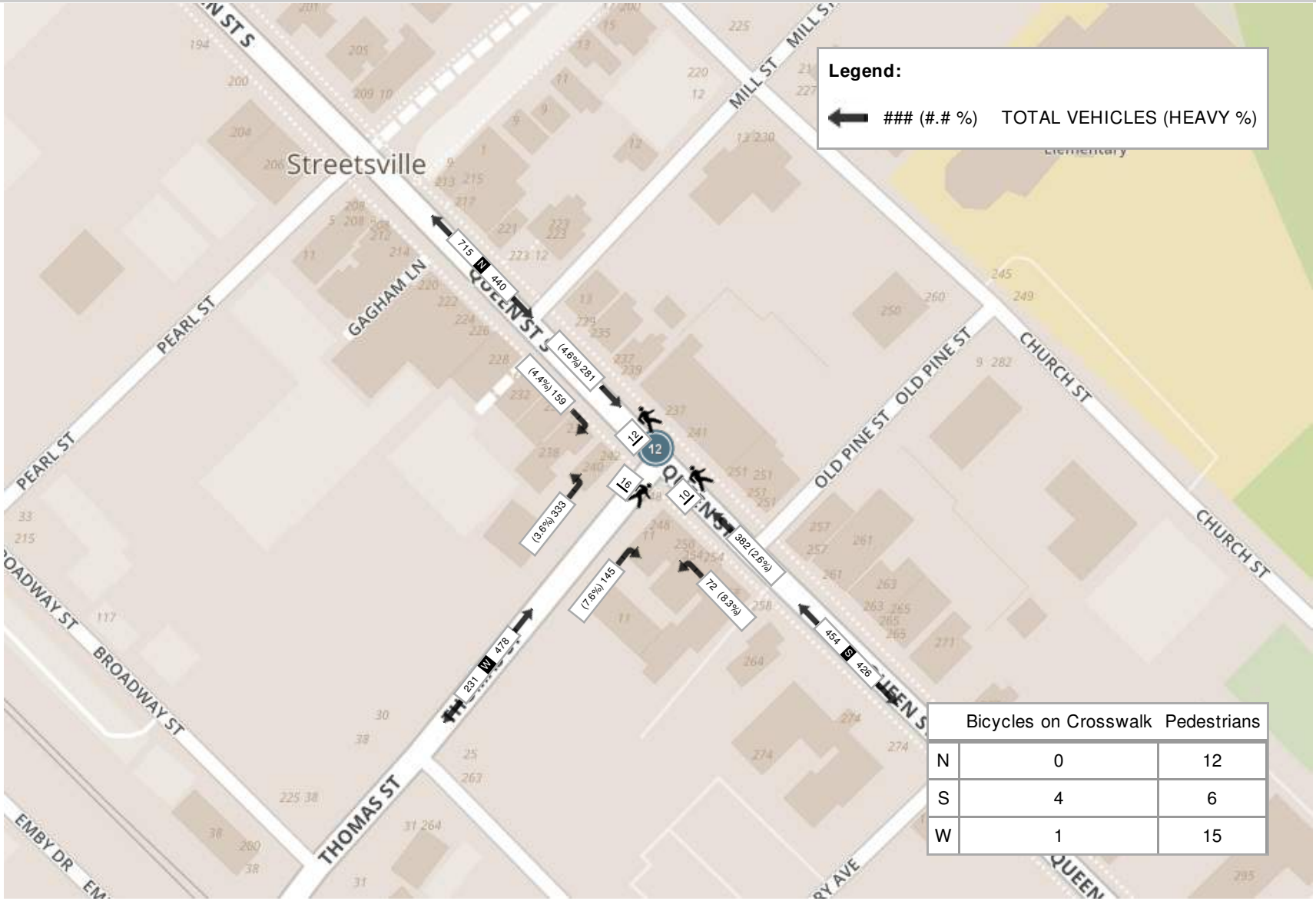
Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach QUEEN ST					S Approach QUEEN ST					W Approach THOMAS RD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
12:30:00	40	74	0	53	114	84	15	0	8	99	21	38	0	30	59	272
12:45:00	27	82	0	16	109	88	16	0	27	104	28	45	0	34	73	286
13:00:00	32	80	0	56	112	88	16	0	16	104	23	49	0	32	72	288
13:15:00	35	86	0	41	121	81	22	0	12	103	25	41	0	18	66	290
Grand Total	134	322	0	166	456	341	69	0	63	410	97	173	0	114	270	**1136**
Approach%	29.4%	70.6%	0%		-	83.2%	16.8%	0%		-	35.9%	64.1%	0%		-	-
Totals %	11.8%	28.3%	0%		40.1%	30%	6.1%	0%		36.1%	8.5%	15.2%	0%		23.8%	-
PHF	0.84	0.94	0		0.94	0.97	0.78	0		0.99	0.87	0.88	0		0.92	-
Heavy	4	10	0		14	10	5	0		15	5	2	0		7	-
Heavy %	3%	3.1%	0%		3.1%	2.9%	7.2%	0%		3.7%	5.2%	1.2%	0%		2.6%	-
Lights	130	310	0		440	330	64	0		394	92	171	0		263	-
Lights %	97%	96.3%	0%		96.5%	96.8%	92.8%	0%		96.1%	94.8%	98.8%	0%		97.4%	-
Single-Unit Trucks	3	3	0		6	5	3	0		8	3	2	0		5	-
Single-Unit Trucks %	2.2%	0.9%	0%		1.3%	1.5%	4.3%	0%		2%	3.1%	1.2%	0%		1.9%	-
Buses	1	6	0		7	4	2	0		6	2	0	0		2	-
Buses %	0.7%	1.9%	0%		1.5%	1.2%	2.9%	0%		1.5%	2.1%	0%	0%		0.7%	-
Articulated Trucks	0	1	0		1	1	0	0		1	0	0	0		0	-
Articulated Trucks %	0%	0.3%	0%		0.2%	0.3%	0%	0%		0.2%	0%	0%	0%		0%	-
Bicycles on Road	0	2	0		2	1	0	0		1	0	0	0		0	-
Bicycles on Road %	0%	0.6%	0%		0.4%	0.3%	0%	0%		0.2%	0%	0%	0%		0%	-
Pedestrians	-	-	-	165	-	-	-	-	63	-	-	-	-	113	-	-
Pedestrians%	-	-	-	48.1%		-	-	-	18.4%		-	-	-	32.9%		-
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0.3%		-	-	-	0%		-	-	-	0.3%		-

Peak Hour: 05:15 PM - 06:15 PM Weather: Overcast Clouds (24.75 °C)

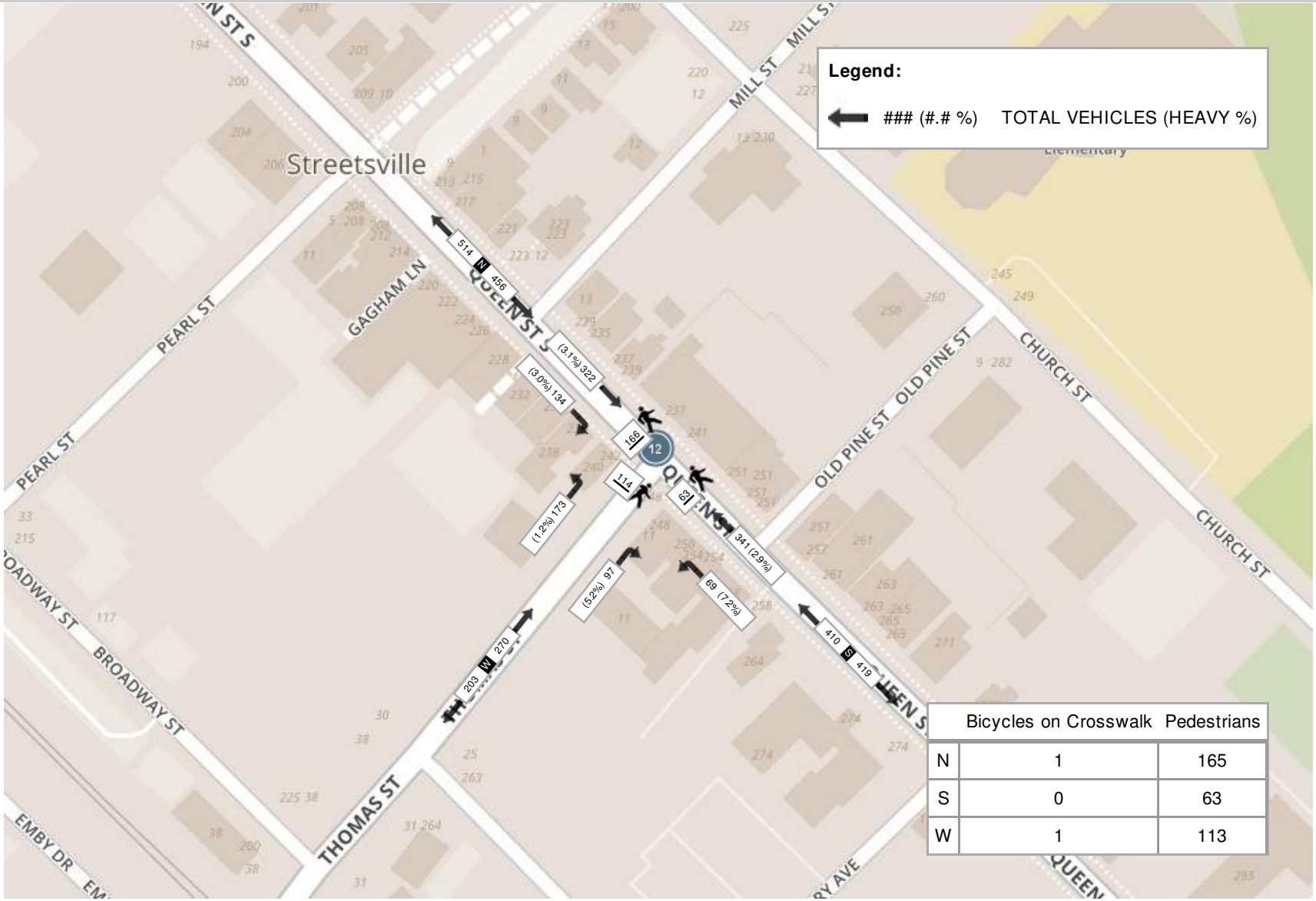
Start Time	N Approach QUEEN ST					S Approach QUEEN ST					W Approach THOMAS RD					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
17:15:00	74	132	0	15	206	96	29	0	6	125	29	32	0	10	61	392
17:30:00	81	101	1	10	183	96	37	0	15	133	38	38	0	12	76	392
17:45:00	83	115	0	7	198	95	47	0	1	142	49	52	0	5	101	441
18:00:00	72	99	0	1	171	93	39	0	10	132	58	49	0	11	107	410
Grand Total	310	447	1	33	758	380	152	0	32	532	174	171	0	38	345	**1635**
Approach%	40.9%	59%	0.1%		-	71.4%	28.6%	0%		-	50.4%	49.6%	0%		-	-
Totals %	19%	27.3%	0.1%		46.4%	23.2%	9.3%	0%		32.5%	10.6%	10.5%	0%		21.1%	-
PHF	0.93	0.85	0.25		0.92	0.99	0.81	0		0.94	0.75	0.82	0		0.81	-
Heavy	0	3	0		3	8	4	0		12	3	2	0		5	-
Heavy %	0%	0.7%	0%		0.4%	2.1%	2.6%	0%		2.3%	1.7%	1.2%	0%		1.4%	-
Lights	310	439	1		750	371	148	0		519	169	169	0		338	-
Lights %	100%	98.2%	100%		98.9%	97.6%	97.4%	0%		97.6%	97.1%	98.8%	0%		98%	-
Single-Unit Trucks	0	0	0		0	3	0	0		3	0	1	0		1	-
Single-Unit Trucks %	0%	0%	0%		0%	0.8%	0%	0%		0.6%	0%	0.6%	0%		0.3%	-
Buses	0	3	0		3	4	4	0		8	3	1	0		4	-
Buses %	0%	0.7%	0%		0.4%	1.1%	2.6%	0%		1.5%	1.7%	0.6%	0%		1.2%	-
Articulated Trucks	0	0	0		0	1	0	0		1	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0.3%	0%	0%		0.2%	0%	0%	0%		0%	-
Bicycles on Road	0	5	0		5	1	0	0		1	2	0	0		2	-
Bicycles on Road %	0%	1.1%	0%		0.7%	0.3%	0%	0%		0.2%	1.1%	0%	0%		0.6%	-
Pedestrians	-	-	-	33	-	-	-	-	28	-	-	-	-	35	-	-
Pedestrians%	-	-	-	32%		-	-	-	27.2%		-	-	-	34%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	4	-	-	-	-	3	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	3.9%		-	-	-	2.9%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)



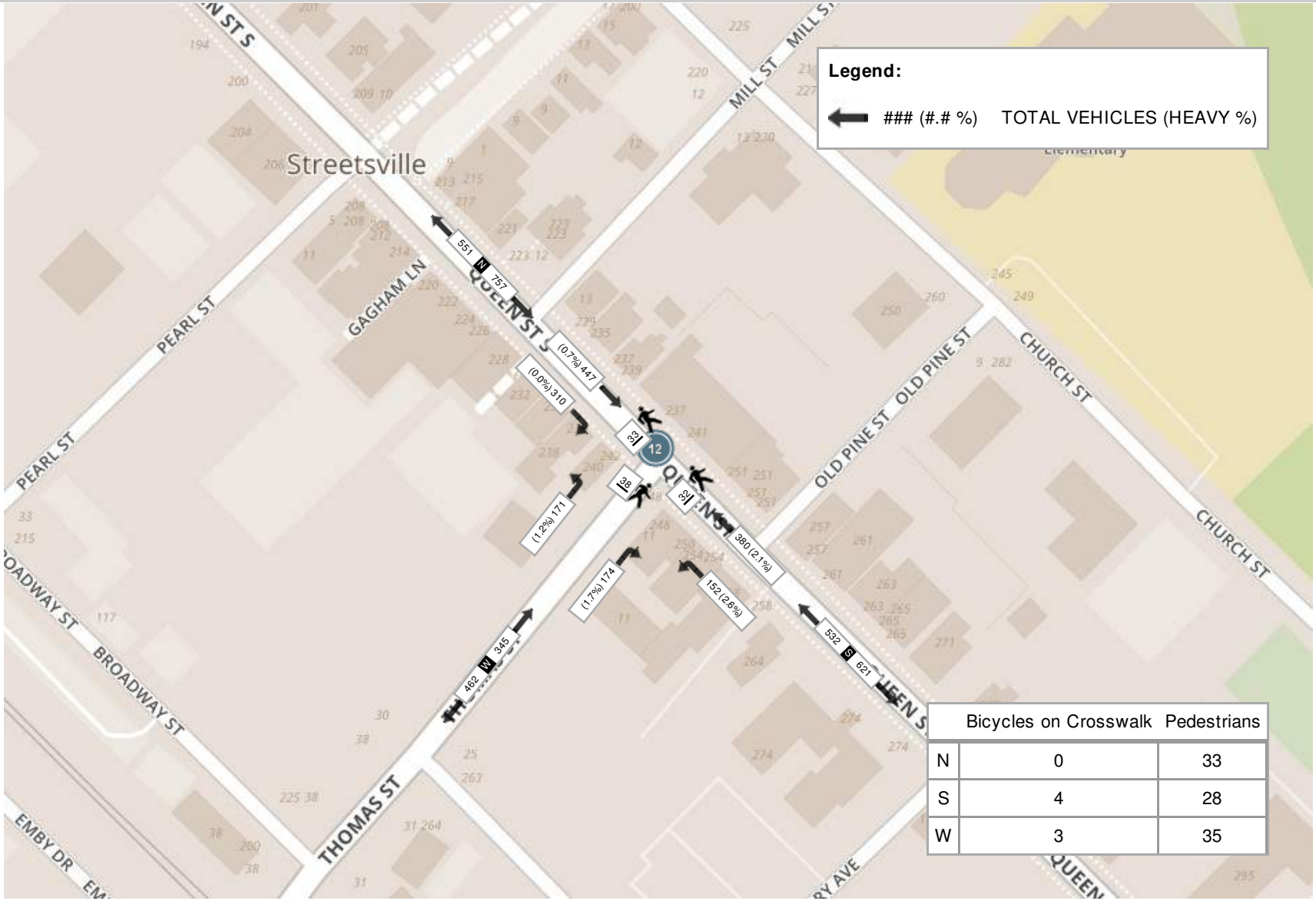
	Bicycles on Crosswalk	Pedestrians
N	0	12
S	4	6
W	1	15

Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	165
S	0	63
W	1	113

Peak Hour: 05:15 PM - 06:15 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	33
S	4	28
W	3	35

Turning Movement Count (21 . WINSTON CHURCHILL BLVD & BURNHAMTHORPE AVE)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach BURNHAMTHORPE AVE						S Approach WINSTON CHURCHILL BLVD						W Approach BURNHAMTHORPE AVE						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	33	154	37	0	1	224	12	32	9	0	0	53	11	138	16	0	2	165	7	110	39	0	3	156	598	
07:15:00	38	193	33	0	2	264	18	60	13	0	0	91	16	141	17	0	0	174	21	147	59	0	3	227	756	
07:30:00	43	274	59	0	13	376	19	62	14	0	0	95	36	185	20	0	3	241	31	155	58	0	3	244	956	
07:45:00	38	330	57	0	3	425	21	108	35	0	0	164	15	202	20	0	2	237	16	166	46	0	3	228	1054	3364
08:00:00	33	290	39	0	1	362	19	82	29	0	0	130	24	181	21	0	1	226	38	183	42	0	1	263	981	3747
08:15:00	45	263	38	1	1	347	15	63	29	0	0	107	17	188	16	0	0	221	18	130	31	0	0	179	854	3845
08:30:00	31	286	55	0	1	372	23	80	32	0	2	135	15	206	23	0	2	244	24	126	55	0	0	205	956	3845
08:45:00	40	323	44	0	2	407	31	87	32	0	1	150	14	200	22	0	0	236	22	136	41	0	0	199	992	3783
09:00:00	34	256	62	0	0	352	19	55	22	0	0	96	14	177	27	0	1	218	19	91	41	0	0	151	817	3619
09:15:00	24	239	47	0	1	310	15	60	14	0	1	89	17	130	16	0	1	163	16	102	32	0	1	150	712	3477
09:30:00	26	192	31	0	0	249	24	64	18	0	0	106	17	160	16	0	0	193	11	79	31	0	0	121	669	3190
09:45:00	29	214	34	0	0	277	17	43	26	0	0	86	13	153	15	0	1	181	16	77	32	0	0	125	669	2867
BREAK																										
11:00:00	23	189	28	0	3	240	21	42	20	0	1	83	25	191	16	0	5	232	14	61	24	0	2	99	654	
11:15:00	41	165	25	0	2	231	20	66	36	0	2	122	15	160	15	0	1	190	13	67	39	0	0	119	662	
11:30:00	25	187	40	0	1	252	24	45	29	0	0	98	38	214	15	0	1	267	20	58	30	0	1	108	725	
11:45:00	33	240	37	0	1	310	25	65	31	0	0	121	26	192	22	0	3	240	12	57	38	0	1	107	778	2819
12:00:00	38	180	30	1	1	249	25	67	36	0	1	128	23	181	21	0	2	225	16	79	51	0	3	146	748	2913
12:15:00	25	189	29	0	0	243	25	57	24	0	1	106	24	200	35	0	1	259	13	56	26	0	2	95	703	2954
12:30:00	33	161	27	0	3	221	26	71	31	0	0	128	45	178	24	0	0	247	12	64	26	0	1	102	698	2927
12:45:00	22	214	33	0	1	269	18	69	32	0	3	119	31	191	29	0	2	251	19	73	26	0	0	118	757	2906
13:00:00	27	189	30	0	0	246	22	56	31	0	0	109	35	202	19	0	2	256	25	50	31	0	0	106	717	2875
13:15:00	34	173	29	0	1	236	24	71	32	0	0	127	30	188	19	0	0	237	12	62	30	0	0	104	704	2876
13:30:00	20	200	22	1	1	243	34	69	21	0	3	124	18	193	20	0	0	231	20	50	16	0	0	86	684	2862
13:45:00	37	186	23	1	0	247	16	64	34	0	0	114	30	225	11	0	0	266	15	59	31	0	0	105	732	2837
BREAK																										
16:00:00	20	143	33	1	2	197	33	137	34	0	0	204	27	320	28	0	0	375	10	80	34	0	3	124	900	
16:15:00	26	165	30	0	2	221	36	167	52	1	2	256	29	276	24	0	1	329	21	103	42	1	2	167	973	
16:30:00	29	241	43	0	2	313	24	151	42	0	0	217	31	319	33	0	0	383	19	106	43	0	0	168	1081	
16:45:00	27	237	27	0	0	291	35	144	48	0	2	227	36	335	28	0	1	399	11	80	33	0	0	124	1041	3995
17:00:00	32	202	28	1	2	263	38	178	38	0	1	254	32	301	30	0	1	363	16	107	42	0	2	165	1045	4140

17:15:00	35	263	37	0	2	335	31	139	38	0	2	208	55	321	44	1	1	421	16	99	37	0	1	152	1116	4283
17:30:00	35	201	47	0	2	283	46	161	52	0	1	259	30	298	26	0	3	354	22	127	45	0	1	194	1090	4292
17:45:00	44	209	44	0	1	297	32	138	44	0	1	214	44	293	36	0	2	373	21	89	39	0	0	149	1033	4284
18:00:00	41	226	43	0	1	310	23	121	28	0	0	172	44	317	45	0	0	406	16	89	38	0	0	143	1031	4270
18:15:00	44	201	32	0	3	277	36	141	43	0	2	220	30	277	36	0	2	343	26	88	48	0	1	162	1002	4156
18:30:00	40	243	35	0	1	318	27	103	40	0	4	170	39	341	39	0	0	419	13	78	39	0	0	130	1037	4103
18:45:00	41	229	39	0	1	309	36	90	47	0	1	173	28	298	35	0	2	361	15	76	35	0	1	126	969	4039
Grand Total	1186	7847	1327	6	58	10366	910	3208	1136	1	31	5255	974	8072	879	1	43	9926	636	3360	1350	1	35	5347	**30894**	-
Approach%	11.4%	75.7%	12.8%	0.1%		-	17.3%	61%	21.6%	0%		-	9.8%	81.3%	8.9%	0%		-	11.9%	62.8%	25.2%	0%		-	-	-
Totals %	3.8%	25.4%	4.3%	0%		33.6%	2.9%	10.4%	3.7%	0%		17%	3.2%	26.1%	2.8%	0%		32.1%	2.1%	10.9%	4.4%	0%		17.3%	-	-
Heavy	91	236	52	0		-	26	70	36	0		-	13	278	13	0		-	8	50	67	0		-	-	-
Heavy %	7.7%	3%	3.9%	0%		-	2.9%	2.2%	3.2%	0%		-	1.3%	3.4%	1.5%	0%		-	1.3%	1.5%	5%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach BURNHAMTHORPE AVE						S Approach WINSTON CHURCHILL BLVD						W Approach BURNHAMTHORPE AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	38	330	57	0	3	425	21	108	35	0	0	164	15	202	20	0	2	237	16	166	46	0	3	228	1054
08:00:00	33	290	39	0	1	362	19	82	29	0	0	130	24	181	21	0	1	226	38	183	42	0	1	263	981
08:15:00	45	263	38	1	1	347	15	63	29	0	0	107	17	188	16	0	0	221	18	130	31	0	0	179	854
08:30:00	31	286	55	0	1	372	23	80	32	0	2	135	15	206	23	0	2	244	24	126	55	0	0	205	956
Grand Total	147	1169	189	1	6	1506	78	333	125	0	2	536	71	777	80	0	5	928	96	605	174	0	4	875	**3845**
Approach%	9.8%	77.6%	12.5%	0.1%		-	14.6%	62.1%	23.3%	0%		-	7.7%	83.7%	8.6%	0%		-	11%	69.1%	19.9%	0%		-	-
Totals %	3.8%	30.4%	4.9%	0%		39.2%	2%	8.7%	3.3%	0%		13.9%	1.8%	20.2%	2.1%	0%		24.1%	2.5%	15.7%	4.5%	0%		22.8%	-
PHF	0.82	0.89	0.83	0.25		0.89	0.85	0.77	0.89	0		0.82	0.74	0.94	0.87	0		0.95	0.63	0.83	0.79	0		0.83	-
Heavy	14	35	8	0		57	4	11	7	0		22	1	31	1	0		33	2	9	5	0		16	-
Heavy %	9.5%	3%	4.2%	0%		3.8%	5.1%	3.3%	5.6%	0%		4.1%	1.4%	4%	1.3%	0%		3.6%	2.1%	1.5%	2.9%	0%		1.8%	-
Lights	133	1134	181	1		1449	74	322	118	0		514	70	746	79	0		895	94	595	169	0		858	-
Lights %	90.5%	97%	95.8%	100%		96.2%	94.9%	96.7%	94.4%	0%		95.9%	98.6%	96%	98.8%	0%		96.4%	97.9%	98.3%	97.1%	0%		98.1%	-
Single-Unit Trucks	5	17	3	0		25	2	4	1	0		7	1	15	1	0		17	0	5	1	0		6	-
Single-Unit Trucks %	3.4%	1.5%	1.6%	0%		1.7%	2.6%	1.2%	0.8%	0%		1.3%	1.4%	1.9%	1.3%	0%		1.8%	0%	0.8%	0.6%	0%		0.7%	-
Buses	5	11	4	0		20	2	7	6	0		15	0	12	0	0		12	2	4	4	0		10	-
Buses %	3.4%	0.9%	2.1%	0%		1.3%	2.6%	2.1%	4.8%	0%		2.8%	0%	1.5%	0%	0%		1.3%	2.1%	0.7%	2.3%	0%		1.1%	-
Articulated Trucks	4	7	1	0		12	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	-
Articulated Trucks %	2.7%	0.6%	0.5%	0%		0.8%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	17.6%		-	-	-	-	0%		-	-	-	-	17.6%		-	-	-	-	11.8%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	17.6%		-	-	-	-	11.8%		-	-	-	-	11.8%		-	-	-	-	11.8%		-

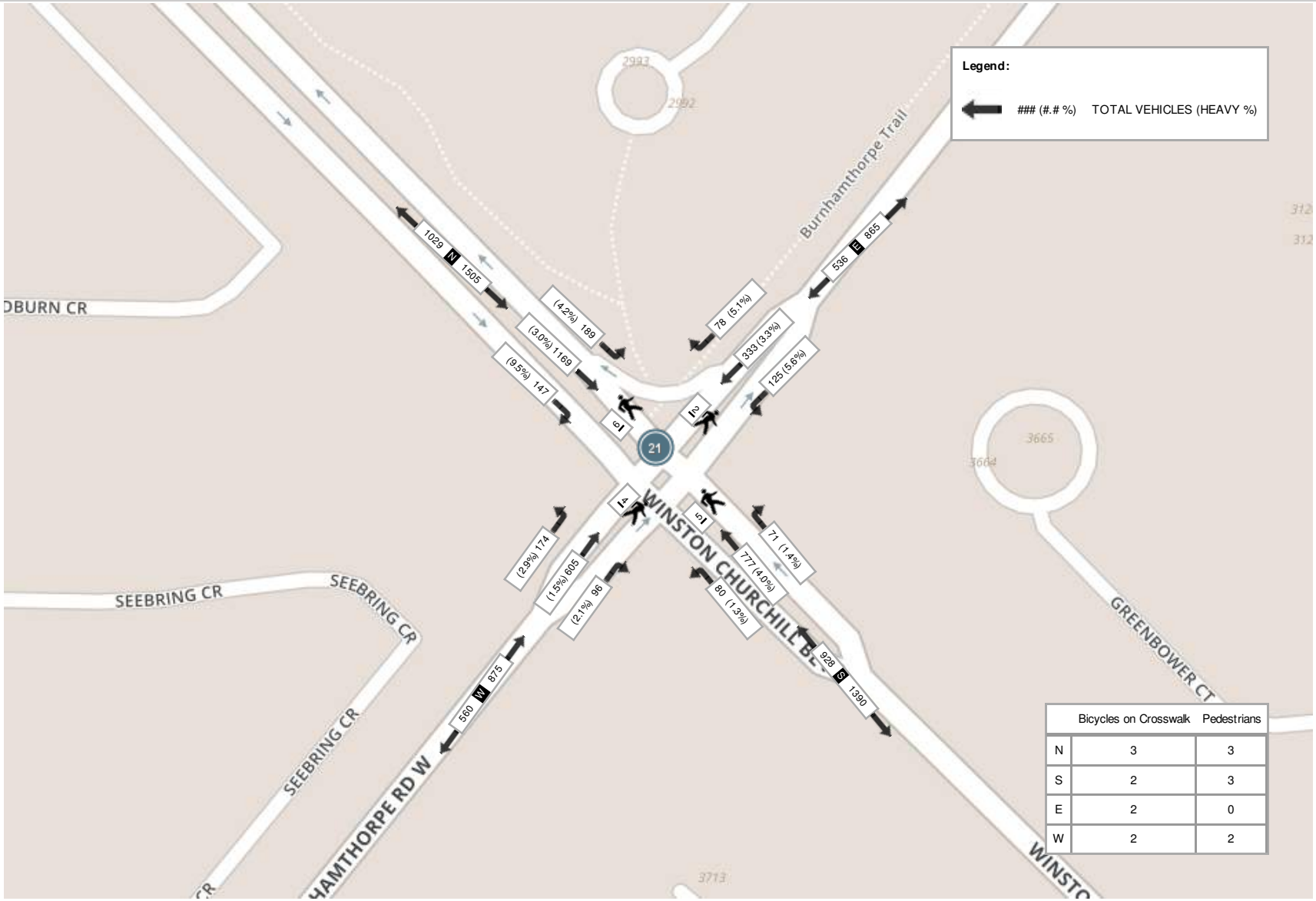
Peak Hour: 11:30 AM - 12:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach BURNHAMTHORPE AVE						S Approach WINSTON CHURCHILL BLVD						W Approach BURNHAMTHORPE AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
11:30:00	25	187	40	0	1	252	24	45	29	0	0	98	38	214	15	0	1	267	20	58	30	0	1	108	725
11:45:00	33	240	37	0	1	310	25	65	31	0	0	121	26	192	22	0	3	240	12	57	38	0	1	107	778
12:00:00	38	180	30	1	1	249	25	67	36	0	1	128	23	181	21	0	2	225	16	79	51	0	3	146	748
12:15:00	25	189	29	0	0	243	25	57	24	0	1	106	24	200	35	0	1	259	13	56	26	0	2	95	703
Grand Total	121	796	136	1	3	1054	99	234	120	0	2	453	111	787	93	0	7	991	61	250	145	0	7	456	**2954**
Approach%	11.5%	75.5%	12.9%	0.1%		-	21.9%	51.7%	26.5%	0%		-	11.2%	79.4%	9.4%	0%		-	13.4%	54.8%	31.8%	0%		-	-
Totals %	4.1%	26.9%	4.6%	0%		35.7%	3.4%	7.9%	4.1%	0%		15.3%	3.8%	26.6%	3.1%	0%		33.5%	2.1%	8.5%	4.9%	0%		15.4%	-
PHF	0.8	0.83	0.85	0.25		0.85	0.99	0.87	0.83	0		0.88	0.73	0.92	0.66	0		0.93	0.76	0.79	0.71	0		0.78	-
Heavy	15	41	4	0		60	4	12	3	0		19	2	44	3	0		49	1	7	13	0		21	-
Heavy %	12.4%	5.2%	2.9%	0%		5.7%	4%	5.1%	2.5%	0%		4.2%	1.8%	5.6%	3.2%	0%		4.9%	1.6%	2.8%	9%	0%		4.6%	-
Lights	106	755	132	1		994	95	221	117	0		433	109	743	90	0		942	60	239	132	0		431	-
Lights %	87.6%	94.8%	97.1%	100%		94.3%	96%	94.4%	97.5%	0%		95.6%	98.2%	94.4%	96.8%	0%		95.1%	98.4%	95.6%	91%	0%		94.5%	-
Single-Unit Trucks	9	25	4	0		38	1	9	1	0		11	2	28	0	0		30	1	3	11	0		15	-
Single-Unit Trucks %	7.4%	3.1%	2.9%	0%		3.6%	1%	3.8%	0.8%	0%		2.4%	1.8%	3.6%	0%	0%		3%	1.6%	1.2%	7.6%	0%		3.3%	-
Buses	3	7	0	0		10	3	3	2	0		8	0	7	3	0		10	0	3	2	0		5	-
Buses %	2.5%	0.9%	0%	0%		0.9%	3%	1.3%	1.7%	0%		1.8%	0%	0.9%	3.2%	0%		1%	0%	1.2%	1.4%	0%		1.1%	-
Articulated Trucks	3	9	0	0		12	0	0	0	0		0	0	9	0	0		9	0	1	0	0		1	-
Articulated Trucks %	2.5%	1.1%	0%	0%		1.1%	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		0.9%	0%	0.4%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	4	0	0		4	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		0.9%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	5	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	5.3%		-	-	-	-	5.3%		-	-	-	-	26.3%		-	-	-	-	26.3%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	10.5%		-	-	-	-	5.3%		-	-	-	-	10.5%		-	-	-	-	10.5%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)

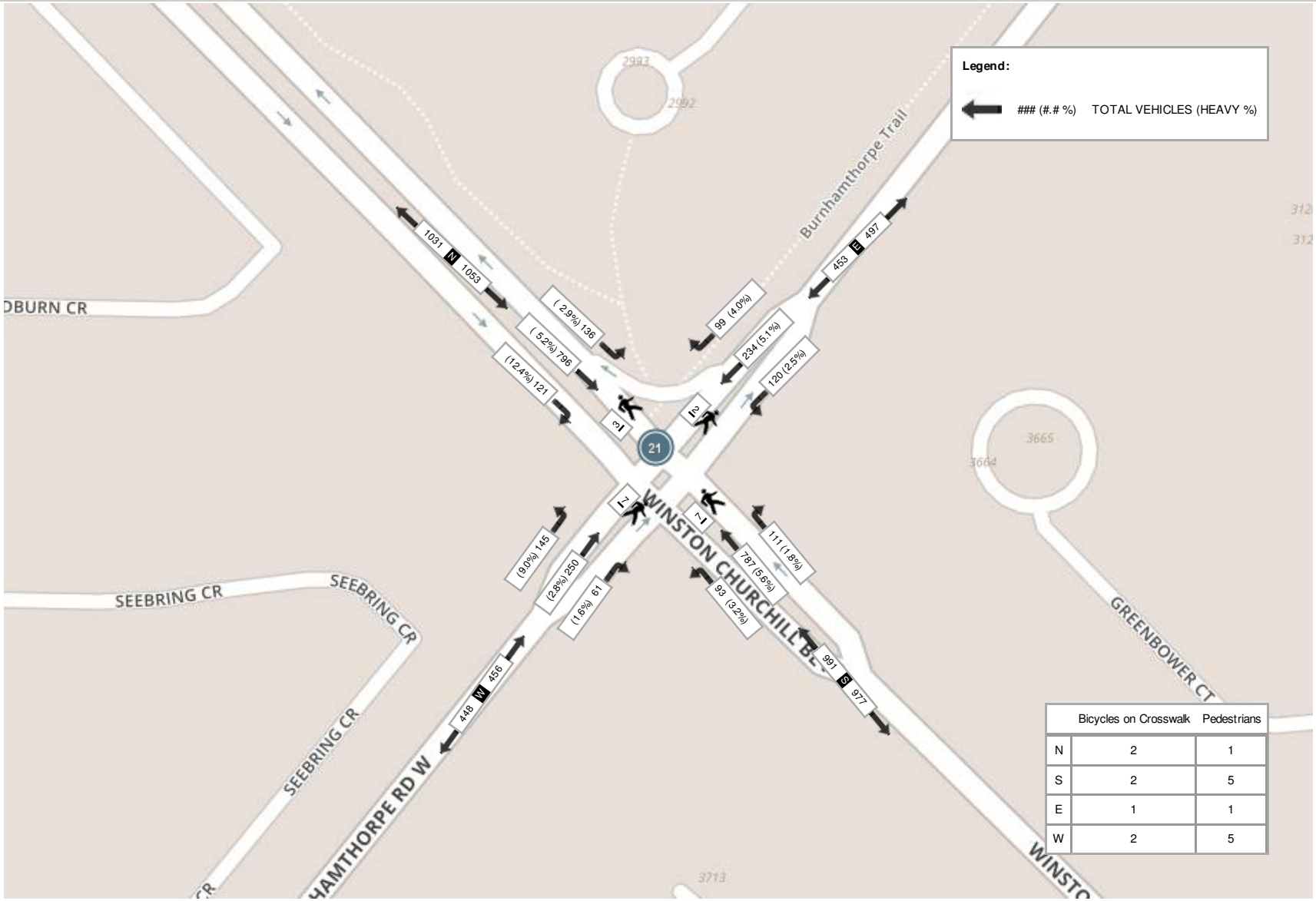
Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach BURNHAMTHORPE AVE						S Approach WINSTON CHURCHILL BLVD						W Approach BURNHAMTHORPE AVE						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	27	237	27	0	0	291	35	144	48	0	2	227	36	335	28	0	1	399	11	80	33	0	0	124	1041
17:00:00	32	202	28	1	2	263	38	178	38	0	1	254	32	301	30	0	1	363	16	107	42	0	2	165	1045
17:15:00	35	263	37	0	2	335	31	139	38	0	2	208	55	321	44	1	1	421	16	99	37	0	1	152	1116
17:30:00	35	201	47	0	2	283	46	161	52	0	1	259	30	298	26	0	3	354	22	127	45	0	1	194	1090
Grand Total	129	903	139	1	6	1172	150	622	176	0	6	948	153	1255	128	1	6	1537	65	413	157	0	4	635	**4292**
Approach%	11%	77%	11.9%	0.1%		-	15.8%	65.6%	18.6%	0%		-	10%	81.7%	8.3%	0.1%		-	10.2%	65%	24.7%	0%		-	-
Totals %	3%	21%	3.2%	0%		27.3%	3.5%	14.5%	4.1%	0%		22.1%	3.6%	29.2%	3%	0%		35.8%	1.5%	9.6%	3.7%	0%		14.8%	-
PHF	0.92	0.86	0.74	0.25		0.87	0.82	0.87	0.85	0		0.92	0.7	0.94	0.73	0.25		0.91	0.74	0.81	0.87	0		0.82	-
Heavy	4	13	2	0		19	1	3	4	0		8	0	22	2	0		24	0	1	5	0		6	-
Heavy %	3.1%	1.4%	1.4%	0%		1.6%	0.7%	0.5%	2.3%	0%		0.8%	0%	1.8%	1.6%	0%		1.6%	0%	0.2%	3.2%	0%		0.9%	-
Lights	125	890	137	1		1153	149	616	172	0		937	153	1232	126	1		1512	65	412	152	0		629	-
Lights %	96.9%	98.6%	98.6%	100%		98.4%	99.3%	99%	97.7%	0%		98.8%	100%	98.2%	98.4%	100%		98.4%	100%	99.8%	96.8%	0%		99.1%	-
Single-Unit Trucks	2	6	1	0		9	1	2	1	0		4	0	11	0	0		11	0	1	2	0		3	-
Single-Unit Trucks %	1.6%	0.7%	0.7%	0%		0.8%	0.7%	0.3%	0.6%	0%		0.4%	0%	0.9%	0%	0%		0.7%	0%	0.2%	1.3%	0%		0.5%	-
Buses	2	4	1	0		7	0	0	3	0		3	0	5	2	0		7	0	0	2	0		2	-
Buses %	1.6%	0.4%	0.7%	0%		0.6%	0%	0%	1.7%	0%		0.3%	0%	0.4%	1.6%	0%		0.5%	0%	0%	1.3%	0%		0.3%	-
Articulated Trucks	0	3	0	0		3	0	1	0	0		1	0	6	0	0		6	0	0	1	0		1	-
Articulated Trucks %	0%	0.3%	0%	0%		0.3%	0%	0.2%	0%	0%		0.1%	0%	0.5%	0%	0%		0.4%	0%	0%	0.6%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	0	3	0	0		3	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.3%	0%	0.1%	0%	0%		0.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	18.2%		-	-	-	-	9.1%		-	-	-	-	18.2%		-	-	-	-	18.2%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	9.1%		-	-	-	-	18.2%		-	-	-	-	9.1%		-	-	-	-	0%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)



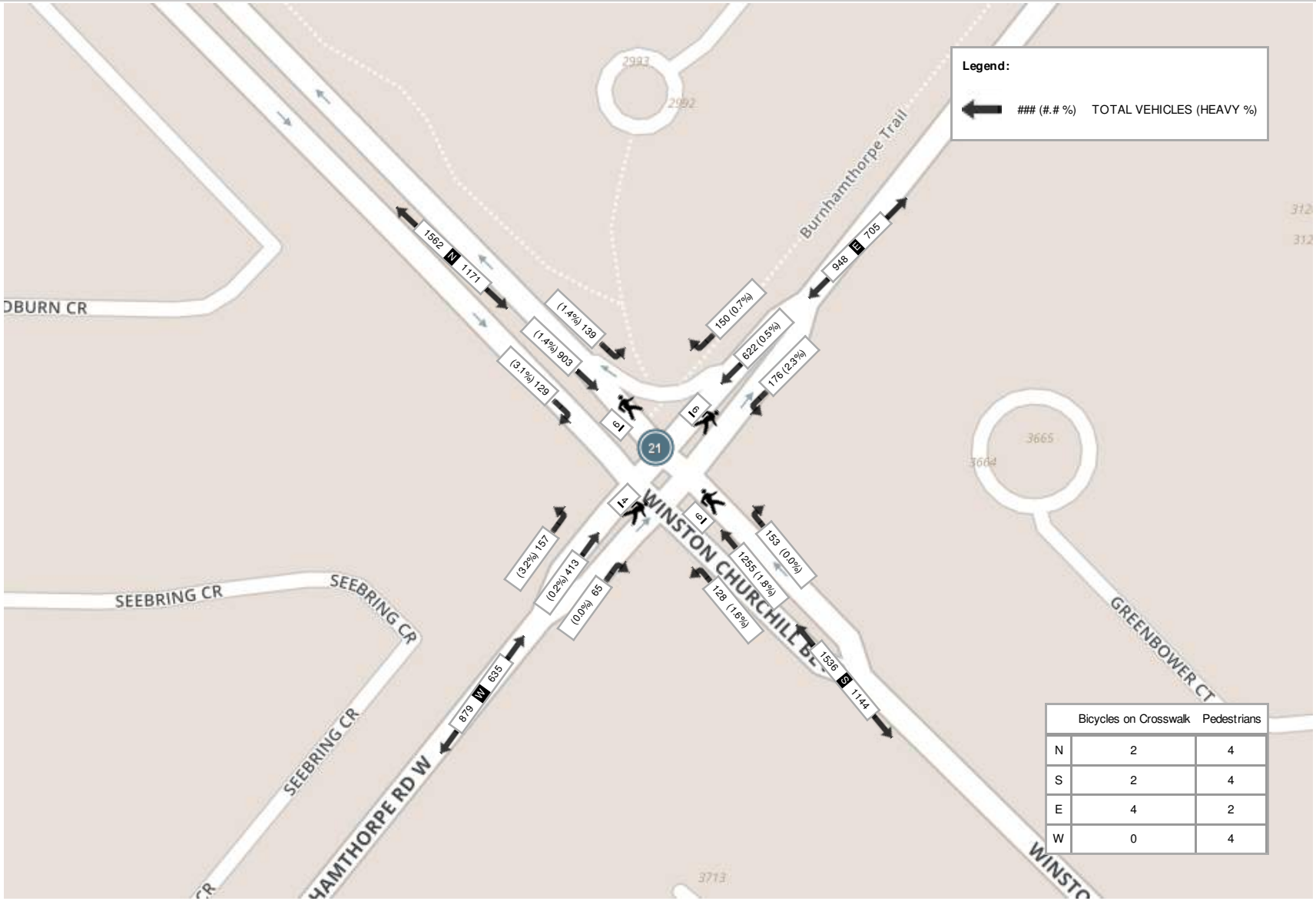
	Bicycles on Crosswalk	Pedestrians
N	3	3
S	2	3
E	2	0
W	2	2

Peak Hour: 11:30 AM - 12:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	1
S	2	5
E	1	1
W	2	5

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	4
S	2	4
E	4	2
W	0	4

Turning Movement Count (20 . WINSTON CHURCHILL BLVD & EGLINTON AVE W)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach EGLINTON AVE W						S Approach WINSTON CHURCHILL BLVD						W Approach EGLINTON AVE W						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	16	328	42	0	7	386	11	41	35	0	4	87	30	143	20	0	3	193	82	185	9	0	7	276	942	
07:15:00	26	313	49	0	14	388	9	66	33	0	3	108	29	156	25	0	0	210	69	261	13	0	7	343	1049	
07:30:00	17	407	68	0	6	492	19	80	40	0	6	139	43	236	29	0	4	308	66	198	21	0	2	285	1224	
07:45:00	21	314	76	0	14	411	22	100	39	0	6	161	57	231	40	0	2	328	76	281	23	0	4	380	1280	4495
08:00:00	26	330	70	0	10	426	17	121	43	0	2	181	45	256	34	0	3	335	48	249	30	0	1	327	1269	4822
08:15:00	35	467	86	0	7	588	23	92	51	0	6	166	74	232	30	0	8	336	63	246	19	0	3	328	1418	5191
08:30:00	26	347	98	0	9	471	21	103	39	1	8	164	79	200	35	0	5	314	64	275	28	0	2	367	1316	5283
08:45:00	36	407	69	0	8	512	29	91	53	0	8	173	70	249	28	0	4	347	61	250	34	0	0	345	1377	5380
09:00:00	22	317	60	0	5	399	21	65	50	0	3	136	75	204	39	0	4	318	69	215	29	0	1	313	1166	5277
09:15:00	17	298	44	0	7	359	36	84	62	1	3	183	50	183	21	0	3	254	77	166	18	0	7	261	1057	4916
09:30:00	10	316	51	0	3	377	33	75	40	0	7	148	44	169	21	0	2	234	94	116	26	0	4	236	995	4595
09:45:00	13	286	33	0	12	332	34	78	59	0	8	171	50	182	30	1	1	263	78	111	26	0	3	215	981	4199
BREAK																										
11:00:00	16	216	31	1	8	264	35	84	71	0	2	190	41	212	16	1	6	270	74	101	28	0	7	203	927	
11:15:00	17	242	44	0	10	303	33	87	64	1	10	185	58	212	40	0	2	310	47	80	18	0	6	145	943	
11:30:00	12	244	40	0	8	296	39	98	71	0	6	208	37	210	27	0	3	274	76	111	28	0	3	215	993	
11:45:00	13	238	32	0	7	283	51	100	71	1	5	223	55	259	29	0	0	343	64	102	26	0	1	192	1041	3904
12:00:00	12	244	32	0	7	288	40	86	64	0	11	190	43	258	42	0	2	343	51	127	35	0	1	213	1034	4011
12:15:00	15	230	39	0	0	284	49	115	64	0	4	228	38	228	30	0	5	296	74	110	31	0	3	215	1023	4091
12:30:00	17	266	45	0	6	328	51	105	75	1	6	232	36	258	36	0	2	330	59	87	31	0	3	177	1067	4165
12:45:00	15	242	38	0	11	295	48	129	82	0	4	259	61	231	46	0	1	338	56	118	18	0	5	192	1084	4208
13:00:00	14	200	26	0	10	240	47	134	80	0	5	261	48	251	33	1	5	333	69	106	31	1	3	207	1041	4215
13:15:00	12	246	37	0	10	295	42	100	69	0	3	211	49	276	61	0	3	386	58	87	27	0	8	172	1064	4256
13:30:00	14	218	29	0	6	261	45	133	63	0	6	241	37	218	45	0	6	300	55	110	24	0	1	189	991	4180
13:45:00	22	227	31	0	12	280	42	119	67	0	10	228	43	292	43	0	4	378	66	99	28	0	4	193	1079	4175
BREAK																										
16:00:00	17	246	37	0	4	300	77	186	64	0	0	327	48	280	28	0	1	356	57	122	35	0	1	214	1197	
16:15:00	20	221	37	0	13	278	73	257	89	2	7	421	46	281	40	0	4	367	66	138	39	0	6	243	1309	
16:30:00	17	243	53	0	7	313	65	248	87	0	10	400	56	353	63	1	8	473	71	135	38	0	5	244	1430	
16:45:00	25	287	47	0	6	359	82	229	84	1	6	396	47	388	88	1	3	524	80	119	43	0	4	242	1521	5457
17:00:00	18	240	37	0	10	295	79	269	89	0	15	437	45	355	91	0	5	491	84	159	62	0	2	305	1528	5788

17:15:00	23	267	54	1	9	345	71	205	77	0	5	353	50	387	85	1	8	523	105	141	58	0	4	304	1525	6004
17:30:00	14	240	52	0	12	306	72	235	68	0	16	375	40	376	97	0	5	513	100	163	46	0	2	309	1503	6077
17:45:00	22	251	55	0	8	328	70	222	86	0	15	378	59	361	79	0	5	499	90	169	50	0	1	309	1514	6070
18:00:00	21	244	41	0	7	306	63	177	60	2	6	302	46	365	84	0	3	495	68	137	50	0	3	255	1358	5900
18:15:00	17	247	61	0	14	325	71	254	84	0	11	409	46	278	79	1	6	404	82	157	41	0	7	280	1418	5793
18:30:00	27	276	45	0	16	348	64	224	87	1	6	376	60	339	92	1	8	492	75	160	43	0	3	278	1494	5784
18:45:00	26	285	47	0	7	358	64	165	74	0	6	303	51	372	98	1	7	522	70	162	29	0	8	261	1444	5714
Grand Total	691	9990	1736	2	310	12419	1648	4957	2334	11	239	8950	1786	9481	1724	9	141	13000	2544	5553	1135	1	132	9233	**43602**	-
Approach%	5.6%	80.4%	14%	0%		-	18.4%	55.4%	26.1%	0.1%		-	13.7%	72.9%	13.3%	0.1%		-	27.6%	60.1%	12.3%	0%		-	-	-
Totals %	1.6%	22.9%	4%	0%		28.5%	3.8%	11.4%	5.4%	0%		20.5%	4.1%	21.7%	4%	0%		29.8%	5.8%	12.7%	2.6%	0%		21.2%	-	-
Heavy	18	312	67	0		-	49	237	40	0		-	37	312	59	0		-	75	211	22	0		-	-	-
Heavy %	2.6%	3.1%	3.9%	0%		-	3%	4.8%	1.7%	0%		-	2.1%	3.3%	3.4%	0%		-	2.9%	3.8%	1.9%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach EGLINTON AVE W						S Approach WINSTON CHURCHILL BLVD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:00:00	26	330	70	0	10	426	17	121	43	0	2	181	45	256	34	0	3	335	48	249	30	0	1	327	1269
08:15:00	35	467	86	0	7	588	23	92	51	0	6	166	74	232	30	0	8	336	63	246	19	0	3	328	1418
08:30:00	26	347	98	0	9	471	21	103	39	1	8	164	79	200	35	0	5	314	64	275	28	0	2	367	1316
08:45:00	36	407	69	0	8	512	29	91	53	0	8	173	70	249	28	0	4	347	61	250	34	0	0	345	1377
Grand Total	123	1551	323	0	34	1997	90	407	186	1	24	684	268	937	127	0	20	1332	236	1020	111	0	6	1367	**5380**
Approach%	6.2%	77.7%	16.2%	0%		-	13.2%	59.5%	27.2%	0.1%		-	20.1%	70.3%	9.5%	0%		-	17.3%	74.6%	8.1%	0%		-	-
Totals %	2.3%	28.8%	6%	0%		37.1%	1.7%	7.6%	3.5%	0%		12.7%	5%	17.4%	2.4%	0%		24.8%	4.4%	19%	2.1%	0%		25.4%	-
PHF	0.85	0.83	0.82	0		0.85	0.78	0.84	0.88	0.25		0.94	0.85	0.92	0.91	0		0.96	0.92	0.93	0.82	0		0.93	-
Heavy	5	41	8	0		54	6	29	4	0		39	11	42	11	0		64	11	29	8	0		48	-
Heavy %	4.1%	2.6%	2.5%	0%		2.7%	6.7%	7.1%	2.2%	0%		5.7%	4.1%	4.5%	8.7%	0%		4.8%	4.7%	2.8%	7.2%	0%		3.5%	-
Lights	118	1510	315	0		1943	84	378	182	1		645	257	895	116	0		1268	225	991	103	0		1319	-
Lights %	95.9%	97.4%	97.5%	0%		97.3%	93.3%	92.9%	97.8%	100%		94.3%	95.9%	95.5%	91.3%	0%		95.2%	95.3%	97.2%	92.8%	0%		96.5%	-
Single-Unit Trucks	2	9	1	0		12	1	22	1	0		24	7	21	7	0		35	5	23	4	0		32	-
Single-Unit Trucks %	1.6%	0.6%	0.3%	0%		0.6%	1.1%	5.4%	0.5%	0%		3.5%	2.6%	2.2%	5.5%	0%		2.6%	2.1%	2.3%	3.6%	0%		2.3%	-
Buses	2	28	7	0		37	5	5	3	0		13	1	18	4	0		23	2	6	3	0		11	-
Buses %	1.6%	1.8%	2.2%	0%		1.9%	5.6%	1.2%	1.6%	0%		1.9%	0.4%	1.9%	3.1%	0%		1.7%	0.8%	0.6%	2.7%	0%		0.8%	-
Articulated Trucks	1	4	0	0		5	0	2	0	0		2	3	3	0	0		6	4	0	1	0		5	-
Articulated Trucks %	0.8%	0.3%	0%	0%		0.3%	0%	0.5%	0%	0%		0.3%	1.1%	0.3%	0%	0%		0.5%	1.7%	0%	0.9%	0%		0.4%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	32	-	-	-	-	-	24	-	-	-	-	-	16	-	-	-	-	-	5	-	-
Pedestrians%	-	-	-	-	38.1%		-	-	-	-	28.6%		-	-	-	-	19%		-	-	-	-	6%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	2.4%		-	-	-	-	0%		-	-	-	-	4.8%		-	-	-	-	1.2%		-

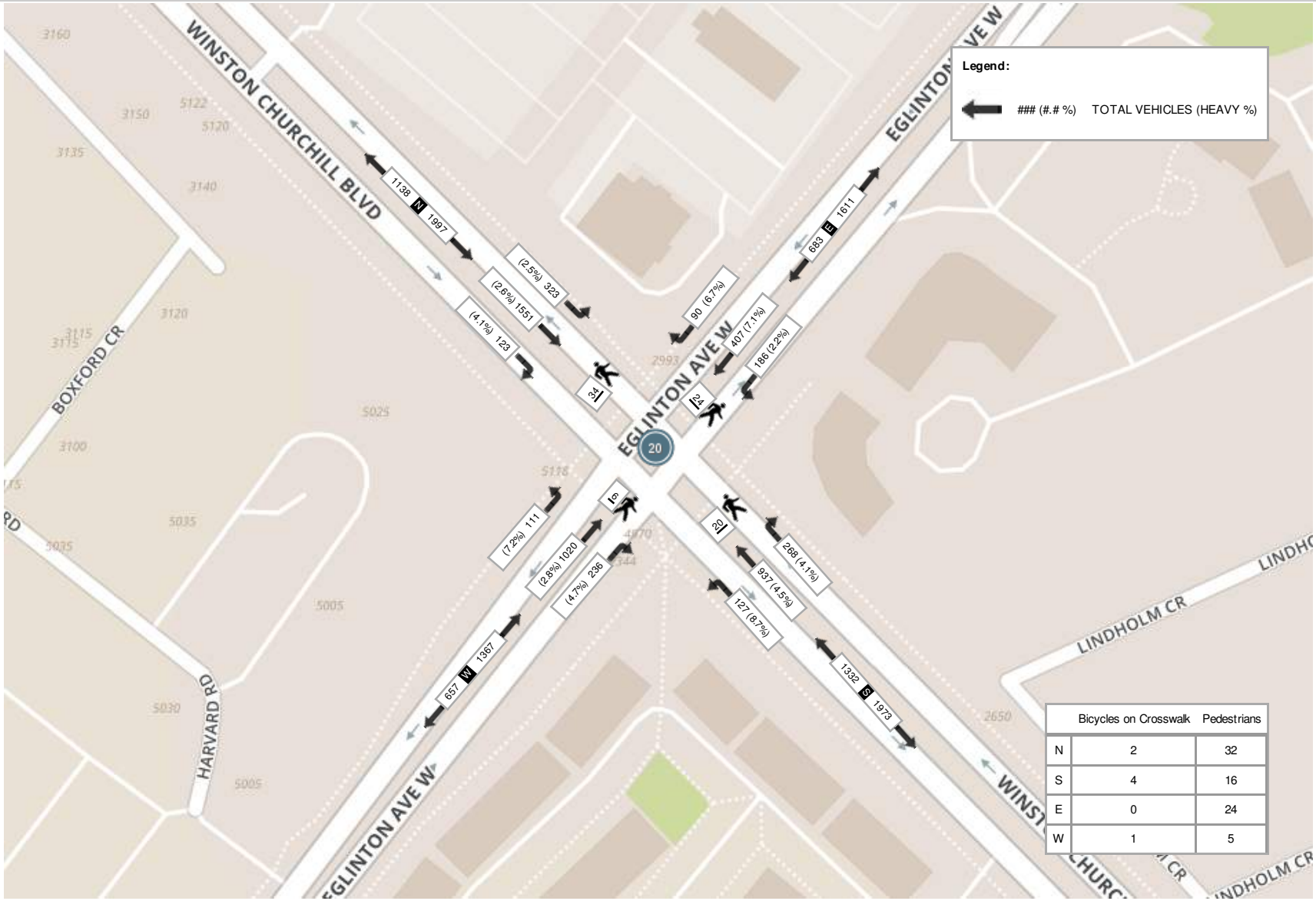
Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach EGLINTON AVE W						S Approach WINSTON CHURCHILL BLVD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:30:00	17	266	45	0	6	328	51	105	75	1	6	232	36	258	36	0	2	330	59	87	31	0	3	177	1067
12:45:00	15	242	38	0	11	295	48	129	82	0	4	259	61	231	46	0	1	338	56	118	18	0	5	192	1084
13:00:00	14	200	26	0	10	240	47	134	80	0	5	261	48	251	33	1	5	333	69	106	31	1	3	207	1041
13:15:00	12	246	37	0	10	295	42	100	69	0	3	211	49	276	61	0	3	386	58	87	27	0	8	172	1064
Grand Total	58	954	146	0	37	1158	188	468	306	1	18	963	194	1016	176	1	11	1387	242	398	107	1	19	748	**4256**
Approach%	5%	82.4%	12.6%	0%		-	19.5%	48.6%	31.8%	0.1%		-	14%	73.3%	12.7%	0.1%		-	32.4%	53.2%	14.3%	0.1%		-	-
Totals %	1.4%	22.4%	3.4%	0%		27.2%	4.4%	11%	7.2%	0%		22.6%	4.6%	23.9%	4.1%	0%		32.6%	5.7%	9.4%	2.5%	0%		17.6%	-
PHF	0.85	0.9	0.81	0		0.88	0.92	0.87	0.93	0.25		0.92	0.8	0.92	0.72	0.25		0.9	0.88	0.84	0.86	0.25		0.9	-
Heavy	3	42	5	0		50	8	30	6	0		44	6	48	7	0		61	6	25	4	0		35	-
Heavy %	5.2%	4.4%	3.4%	0%		4.3%	4.3%	6.4%	2%	0%		4.6%	3.1%	4.7%	4%	0%		4.4%	2.5%	6.3%	3.7%	0%		4.7%	-
Lights	55	912	141	0		1108	180	437	300	1		918	188	968	169	1		1326	236	372	103	1		712	-
Lights %	94.8%	95.6%	96.6%	0%		95.7%	95.7%	93.4%	98%	100%		95.3%	96.9%	95.3%	96%	100%		95.6%	97.5%	93.5%	96.3%	100%		95.2%	-
Single-Unit Trucks	1	24	3	0		28	2	24	5	0		31	3	23	4	0		30	5	21	3	0		29	-
Single-Unit Trucks %	1.7%	2.5%	2.1%	0%		2.4%	1.1%	5.1%	1.6%	0%		3.2%	1.5%	2.3%	2.3%	0%		2.2%	2.1%	5.3%	2.8%	0%		3.9%	-
Buses	0	13	2	0		15	4	3	1	0		8	1	13	2	0		16	0	4	0	0		4	-
Buses %	0%	1.4%	1.4%	0%		1.3%	2.1%	0.6%	0.3%	0%		0.8%	0.5%	1.3%	1.1%	0%		1.2%	0%	1%	0%	0%		0.5%	-
Articulated Trucks	2	5	0	0		7	2	3	0	0		5	2	12	1	0		15	1	0	1	0		2	-
Articulated Trucks %	3.4%	0.5%	0%	0%		0.6%	1.1%	0.6%	0%	0%		0.5%	1%	1.2%	0.6%	0%		1.1%	0.4%	0%	0.9%	0%		0.3%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	35	-	-	-	-	-	18	-	-	-	-	-	11	-	-	-	-	-	18	-	-
Pedestrians%	-	-	-	-	41.2%		-	-	-	-	21.2%		-	-	-	-	12.9%		-	-	-	-	21.2%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	2.4%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	1.2%		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)

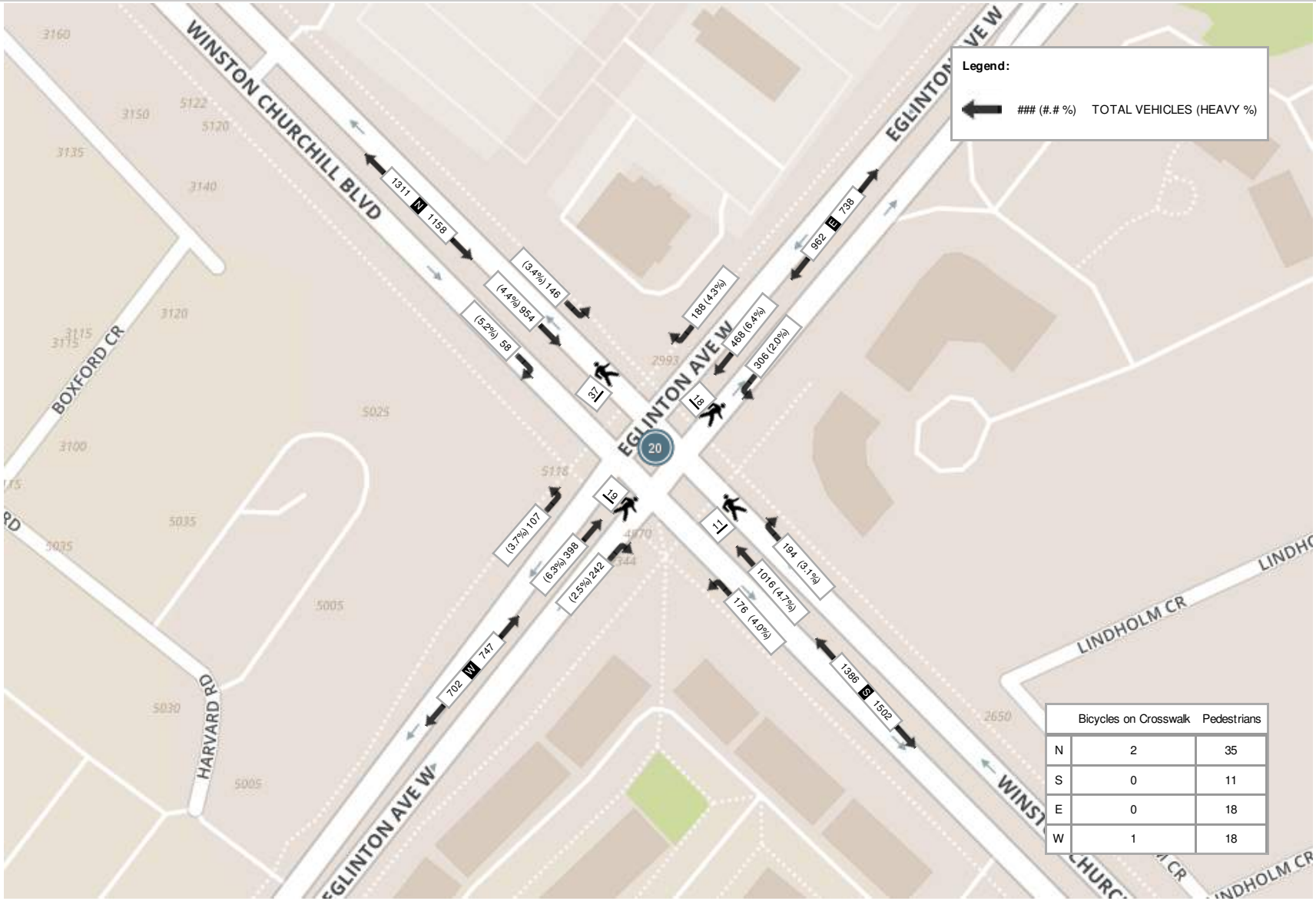
Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach EGLINTON AVE W						S Approach WINSTON CHURCHILL BLVD						W Approach EGLINTON AVE W						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	25	287	47	0	6	359	82	229	84	1	6	396	47	388	88	1	3	524	80	119	43	0	4	242	1521
17:00:00	18	240	37	0	10	295	79	269	89	0	15	437	45	355	91	0	5	491	84	159	62	0	2	305	1528
17:15:00	23	267	54	1	9	345	71	205	77	0	5	353	50	387	85	1	8	523	105	141	58	0	4	304	1525
17:30:00	14	240	52	0	12	306	72	235	68	0	16	375	40	376	97	0	5	513	100	163	46	0	2	309	1503
Grand Total	80	1034	190	1	37	1305	304	938	318	1	42	1561	182	1506	361	2	21	2051	369	582	209	0	12	1160	**6077**
Approach%	6.1%	79.2%	14.6%	0.1%		-	19.5%	60.1%	20.4%	0.1%		-	8.9%	73.4%	17.6%	0.1%		-	31.8%	50.2%	18%	0%		-	-
Totals %	1.3%	17%	3.1%	0%		21.5%	5%	15.4%	5.2%	0%		25.7%	3%	24.8%	5.9%	0%		33.8%	6.1%	9.6%	3.4%	0%		19.1%	-
PHF	0.8	0.9	0.88	0.25		0.91	0.93	0.87	0.89	0.25		0.89	0.91	0.97	0.93	0.5		0.98	0.88	0.89	0.84	0		0.94	-
Heavy	2	25	9	0		36	4	14	3	0		21	3	22	6	0		31	9	14	2	0		25	-
Heavy %	2.5%	2.4%	4.7%	0%		2.8%	1.3%	1.5%	0.9%	0%		1.3%	1.6%	1.5%	1.7%	0%		1.5%	2.4%	2.4%	1%	0%		2.2%	-
Lights	77	1009	181	1		1268	300	924	315	1		1540	179	1483	355	2		2019	360	567	207	0		1134	-
Lights %	96.3%	97.6%	95.3%	100%		97.2%	98.7%	98.5%	99.1%	100%		98.7%	98.4%	98.5%	98.3%	100%		98.4%	97.6%	97.4%	99%	0%		97.8%	-
Single-Unit Trucks	2	9	2	0		13	1	6	3	0		10	3	7	3	0		13	4	7	2	0		13	-
Single-Unit Trucks %	2.5%	0.9%	1.1%	0%		1%	0.3%	0.6%	0.9%	0%		0.6%	1.6%	0.5%	0.8%	0%		0.6%	1.1%	1.2%	1%	0%		1.1%	-
Buses	0	11	7	0		18	3	6	0	0		9	0	10	0	0		10	1	7	0	0		8	-
Buses %	0%	1.1%	3.7%	0%		1.4%	1%	0.6%	0%	0%		0.6%	0%	0.7%	0%	0%		0.5%	0.3%	1.2%	0%	0%		0.7%	-
Articulated Trucks	0	5	0	0		5	0	2	0	0		2	0	5	3	0		8	4	0	0	0		4	-
Articulated Trucks %	0%	0.5%	0%	0%		0.4%	0%	0.2%	0%	0%		0.1%	0%	0.3%	0.8%	0%		0.4%	1.1%	0%	0%	0%		0.3%	-
Bicycles on Road	1	0	0	0		1	0	0	0	0		0	0	1	0	0		1	0	1	0	0		1	-
Bicycles on Road %	1.3%	0%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	35	-	-	-	-	-	38	-	-	-	-	-	19	-	-	-	-	-	12	-	-
Pedestrians%	-	-	-	-	31.3%		-	-	-	-	33.9%		-	-	-	-	17%		-	-	-	-	10.7%		-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	1.8%		-	-	-	-	3.6%		-	-	-	-	1.8%		-	-	-	-	0%		-

Peak Hour: 08:00 AM - 09:00 AM Weather: Mist (15.52 °C)



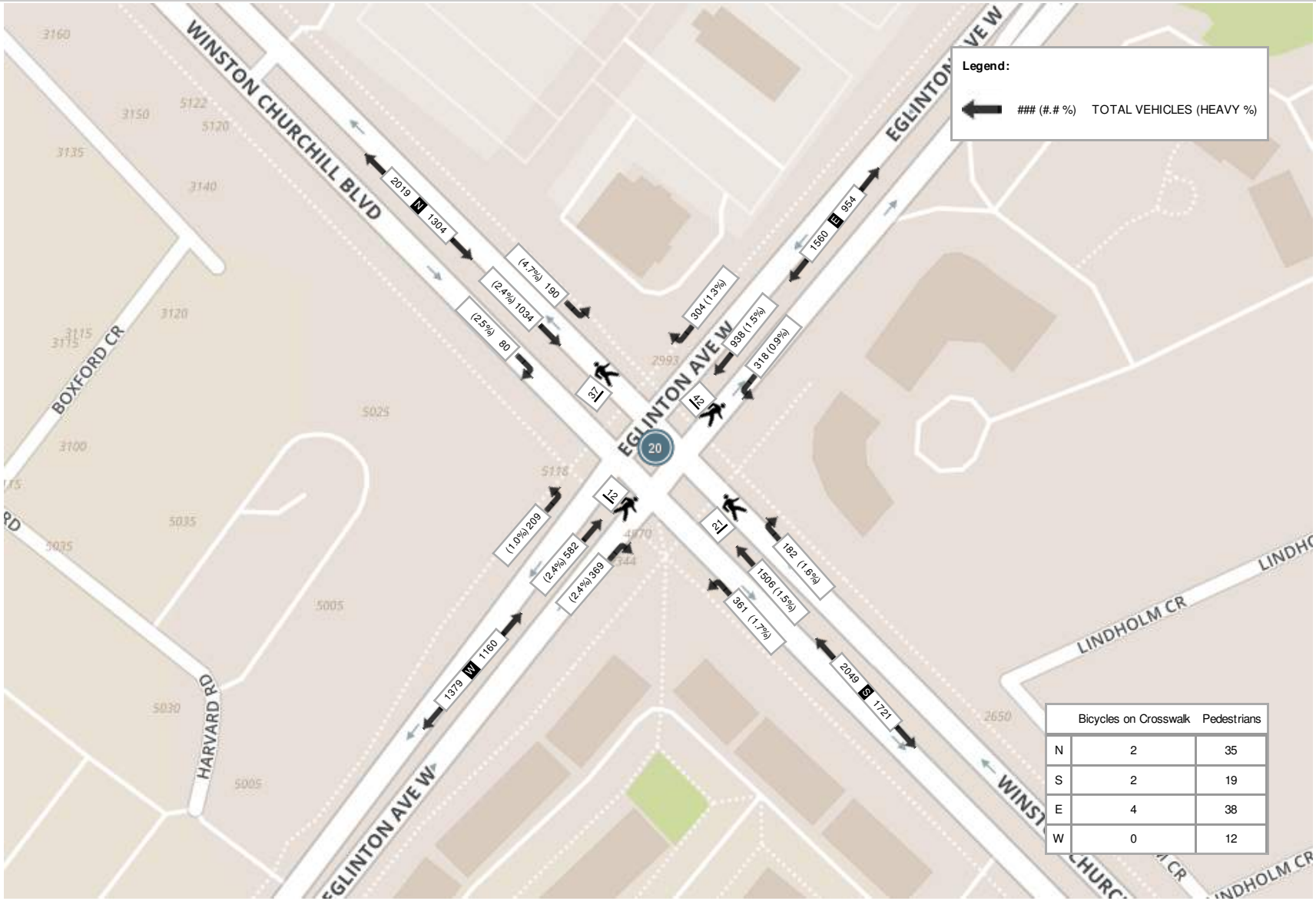
	Bicycles on Crosswalk	Pedestrians
N	2	32
S	4	16
E	0	24
W	1	5

Peak Hour: 12:30 PM - 01:30 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	35
S	0	11
E	0	18
W	1	18

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	2	35
S	2	19
E	4	38
W	0	12

Turning Movement Count (18 . WINSTON CHURCHILL RD & BRITANNIA RD) CustID: 00308232 MioID: 670004

Start Time	N Approach WINSTON CHURCHILL RD						E Approach BRITANNIA RD						S Approach WINSTON CHURCHILL RD						W Approach BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	20	162	21	0	6	203	12	49	22	0	3	83	11	98	17	0	3	126	45	227	43	0	3	315	727	
07:15:00	21	182	34	0	8	237	12	67	26	0	1	105	22	156	18	0	3	196	68	258	56	0	5	382	920	
07:30:00	24	229	30	0	6	283	10	61	26	0	4	97	24	145	25	0	3	194	55	337	73	0	7	465	1039	
07:45:00	31	191	37	0	5	259	15	90	26	0	1	131	24	183	24	0	3	231	64	358	87	0	4	509	1130	3816
08:00:00	29	254	45	0	6	328	17	106	31	0	2	154	32	198	30	0	1	260	67	339	44	0	5	450	1192	4281
08:15:00	38	192	27	0	6	257	20	85	26	0	4	131	29	212	41	0	3	282	63	368	102	0	1	533	1203	4564
08:30:00	19	223	39	0	5	281	25	83	24	0	0	132	32	250	33	0	3	315	57	349	80	0	2	486	1214	4739
08:45:00	28	194	42	0	7	264	25	67	22	0	3	114	20	214	43	0	4	277	60	302	81	0	7	443	1098	4707
09:00:00	20	169	26	0	2	215	18	80	19	0	0	117	19	135	20	0	3	174	51	273	79	0	2	403	909	4424
09:15:00	18	162	29	0	7	209	22	55	22	0	1	99	26	147	21	0	3	194	36	196	48	0	4	280	782	4003
09:30:00	20	171	29	0	1	220	16	77	28	0	2	121	21	124	33	0	1	178	56	188	25	0	2	269	788	3577
09:45:00	18	140	26	0	4	184	19	67	21	0	6	107	33	140	30	0	0	203	53	182	39	0	0	274	768	3247
BREAK																										
11:00:00	23	139	37	0	4	199	15	80	21	0	3	116	13	109	33	0	1	155	39	133	29	0	4	201	671	
11:15:00	31	175	18	0	4	224	26	75	15	0	1	116	22	144	40	0	0	206	32	92	24	0	1	148	694	
11:30:00	20	160	31	0	6	211	28	81	25	0	4	134	23	170	41	0	5	234	37	114	26	0	1	177	756	
11:45:00	25	153	30	0	8	208	31	92	25	0	2	148	25	148	38	0	3	211	39	131	24	0	5	194	761	2882
12:00:00	34	171	29	0	3	234	14	82	16	0	3	112	24	160	50	0	2	234	38	96	20	0	1	154	734	2945
12:15:00	26	154	22	0	4	202	31	115	26	0	2	172	24	153	49	0	1	226	29	134	35	0	2	198	798	3049
12:30:00	20	154	32	0	5	206	34	120	32	0	1	186	10	155	42	0	0	207	38	101	24	0	0	163	762	3055
12:45:00	17	157	34	0	0	208	30	115	28	0	1	173	17	183	42	0	0	242	32	109	26	0	2	167	790	3084
13:00:00	29	120	23	0	6	172	24	117	24	0	4	165	17	151	37	0	2	205	43	120	37	0	5	200	742	3092
13:15:00	33	152	29	0	2	214	30	109	21	0	1	160	12	170	51	0	1	233	28	99	18	0	7	145	752	3046
13:30:00	17	143	18	0	2	178	28	106	26	0	1	160	20	165	43	0	5	228	39	122	29	0	2	190	756	3040
13:45:00	32	144	35	0	3	211	35	143	31	0	0	209	24	164	47	0	2	235	29	116	23	0	2	168	823	3073
BREAK																										
16:00:00	50	202	30	0	2	282	45	286	44	0	1	375	18	237	71	0	3	326	36	117	39	0	1	192	1175	
16:15:00	56	196	38	0	6	290	40	298	30	0	6	368	11	211	85	1	2	308	46	117	36	0	1	199	1165	
16:30:00	48	228	38	0	4	314	29	298	44	0	0	371	23	249	72	0	2	344	31	143	35	0	1	209	1238	
16:45:00	62	241	37	0	3	340	41	285	34	0	4	360	29	253	79	0	1	361	44	141	39	0	2	224	1285	4863
17:00:00	53	184	27	0	5	264	32	329	49	0	1	410	10	230	80	0	2	320	30	149	42	0	5	221	1215	4903

17:15:00	77	258	33	0	4	368	38	339	49	0	9	426	21	278	72	0	2	371	45	129	40	0	3	214	1379	5117
17:30:00	54	223	29	0	5	306	32	254	43	0	2	329	22	248	70	0	2	340	52	138	50	1	1	241	1216	5095
17:45:00	50	205	36	0	4	291	37	282	64	0	13	383	30	197	62	0	9	289	44	161	49	0	1	254	1217	5027
18:00:00	52	243	32	0	5	327	33	243	61	0	2	337	28	214	80	0	4	322	45	154	48	0	2	247	1233	5045
18:15:00	43	223	44	0	4	310	31	264	37	0	3	332	28	206	64	0	5	298	39	182	51	0	5	272	1212	4878
18:30:00	50	250	51	0	6	351	34	251	40	0	0	325	25	207	59	0	5	291	51	147	41	0	3	239	1206	4868
18:45:00	54	245	44	0	3	343	26	180	46	1	10	253	20	166	61	0	1	247	55	137	50	0	1	242	1085	4736
Grand Total	1242	6789	1162	0	161	9193	955	5431	1124	1	101	7511	789	6570	1703	1	90	9063	1616	6459	1592	1	100	9668	**35435**	-
Approach%	13.5%	73.8%	12.6%	0%		-	12.7%	72.3%	15%	0%		-	8.7%	72.5%	18.8%	0%		-	16.7%	66.8%	16.5%	0%		-	-	-
Totals %	3.5%	19.2%	3.3%	0%		25.9%	2.7%	15.3%	3.2%	0%		21.2%	2.2%	18.5%	4.8%	0%		25.6%	4.6%	18.2%	4.5%	0%		27.3%	-	-
Heavy	19	258	32	0		-	39	137	29	0		-	13	294	34	0		-	23	128	25	0		-	-	-
Heavy %	1.5%	3.8%	2.8%	0%		-	4.1%	2.5%	2.6%	0%		-	1.6%	4.5%	2%	0%		-	1.4%	2%	1.6%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (15.02 °C)

Start Time	N Approach WINSTON CHURCHILL RD						E Approach BRITANNIA RD						S Approach WINSTON CHURCHILL RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	31	191	37	0	5	259	15	90	26	0	1	131	24	183	24	0	3	231	64	358	87	0	4	509	1130
08:00:00	29	254	45	0	6	328	17	106	31	0	2	154	32	198	30	0	1	260	67	339	44	0	5	450	1192
08:15:00	38	192	27	0	6	257	20	85	26	0	4	131	29	212	41	0	3	282	63	368	102	0	1	533	1203
08:30:00	19	223	39	0	5	281	25	83	24	0	0	132	32	250	33	0	3	315	57	349	80	0	2	486	1214
Grand Total	117	860	148	0	22	1125	77	364	107	0	7	548	117	843	128	0	10	1088	251	1414	313	0	12	1978	**4739**
Approach%	10.4%	76.4%	13.2%	0%		-	14.1%	66.4%	19.5%	0%		-	10.8%	77.5%	11.8%	0%		-	12.7%	71.5%	15.8%	0%		-	-
Totals %	2.5%	18.1%	3.1%	0%		23.7%	1.6%	7.7%	2.3%	0%		11.6%	2.5%	17.8%	2.7%	0%		23%	5.3%	29.8%	6.6%	0%		41.7%	-
PHF	0.77	0.85	0.82	0		0.86	0.77	0.86	0.86	0		0.89	0.91	0.84	0.78	0		0.86	0.94	0.96	0.77	0		0.93	-
Heavy	4	34	11	0		49	6	26	10	0		42	3	33	5	0		41	6	20	8	0		34	-
Heavy %	3.4%	4%	7.4%	0%		4.4%	7.8%	7.1%	9.3%	0%		7.7%	2.6%	3.9%	3.9%	0%		3.8%	2.4%	1.4%	2.6%	0%		1.7%	-
Lights	113	826	137	0		1076	71	338	97	0		506	114	810	123	0		1047	245	1393	305	0		1943	-
Lights %	96.6%	96%	92.6%	0%		95.6%	92.2%	92.9%	90.7%	0%		92.3%	97.4%	96.1%	96.1%	0%		96.2%	97.6%	98.5%	97.4%	0%		98.2%	-
Single-Unit Trucks	2	4	0	0		6	0	5	2	0		7	2	8	0	0		10	1	9	4	0		14	-
Single-Unit Trucks %	1.7%	0.5%	0%	0%		0.5%	0%	1.4%	1.9%	0%		1.3%	1.7%	0.9%	0%	0%		0.9%	0.4%	0.6%	1.3%	0%		0.7%	-
Buses	2	26	10	0		38	3	18	7	0		28	0	18	5	0		23	5	8	2	0		15	-
Buses %	1.7%	3%	6.8%	0%		3.4%	3.9%	4.9%	6.5%	0%		5.1%	0%	2.1%	3.9%	0%		2.1%	2%	0.6%	0.6%	0%		0.8%	-
Articulated Trucks	0	4	1	0		5	3	3	1	0		7	1	7	0	0		8	0	3	2	0		5	-
Articulated Trucks %	0%	0.5%	0.7%	0%		0.4%	3.9%	0.8%	0.9%	0%		1.3%	0.9%	0.8%	0%	0%		0.7%	0%	0.2%	0.6%	0%		0.3%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.1%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	21	-	-	-	-	-	7	-	-	-	-	-	8	-	-	-	-	-	10	-	-
Pedestrians%	-	-	-	-	41.2%		-	-	-	-	13.7%		-	-	-	-	15.7%		-	-	-	-	19.6%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	2%		-	-	-	-	0%		-	-	-	-	3.9%		-	-	-	-	3.9%		-

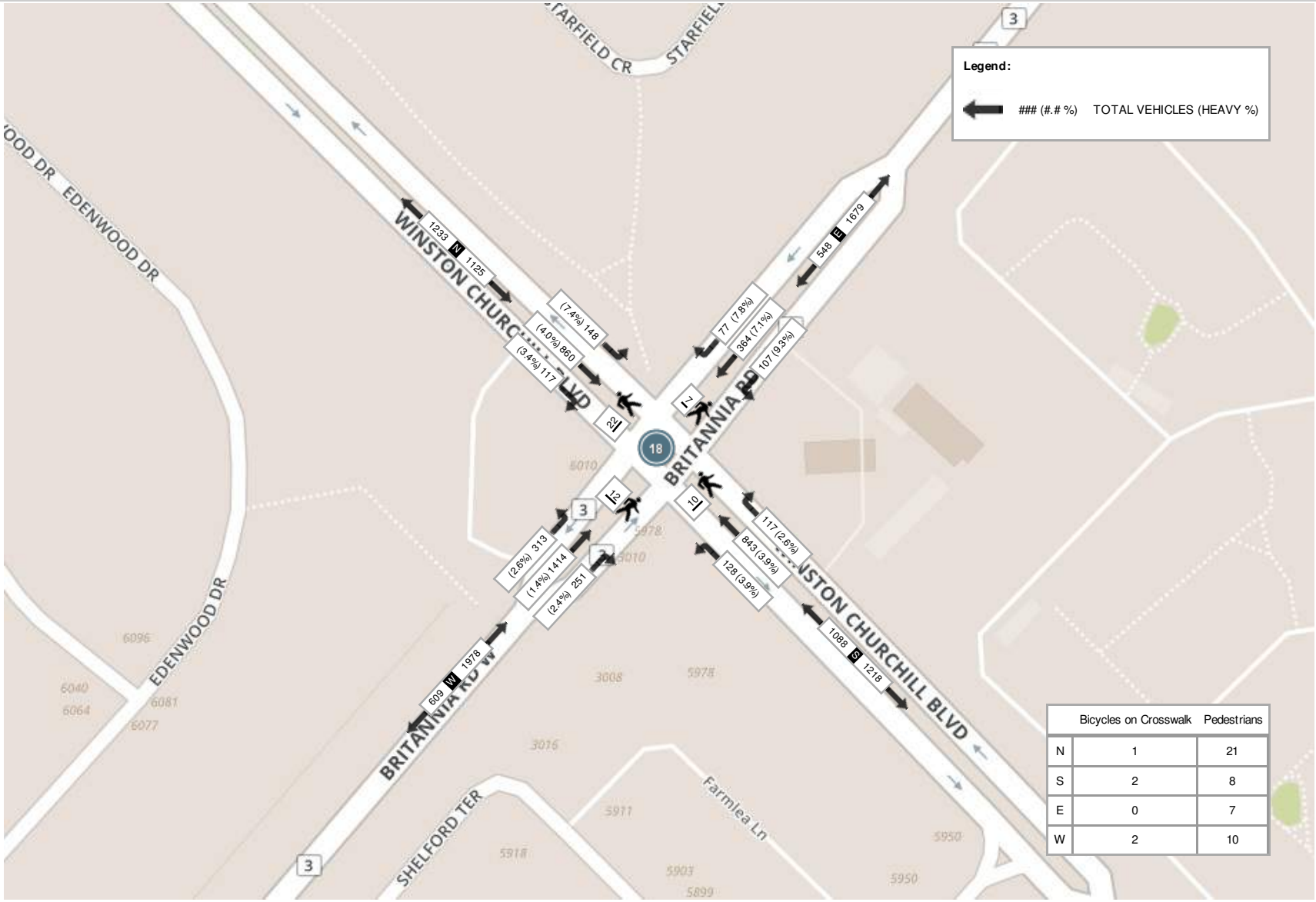
Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)

Start Time	N Approach WINSTON CHURCHILL RD						E Approach BRITANNIA RD						S Approach WINSTON CHURCHILL RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
12:15:00	26	154	22	0	4	202	31	115	26	0	2	172	24	153	49	0	1	226	29	134	35	0	2	198	798
12:30:00	20	154	32	0	5	206	34	120	32	0	1	186	10	155	42	0	0	207	38	101	24	0	0	163	762
12:45:00	17	157	34	0	0	208	30	115	28	0	1	173	17	183	42	0	0	242	32	109	26	0	2	167	790
13:00:00	29	120	23	0	6	172	24	117	24	0	4	165	17	151	37	0	2	205	43	120	37	0	5	200	742
Grand Total	92	585	111	0	15	788	119	467	110	0	8	696	68	642	170	0	3	880	142	464	122	0	9	728	**3092**
Approach%	11.7%	74.2%	14.1%	0%		-	17.1%	67.1%	15.8%	0%		-	7.7%	73%	19.3%	0%		-	19.5%	63.7%	16.8%	0%		-	-
Totals %	3%	18.9%	3.6%	0%		25.5%	3.8%	15.1%	3.6%	0%		22.5%	2.2%	20.8%	5.5%	0%		28.5%	4.6%	15%	3.9%	0%		23.5%	-
PHF	0.79	0.93	0.82	0		0.95	0.88	0.97	0.86	0		0.94	0.71	0.88	0.87	0		0.91	0.83	0.87	0.82	0		0.91	-
Heavy	1	19	1	0		21	6	17	2	0		25	1	34	4	0		39	0	12	2	0		14	-
Heavy %	1.1%	3.2%	0.9%	0%		2.7%	5%	3.6%	1.8%	0%		3.6%	1.5%	5.3%	2.4%	0%		4.4%	0%	2.6%	1.6%	0%		1.9%	-
Lights	91	566	110	0		767	113	450	108	0		671	67	608	166	0		841	142	451	120	0		713	-
Lights %	98.9%	96.8%	99.1%	0%		97.3%	95%	96.4%	98.2%	0%		96.4%	98.5%	94.7%	97.6%	0%		95.6%	100%	97.2%	98.4%	0%		97.9%	-
Single-Unit Trucks	1	6	1	0		8	3	11	1	0		15	1	15	4	0		20	0	7	2	0		9	-
Single-Unit Trucks %	1.1%	1%	0.9%	0%		1%	2.5%	2.4%	0.9%	0%		2.2%	1.5%	2.3%	2.4%	0%		2.3%	0%	1.5%	1.6%	0%		1.2%	-
Buses	0	9	0	0		9	0	3	0	0		3	0	11	0	0		11	0	5	0	0		5	-
Buses %	0%	1.5%	0%	0%		1.1%	0%	0.6%	0%	0%		0.4%	0%	1.7%	0%	0%		1.3%	0%	1.1%	0%	0%		0.7%	-
Articulated Trucks	0	4	0	0		4	3	3	1	0		7	0	8	0	0		8	0	0	0	0		0	-
Articulated Trucks %	0%	0.7%	0%	0%		0.5%	2.5%	0.6%	0.9%	0%		1%	0%	1.2%	0%	0%		0.9%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	4	-	-
Pedestrians%	-	-	-	-	31.4%		-	-	-	-	20%		-	-	-	-	2.9%		-	-	-	-	11.4%		-
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	5	-	-
Bicycles on Crosswalk%	-	-	-	-	11.4%		-	-	-	-	2.9%		-	-	-	-	5.7%		-	-	-	-	14.3%		-

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (24.34 °C)

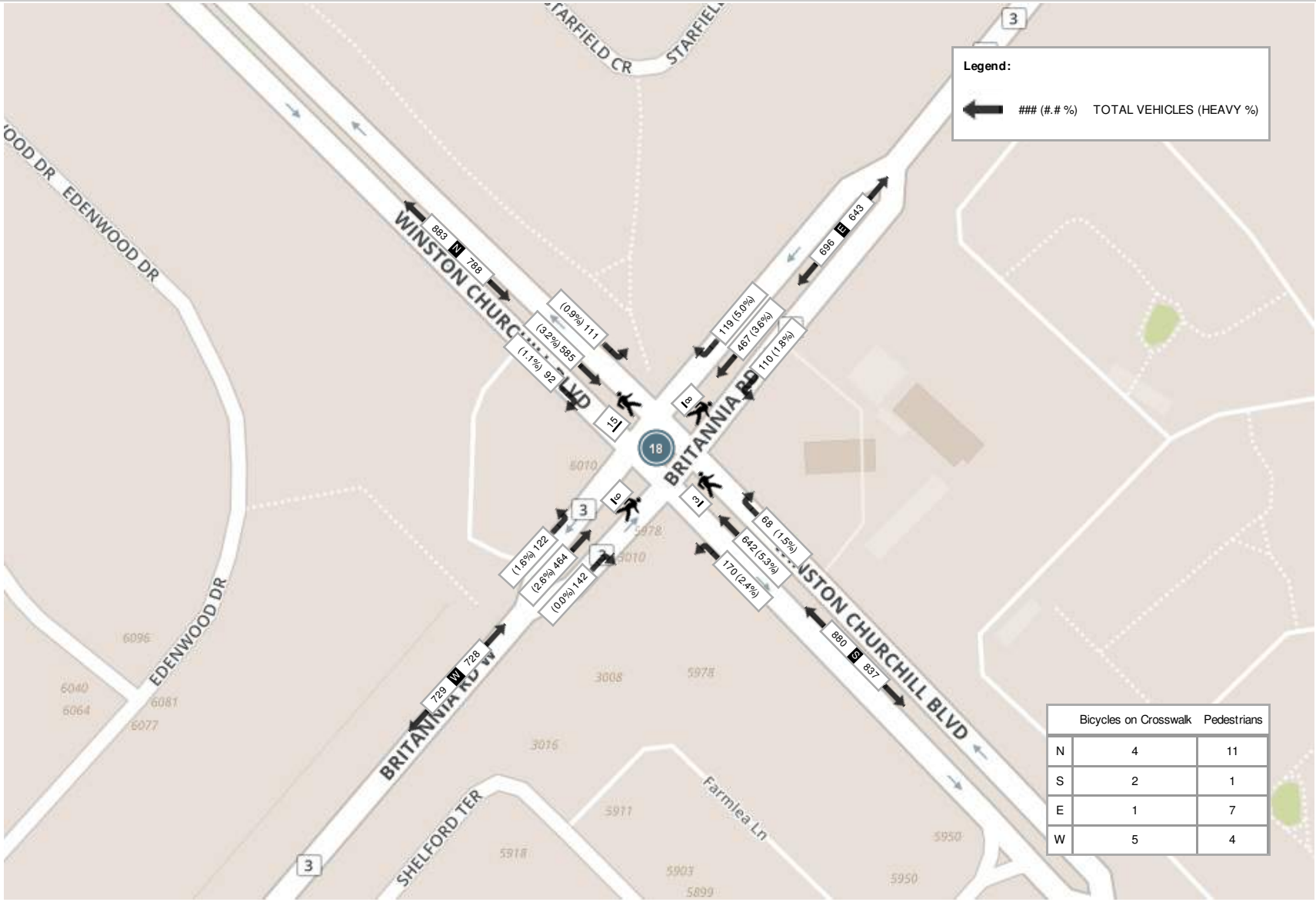
Start Time	N Approach WINSTON CHURCHILL RD						E Approach BRITANNIA RD						S Approach WINSTON CHURCHILL RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:30:00	48	228	38	0	4	314	29	298	44	0	0	371	23	249	72	0	2	344	31	143	35	0	1	209	1238
16:45:00	62	241	37	0	3	340	41	285	34	0	4	360	29	253	79	0	1	361	44	141	39	0	2	224	1285
17:00:00	53	184	27	0	5	264	32	329	49	0	1	410	10	230	80	0	2	320	30	149	42	0	5	221	1215
17:15:00	77	258	33	0	4	368	38	339	49	0	9	426	21	278	72	0	2	371	45	129	40	0	3	214	1379
Grand Total	240	911	135	0	16	1286	140	1251	176	0	14	1567	83	1010	303	0	7	1396	150	562	156	0	11	868	**5117**
Approach%	18.7%	70.8%	10.5%	0%		-	8.9%	79.8%	11.2%	0%		-	5.9%	72.3%	21.7%	0%		-	17.3%	64.7%	18%	0%		-	-
Totals %	4.7%	17.8%	2.6%	0%		25.1%	2.7%	24.4%	3.4%	0%		30.6%	1.6%	19.7%	5.9%	0%		27.3%	2.9%	11%	3%	0%		17%	-
PHF	0.78	0.88	0.89	0		0.87	0.85	0.92	0.9	0		0.92	0.72	0.91	0.95	0		0.94	0.83	0.94	0.93	0		0.97	-
Heavy	0	19	0	0		19	3	6	1	0		10	2	22	2	0		26	2	4	1	0		7	-
Heavy %	0%	2.1%	0%	0%		1.5%	2.1%	0.5%	0.6%	0%		0.6%	2.4%	2.2%	0.7%	0%		1.9%	1.3%	0.7%	0.6%	0%		0.8%	-
Lights	240	892	135	0		1267	137	1245	175	0		1557	81	988	301	0		1370	148	558	155	0		861	-
Lights %	100%	97.9%	100%	0%		98.5%	97.9%	99.5%	99.4%	0%		99.4%	97.6%	97.8%	99.3%	0%		98.1%	98.7%	99.3%	99.4%	0%		99.2%	-
Single-Unit Trucks	0	5	0	0		5	1	1	1	0		3	0	7	1	0		8	1	0	1	0		2	-
Single-Unit Trucks %	0%	0.5%	0%	0%		0.4%	0.7%	0.1%	0.6%	0%		0.2%	0%	0.7%	0.3%	0%		0.6%	0.7%	0%	0.6%	0%		0.2%	-
Buses	0	12	0	0		12	2	3	0	0		5	1	12	1	0		14	1	4	0	0		5	-
Buses %	0%	1.3%	0%	0%		0.9%	1.4%	0.2%	0%	0%		0.3%	1.2%	1.2%	0.3%	0%		1%	0.7%	0.7%	0%	0%		0.6%	-
Articulated Trucks	0	2	0	0		2	0	2	0	0		2	1	3	0	0		4	0	0	0	0		0	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	0.2%	0%	0%		0.1%	1.2%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	14	-	-	-	-	-	7	-	-	-	-	-	10	-	-
Pedestrians%	-	-	-	-	27.1%		-	-	-	-	29.2%		-	-	-	-	14.6%		-	-	-	-	20.8%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	6.3%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	2.1%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (15.02 °C)



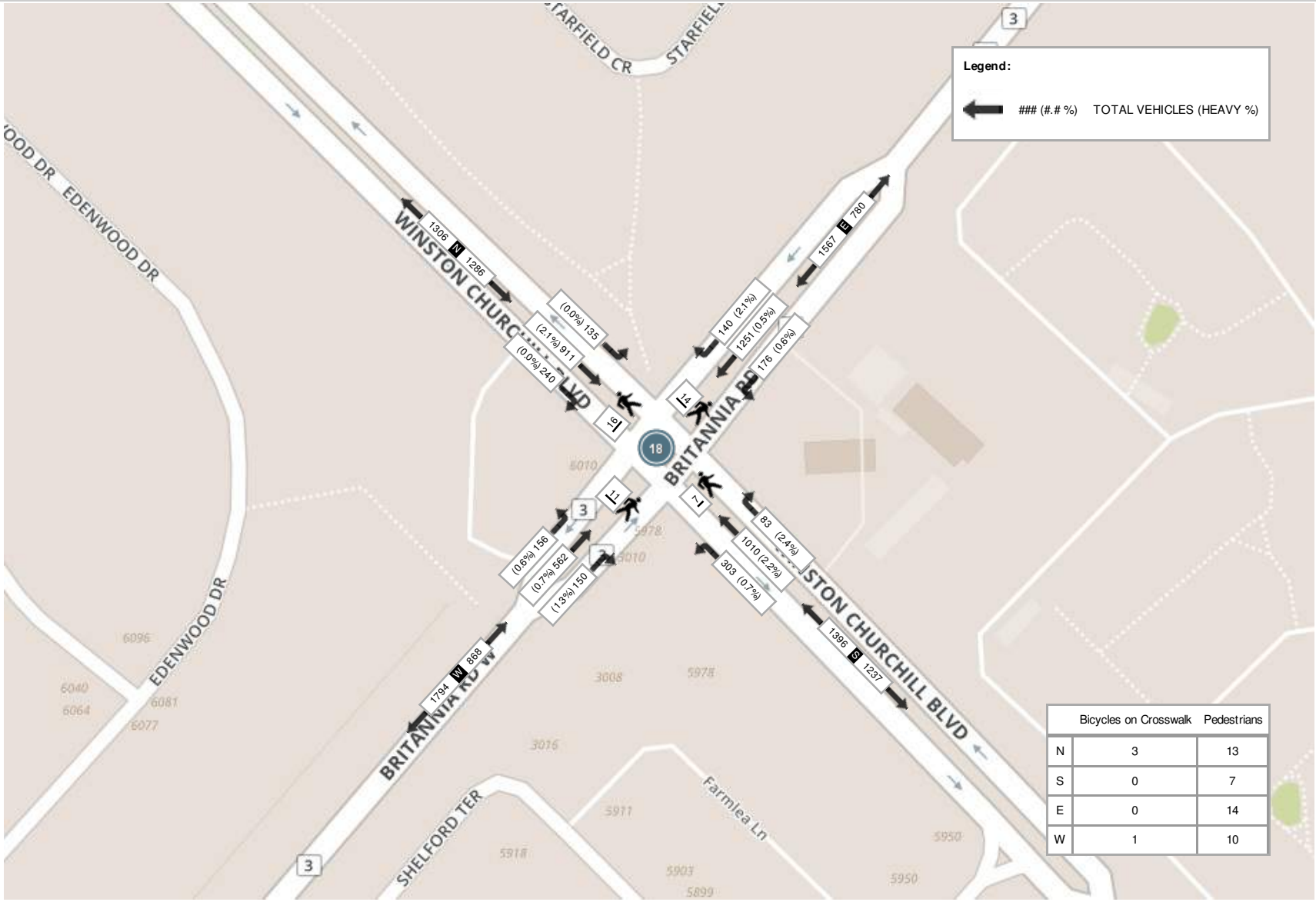
	Bicycles on Crosswalk	Pedestrians
N	1	21
S	2	8
E	0	7
W	2	10

Peak Hour: 12:15 PM - 01:15 PM Weather: Broken Clouds (21.3 °C)



	Bicycles on Crosswalk	Pedestrians
N	4	11
S	2	1
E	1	7
W	5	4

Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (24.34 °C)



	Bicycles on Crosswalk	Pedestrians
N	3	13
S	0	7
E	0	14
W	1	10

Turning Movement Count (19 . WINSTON CHURCHILL RD & THOMAS RD)

Start Time	N Approach WINSTON CHURCHILL RD						E Approach THOMAS RD						S Approach WINSTON CHURCHILL RD						W Approach THOMAS RD						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	7	265	14	0	11	286	10	30	22	0	9	62	17	95	14	0	2	126	39	101	10	0	3	150	624	
07:15:00	13	288	32	0	7	333	10	43	29	0	5	82	22	156	29	0	6	207	63	123	21	0	7	207	829	
07:30:00	12	308	46	0	11	366	19	48	33	0	5	100	39	152	27	0	1	218	47	185	26	0	4	258	942	
07:45:00	12	343	52	0	8	407	13	44	39	0	11	96	44	249	47	0	3	340	29	140	15	0	6	184	1027	3422
08:00:00	12	326	41	1	8	380	18	80	53	0	6	151	49	222	43	0	5	314	62	164	29	0	1	255	1100	3898
08:15:00	18	337	38	0	11	393	19	68	46	0	4	133	32	246	43	0	7	321	63	115	30	0	3	208	1055	4124
08:30:00	8	306	33	0	4	347	20	48	26	0	4	94	45	250	36	0	3	331	59	120	33	0	7	212	984	4166
08:45:00	13	282	20	0	4	315	22	63	36	1	1	122	35	208	31	1	4	275	61	92	40	0	2	193	905	4044
09:00:00	9	261	33	0	4	303	14	38	37	0	4	89	41	179	28	0	6	248	41	71	20	0	4	132	772	3716
09:15:00	11	267	19	0	1	297	11	40	24	0	3	75	21	184	31	0	6	236	47	53	12	1	6	113	721	3382
09:30:00	12	241	12	0	5	265	11	39	27	0	3	77	19	164	35	0	4	218	49	51	19	0	8	119	679	3077
09:45:00	6	227	15	1	4	249	24	37	24	0	6	85	25	166	45	0	2	236	49	42	18	0	4	109	679	2851
BREAK																										
11:00:00	12	192	8	0	11	212	16	46	28	0	10	90	19	209	61	1	7	290	41	49	22	0	8	112	704	
11:15:00	11	228	11	0	9	250	18	44	15	0	5	77	22	214	44	1	7	281	49	60	16	0	9	125	733	
11:30:00	14	215	22	0	5	251	23	47	20	0	7	90	26	168	48	0	10	242	42	57	19	0	5	118	701	
11:45:00	9	215	20	0	7	244	17	44	27	0	8	88	15	221	45	2	12	283	46	45	10	0	8	101	716	2854
12:00:00	12	197	14	0	20	223	23	29	26	0	5	78	17	211	47	1	8	276	49	55	27	0	8	131	708	2858
12:15:00	20	238	18	0	6	276	18	57	19	0	5	94	17	200	45	0	4	262	45	44	16	0	5	105	737	2862
12:30:00	12	194	19	0	3	225	21	35	13	0	4	69	19	225	39	1	3	284	44	32	16	0	1	92	670	2831
12:45:00	11	223	9	0	6	243	25	55	24	0	7	104	34	201	40	0	4	275	46	36	15	0	5	97	719	2834
13:00:00	11	193	16	0	3	220	17	50	33	0	2	100	22	223	63	1	4	309	45	41	18	0	5	104	733	2859
13:15:00	17	193	16	0	6	226	12	46	27	0	4	85	20	244	47	0	5	311	42	39	13	0	3	94	716	2838
13:30:00	12	171	10	0	2	193	19	48	27	0	0	94	20	215	42	1	5	278	42	61	26	0	5	129	694	2862
13:45:00	12	232	15	0	6	259	24	56	31	0	4	111	24	228	61	2	8	315	41	44	6	0	4	91	776	2919
BREAK																										
16:00:00	18	210	14	0	5	242	35	77	35	0	3	147	26	265	51	0	5	342	31	45	17	0	7	93	824	
16:15:00	23	233	20	0	7	276	34	127	25	0	2	186	30	299	48	0	8	377	38	57	11	0	4	106	945	
16:30:00	21	285	23	0	6	329	21	112	34	0	16	167	26	316	57	0	12	399	32	64	23	0	8	119	1014	
16:45:00	18	256	22	0	4	296	34	141	39	0	2	214	28	306	60	0	10	394	33	68	20	0	9	121	1025	3808
17:00:00	26	319	16	0	11	361	23	149	39	0	8	211	30	395	60	0	14	485	38	53	16	0	9	107	1164	4148

17:15:00	23	277	24	0	11	324	21	100	23	0	13	144	25	359	65	0	11	449	45	68	25	0	5	138	1055	4258
17:30:00	23	282	23	1	12	329	37	179	56	0	17	272	32	309	46	0	11	387	42	71	17	0	5	130	1118	4362
17:45:00	20	306	27	0	6	353	25	150	46	0	8	221	37	330	59	1	2	427	35	71	23	0	11	129	1130	4467
18:00:00	14	287	26	0	5	327	42	167	31	1	8	241	24	281	65	0	8	370	34	95	25	0	10	154	1092	4395
18:15:00	20	302	28	0	9	350	35	160	40	0	15	235	27	288	55	1	15	371	51	78	14	0	12	143	1099	4439
18:30:00	26	287	25	0	12	338	30	139	41	0	22	210	33	296	68	0	3	397	48	73	23	0	2	144	1089	4410
18:45:00	17	244	16	0	6	277	33	136	52	0	6	221	47	323	78	0	9	448	58	76	28	0	1	162	1108	4388
Grand Total	535	9230	797	3	256	10565	794	2772	1147	2	242	4715	1009	8597	1703	13	234	11322	1626	2639	719	1	204	4985	**31587**	-
Approach%	5.1%	87.4%	7.5%	0%		-	16.8%	58.8%	24.3%	0%		-	8.9%	75.9%	15%	0.1%		-	32.6%	52.9%	14.4%	0%		-	-	-
Totals %	1.7%	29.2%	2.5%	0%		33.4%	2.5%	8.8%	3.6%	0%		14.9%	3.2%	27.2%	5.4%	0%		35.8%	5.1%	8.4%	2.3%	0%		15.8%	-	-
Heavy	22	295	22	0		-	24	57	15	0		-	23	298	33	0		-	22	60	21	0		-	-	-
Heavy %	4.1%	3.2%	2.8%	0%		-	3%	2.1%	1.3%	0%		-	2.3%	3.5%	1.9%	0%		-	1.4%	2.3%	2.9%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)

Start Time	N Approach WINSTON CHURCHILL RD						E Approach THOMAS RD						S Approach WINSTON CHURCHILL RD						W Approach THOMAS RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	12	343	52	0	8	407	13	44	39	0	11	96	44	249	47	0	3	340	29	140	15	0	6	184	1027
08:00:00	12	326	41	1	8	380	18	80	53	0	6	151	49	222	43	0	5	314	62	164	29	0	1	255	1100
08:15:00	18	337	38	0	11	393	19	68	46	0	4	133	32	246	43	0	7	321	63	115	30	0	3	208	1055
08:30:00	8	306	33	0	4	347	20	48	26	0	4	94	45	250	36	0	3	331	59	120	33	0	7	212	984
Grand Total	50	1312	164	1	31	1527	70	240	164	0	25	474	170	967	169	0	18	1306	213	539	107	0	17	859	**4166**
Approach%	3.3%	85.9%	10.7%	0.1%		-	14.8%	50.6%	34.6%	0%		-	13%	74%	12.9%	0%		-	24.8%	62.7%	12.5%	0%		-	-
Totals %	1.2%	31.5%	3.9%	0%		36.7%	1.7%	5.8%	3.9%	0%		11.4%	4.1%	23.2%	4.1%	0%		31.3%	5.1%	12.9%	2.6%	0%		20.6%	-
PHF	0.69	0.96	0.79	0.25		0.94	0.88	0.75	0.77	0		0.78	0.87	0.97	0.9	0		0.96	0.85	0.82	0.81	0		0.84	-
Heavy	6	42	6	0		54	4	11	7	0		22	9	34	8	0		51	4	15	4	0		23	-
Heavy %	12%	3.2%	3.7%	0%		3.5%	5.7%	4.6%	4.3%	0%		4.6%	5.3%	3.5%	4.7%	0%		3.9%	1.9%	2.8%	3.7%	0%		2.7%	-
Lights	44	1270	158	1		1473	65	228	157	0		450	161	933	161	0		1255	209	524	103	0		836	-
Lights %	88%	96.8%	96.3%	100%		96.5%	92.9%	95%	95.7%	0%		94.9%	94.7%	96.5%	95.3%	0%		96.1%	98.1%	97.2%	96.3%	0%		97.3%	-
Single-Unit Trucks	2	7	0	0		9	1	1	2	0		4	2	9	2	0		13	0	1	2	0		3	-
Single-Unit Trucks %	4%	0.5%	0%	0%		0.6%	1.4%	0.4%	1.2%	0%		0.8%	1.2%	0.9%	1.2%	0%		1%	0%	0.2%	1.9%	0%		0.3%	-
Buses	4	29	6	0		39	3	10	5	0		18	7	19	5	0		31	4	12	2	0		18	-
Buses %	8%	2.2%	3.7%	0%		2.6%	4.3%	4.2%	3%	0%		3.8%	4.1%	2%	3%	0%		2.4%	1.9%	2.2%	1.9%	0%		2.1%	-
Articulated Trucks	0	6	0	0		6	0	0	0	0		0	0	6	1	0		7	0	2	0	0		2	-
Articulated Trucks %	0%	0.5%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.6%	0.6%	0%		0.5%	0%	0.4%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	1	1	0	0		2	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	1.4%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	28	-	-	-	-	-	20	-	-	-	-	-	16	-	-	-	-	-	14	-	-
Pedestrians%	-	-	-	-	30.8%		-	-	-	-	22%		-	-	-	-	17.6%		-	-	-	-	15.4%		-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	3	-	-
Bicycles on Crosswalk%	-	-	-	-	3.3%		-	-	-	-	5.5%		-	-	-	-	2.2%		-	-	-	-	3.3%		-

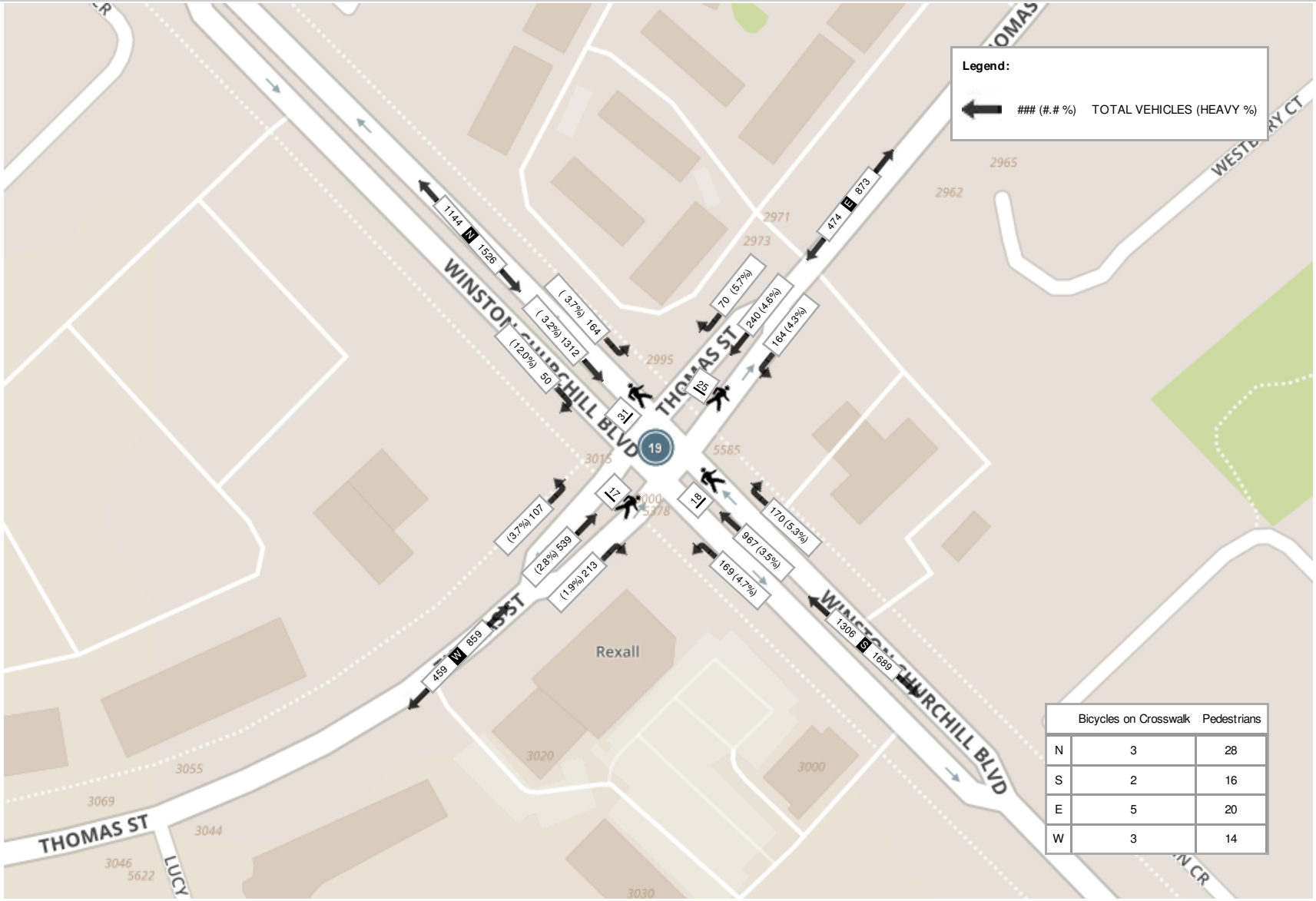
Peak Hour: 01:00 PM - 02:00 PM Weather: Broken Clouds (22.92 °C)

Start Time	N Approach WINSTON CHURCHILL RD						E Approach THOMAS RD						S Approach WINSTON CHURCHILL RD						W Approach THOMAS RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
13:00:00	11	193	16	0	3	220	17	50	33	0	2	100	22	223	63	1	4	309	45	41	18	0	5	104	733
13:15:00	17	193	16	0	6	226	12	46	27	0	4	85	20	244	47	0	5	311	42	39	13	0	3	94	716
13:30:00	12	171	10	0	2	193	19	48	27	0	0	94	20	215	42	1	5	278	42	61	26	0	5	129	694
13:45:00	12	232	15	0	6	259	24	56	31	0	4	111	24	228	61	2	8	315	41	44	6	0	4	91	776
Grand Total	52	789	57	0	17	898	72	200	118	0	10	390	86	910	213	4	22	1213	170	185	63	0	17	418	**2919**
Approach%	5.8%	87.9%	6.3%	0%		-	18.5%	51.3%	30.3%	0%		-	7.1%	75%	17.6%	0.3%		-	40.7%	44.3%	15.1%	0%		-	-
Totals %	1.8%	27%	2%	0%		30.8%	2.5%	6.9%	4%	0%		13.4%	2.9%	31.2%	7.3%	0.1%		41.6%	5.8%	6.3%	2.2%	0%		14.3%	-
PHF	0.76	0.85	0.89	0		0.87	0.75	0.89	0.89	0		0.88	0.9	0.93	0.85	0.5		0.96	0.94	0.76	0.61	0		0.81	-
Heavy	3	30	1	0		34	3	9	0	0		12	0	39	3	0		42	2	8	2	0		12	-
Heavy %	5.8%	3.8%	1.8%	0%		3.8%	4.2%	4.5%	0%	0%		3.1%	0%	4.3%	1.4%	0%		3.5%	1.2%	4.3%	3.2%	0%		2.9%	-
Lights	49	759	56	0		864	68	191	118	0		377	86	871	210	4		1171	168	177	61	0		406	-
Lights %	94.2%	96.2%	98.2%	0%		96.2%	94.4%	95.5%	100%	0%		96.7%	100%	95.7%	98.6%	100%		96.5%	98.8%	95.7%	96.8%	0%		97.1%	-
Single-Unit Trucks	2	10	1	0		13	2	4	0	0		6	0	16	0	0		16	1	2	2	0		5	-
Single-Unit Trucks %	3.8%	1.3%	1.8%	0%		1.4%	2.8%	2%	0%	0%		1.5%	0%	1.8%	0%	0%		1.3%	0.6%	1.1%	3.2%	0%		1.2%	-
Buses	1	12	0	0		13	1	5	0	0		6	0	16	3	0		19	1	5	0	0		6	-
Buses %	1.9%	1.5%	0%	0%		1.4%	1.4%	2.5%	0%	0%		1.5%	0%	1.8%	1.4%	0%		1.6%	0.6%	2.7%	0%	0%		1.4%	-
Articulated Trucks	0	8	0	0		8	0	0	0	0		0	0	7	0	0		7	0	1	0	0		1	-
Articulated Trucks %	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.6%	0%	0.5%	0%	0%		0.2%	-
Bicycles on Road	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	1.4%	0%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	8	-	-	-	-	-	20	-	-	-	-	-	17	-	-
Pedestrians%	-	-	-	-	25.8%		-	-	-	-	12.1%		-	-	-	-	30.3%		-	-	-	-	25.8%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	3%		-	-	-	-	3%		-	-	-	-	0%		-

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)

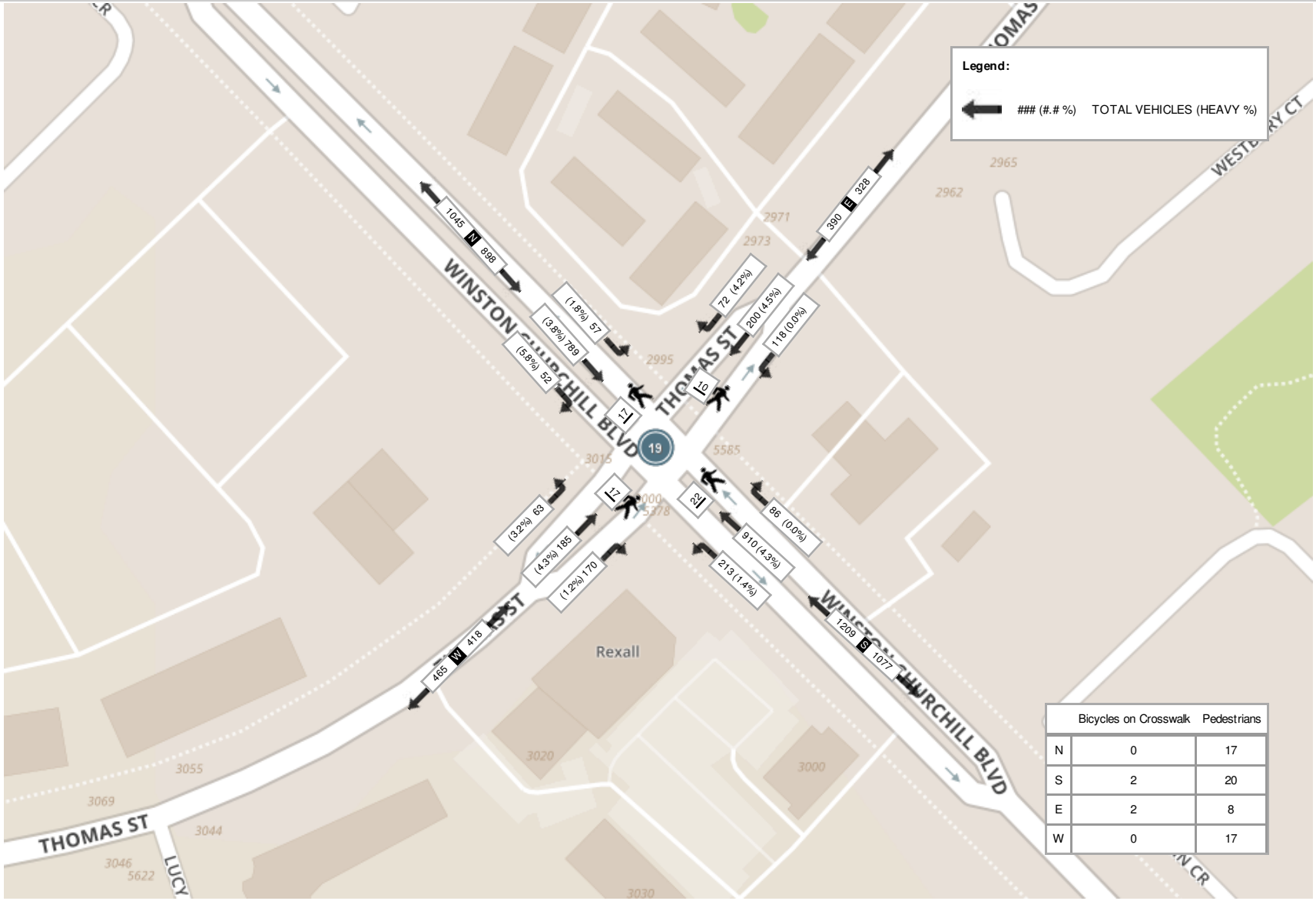
Start Time	N Approach WINSTON CHURCHILL RD						E Approach THOMAS RD						S Approach WINSTON CHURCHILL RD						W Approach THOMAS RD						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	26	319	16	0	11	361	23	149	39	0	8	211	30	395	60	0	14	485	38	53	16	0	9	107	1164
17:15:00	23	277	24	0	11	324	21	100	23	0	13	144	25	359	65	0	11	449	45	68	25	0	5	138	1055
17:30:00	23	282	23	1	12	329	37	179	56	0	17	272	32	309	46	0	11	387	42	71	17	0	5	130	1118
17:45:00	20	306	27	0	6	353	25	150	46	0	8	221	37	330	59	1	2	427	35	71	23	0	11	129	1130
Grand Total	92	1184	90	1	40	1367	106	578	164	0	46	848	124	1393	230	1	38	1748	160	263	81	0	30	504	**4467**
Approach%	6.7%	86.6%	6.6%	0.1%		-	12.5%	68.2%	19.3%	0%		-	7.1%	79.7%	13.2%	0.1%		-	31.7%	52.2%	16.1%	0%		-	-
Totals %	2.1%	26.5%	2%	0%		30.6%	2.4%	12.9%	3.7%	0%		19%	2.8%	31.2%	5.1%	0%		39.1%	3.6%	5.9%	1.8%	0%		11.3%	-
PHF	0.88	0.93	0.83	0.25		0.95	0.72	0.81	0.73	0		0.78	0.84	0.88	0.88	0.25		0.9	0.89	0.93	0.81	0		0.91	-
Heavy	0	23	2	0		25	3	5	0	0		8	1	24	2	0		27	0	6	0	0		6	-
Heavy %	0%	1.9%	2.2%	0%		1.8%	2.8%	0.9%	0%	0%		0.9%	0.8%	1.7%	0.9%	0%		1.5%	0%	2.3%	0%	0%		1.2%	-
Lights	92	1161	88	1		1342	103	572	164	0		839	123	1369	228	1		1721	160	257	81	0		498	-
Lights %	100%	98.1%	97.8%	100%		98.2%	97.2%	99%	100%	0%		98.9%	99.2%	98.3%	99.1%	100%		98.5%	100%	97.7%	100%	0%		98.8%	-
Single-Unit Trucks	0	7	0	0		7	0	1	0	0		1	1	8	1	0		10	0	1	0	0		1	-
Single-Unit Trucks %	0%	0.6%	0%	0%		0.5%	0%	0.2%	0%	0%		0.1%	0.8%	0.6%	0.4%	0%		0.6%	0%	0.4%	0%	0%		0.2%	-
Buses	0	11	2	0		13	3	4	0	0		7	0	11	0	0		11	0	5	0	0		5	-
Buses %	0%	0.9%	2.2%	0%		1%	2.8%	0.7%	0%	0%		0.8%	0%	0.8%	0%	0%		0.6%	0%	1.9%	0%	0%		1%	-
Articulated Trucks	0	5	0	0		5	0	0	0	0		0	0	5	1	0		6	0	0	0	0		0	-
Articulated Trucks %	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.4%	0.4%	0%		0.3%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	30	-	-	-	-	-	34	-	-	-	-	-	34	-	-	-	-	-	26	-	-
Pedestrians%	-	-	-	-	19.5%		-	-	-	-	22.1%		-	-	-	-	22.1%		-	-	-	-	16.9%		-
Bicycles on Crosswalk	-	-	-	-	10	-	-	-	-	-	12	-	-	-	-	-	4	-	-	-	-	-	4	-	-
Bicycles on Crosswalk%	-	-	-	-	6.5%		-	-	-	-	7.8%		-	-	-	-	2.6%		-	-	-	-	2.6%		-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mist (15.52 °C)



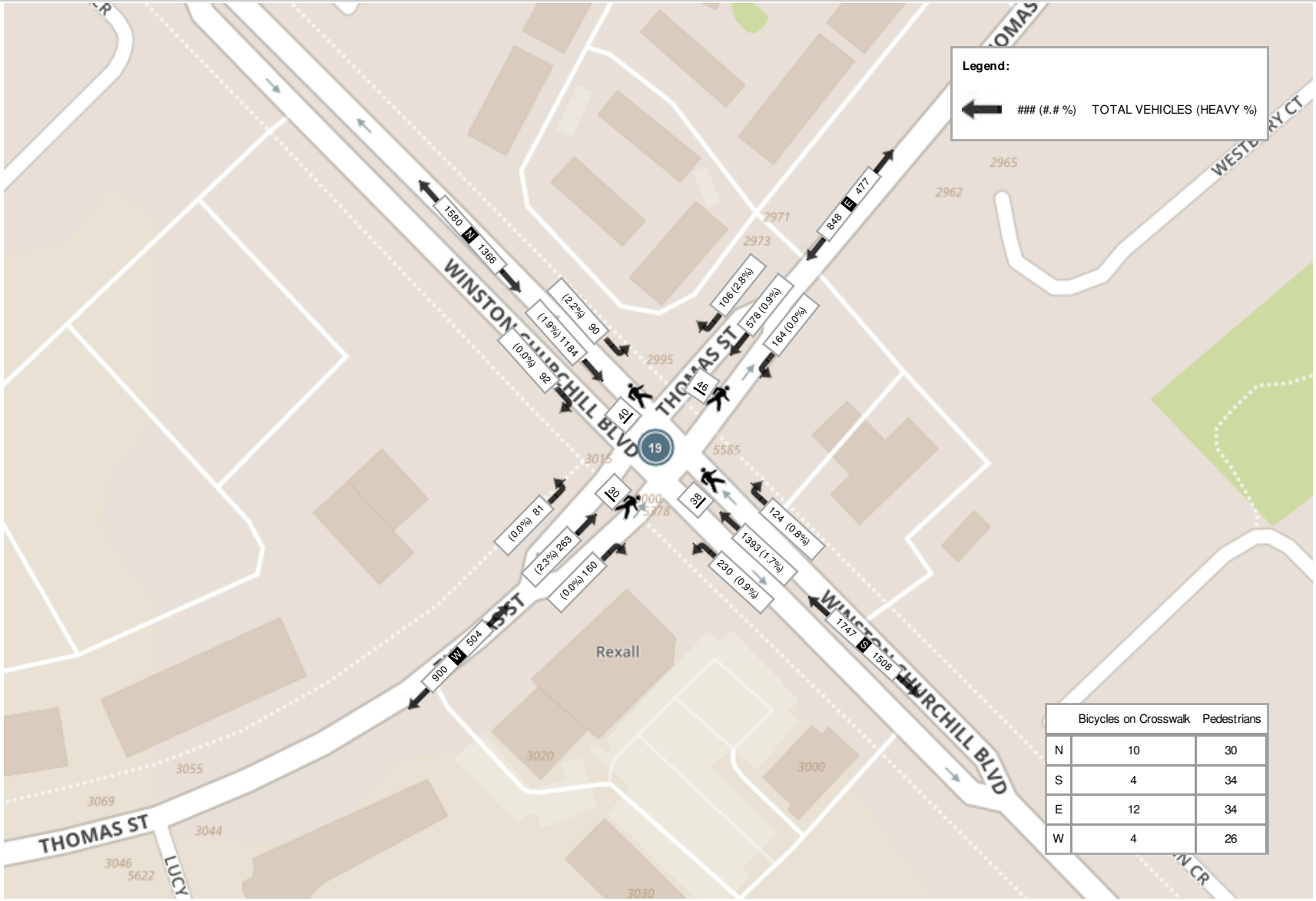
	Bicycles on Crosswalk	Pedestrians
N	3	28
S	2	16
E	5	20
W	3	14

Peak Hour: 01:00 PM - 02:00 PM Weather: Broken Clouds (22.92 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	17
S	2	20
E	2	8
W	0	17

Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (24.75 °C)



	Bicycles on Crosswalk	Pedestrians
N	10	30
S	4	34
E	12	34
W	4	26

APPENDIX G

SUE Desktop Background Review

West Trunk Diversion (WTD)

Environmental Assessment Report for the Peel West Trunk Diversion

Subsurface Utility Engineering (SUE)

December 3, 2021

Report Prepared For:

Regional Municipality of Peel

Report Prepared By:

Hatch Ltd.
2655 Upper Middle Road, 5th Floor
Oakville, Ontario
L6H 0G5

Hatch Project: H-358800

Issue and Revision Record					
Rev	**Date**	**Originator**	**Checker**	**Approver**	**Description**
0	2019-08-09	Claudia Chan	Graeme Henderson	Marc Gelinas	Issued for Review
1	2021-12-03	Derek Kan	Graeme Henderson	Marc Gelinas	Issued for EA

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ACRONYMS

EA	Environmental Assessment
CVTS	Credit Valley Trunk Sewer
Peel Region	Regional Municipality of Peel
Hatch	Hatch Corporation
PUCC	Public Utilities Coordinating Committee
IP	Intermediate Pressure
HP	High Pressure
SCADA	Supervisory Controls and Data Acquisition
SUE	Subsurface Utility Engineering
WTD	West Trunk Diversion
WTS	West Trunk Sewer

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Peel West Trunk Diversion Project (WTD) serves as the groundwork to facilitate the future rehabilitation of the existing Credit Valley Trunk Sewer (CVTS) which was originally built in the late 1960s and has been servicing the west portion of the Regional Municipality of Peel (Peel Region) since then. Peel Region has identified additional benefits of linking the recently constructed West Trunk Sewer (WTS) with the CVTS using newly installed permanent trunk sanitary sewers first as a redundancy measure, and second as operational dynamicity via the inclusion of automated Supervisory Controls and Data Acquisition (SCADA) controlled gates.

1.2 PURPOSE OF DOCUMENT

Hatch has prepared this report to present the existing utility infrastructure in the WTD project area. This report documents the utility investigation performed for this project to identify all existing utilities (above and below ground) conducted with a desktop circulation to all relevant utility owners.

2. STUDY AREA

The WTD is located in the Streetsville neighbourhood of the City of Mississauga between the Credit River and Erin Mills Parkway from west of Britannia Road West to Eglinton Avenue. Four preliminary alignment alternatives are being considered to divert flows from the CVTS to the WTS in order to facilitate future rehabilitation works and manage peak wet weather flows.

The proposed routes run along major roads and will be in close proximity to residential, commercial, and industrial properties with construction taking place mostly below grade using trenchless tunnelling methods. Due to the nature of tunnel construction, working compounds are required at all tunnel shaft sites along the sanitary sewer alignment. Where possible, tunnel shaft sites shall be selected with minimizing impacts to existing utilities.

Following the completion of the Schedule B Municipal Class Environmental Assessment (EA) alternate alignments may be considered which will alter the location of shafts/construction compounds.

The four proposed EA alignment alternatives are illustrated in Figure 1.

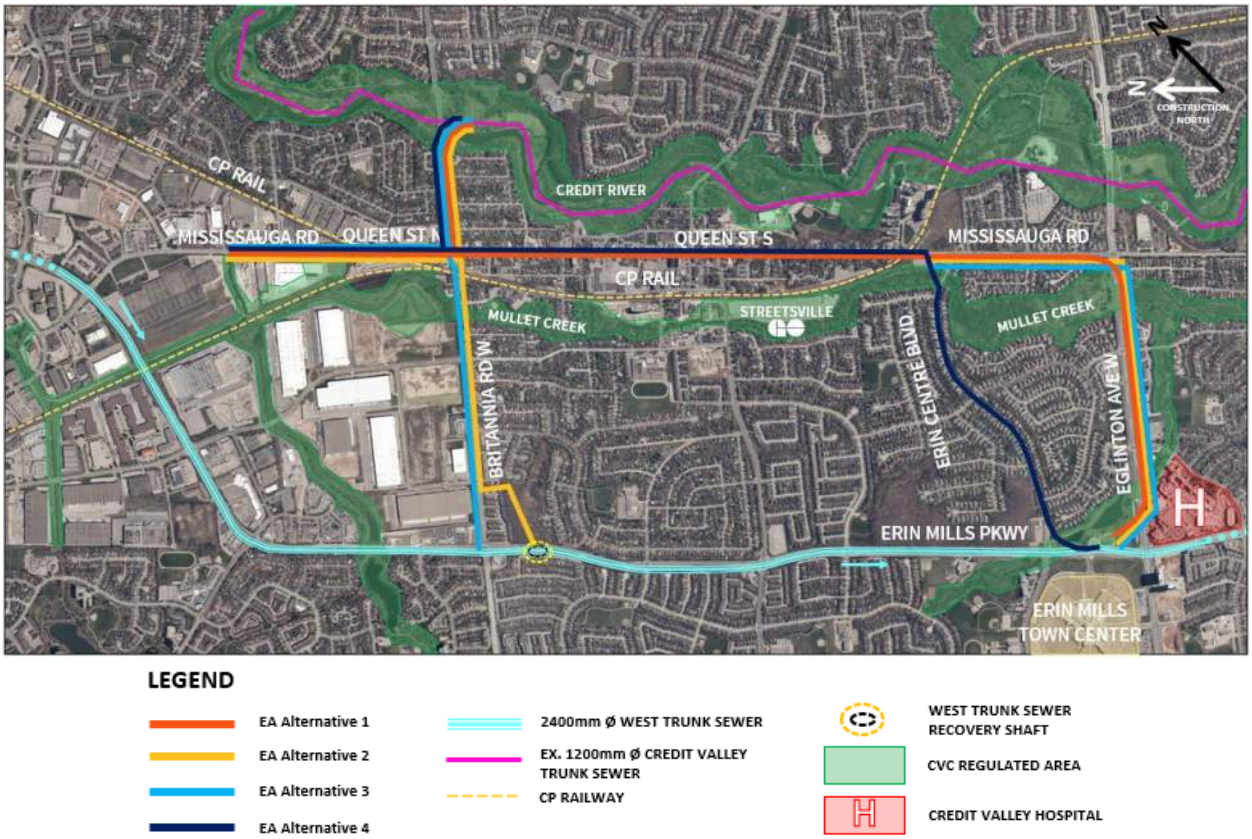

Figure 1 – EA Alignment Alternatives

3. SUBSURFACE UTILITY ENGINEERING (SUE) STUDY

As part of the EA, a Subsurface Utility Engineering (SUE) desktop study was completed for the purposes of assessing existing conditions of the project area. Existing conditions will be considered in choosing the preferred alignment for the West Trunk sanitary sewer diversion.

3.1 SUE QUALITY LEVEL

The Quality Level for SUE information refers to the reliability of the information. These Quality Levels are defined under CI/ASCE 38 - Mapping of Underground Utility Infrastructure as follows, in order of increasing quality:

- Quality Level D (QL-D): Information derived from existing records or verbal recollections;
- Quality Level C (QL-C): Information obtained by surveying and plotting visible above-ground features and by using professional judgement in correlating this information to the QL-D information;
- Quality Level B (QL-B): Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of the utilities; and
- Quality Level A (QL-A): Precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities, usually at a specific point.

The quality levels of all identified utilities during the EA phase of the project are QL-D. Once the alignment and detailed design of the West Trunk sanitary sewer diversion progresses, additional SUE investigation will be identified as required.

4. TASK 1 – UTILITY IDENTIFICATION

4.1 UTILITY CIRCUATION

A utility circulation was conducted in June 2019 where all members of the Public Utilities Coordinating Committee (PUCC) of Peel Region were contacted and requested to provide drawings of their existing plant within the project area. All utility owner information has been documented in the Utility Owner Information List, as seen in Appendix A. Refer to Appendix B for the Utility Circulation Letters. As the information from the utility owners was received, each file was reviewed and catalogued so that it could be efficiently referenced.

Note that information is outstanding for the following utility owners:

- Zayo;
- Plains Midstream; and
- Esso.

Outstanding utility responses will be further investigated in the detailed design. The utility circulation was conducted prior to the development of EA Alternative 4 and therefore is not represented in the request. This is not of concern given that there are no unique staging areas for EA Alternative 4 that are not already shared by the other preliminary alignment alternatives. Due to the expected depth of this alignment it is not anticipated that there will be any conflicts with any major plants.

4.2 EXISTING UTILITIES

The following sections describe the existing utilities within the project area.

4.2.1 ALECTRA UTILITIES

Alectra Utilities has existing underground plant for hydro and streetlighting throughout the entire length of the project area. Existing overhead plant will need to be confirmed with the survey.

There are existing hydro poles and streetlights on both sides of Queen St. N. with an existing underground streetlighting duct on the north side of the road from Matlock Ave. to Britannia Rd. W. Existing hydro poles and streetlights continue along Britannia Rd. W. from Erin Mills Pkwy. to River Grove Ave. There are existing segments of underground streetlighting ducts located along Britannia Rd. W. between Erin Mills Pkwy. and River Grove Ave. There is an existing ductbank on Britannia Rd. W. where the road crosses Credit River.

On Eglinton Ave. W., there are existing hydro poles, streetlights and underground streetlighting ducts on both sides of the road from Erin Mills Pkwy. to Mississauga Rd. There are five existing ductbank crossings on Eglinton Ave. W.

Existing hydro poles and streetlights continue on Queen St. N./Mississauga Rd from Erin Mills Pkwy. to Eglinton Ave. W. There are twenty-six underground hydro ductbank/streetlighting duct crossings along Queen St. N./Mississauga Rd from Erin Mills Pkwy. to Eglinton Ave. W.

4.2.2 BELL 360

There is one Bell 360/Group Telecom crossing at Queen St. N. just west of Matlock Ave.

4.2.3 BELL CANADA

Bell Canada has existing underground conduits and buried cables along Queen St. N./Mississauga Rd. on both north and south sides of the road with thirty seven crossings between Eglinton Ave. W. and Kitimat Rd. These existing underground conduits and buried cables continue along Eglinton Ave. W. with six crossings between Erin Mills Pkwy. and Mississauga Rd. There are also existing underground conduits and buried cables along Britannia Rd. W. with fourteen crossings between Erin Mills Pkwy. and River Grove Ave.

4.2.4 COGECO

Mills Rd. and Britannia Rd. W. This existing plant continues north on Britannia Rd. W. until Amity Rd. An extension of this existing plant also continues north on Falconer Dr. until just south of Alpha Mills Rd.

4.2.5 ENBRIDGE GAS DISTRIBUTION

There is an existing 6” dia. intermediate pressure (IP) gasmain along the east side of Eglinton Ave. W. between Erin Mills Pkwy. and Mississauga Rd. There are five existing gas service connection crossings on Eglinton Ave. W.

On Mississauga Rd., there is an existing 4” dia. IP gasmain along the north side of the road from Eglinton Ave. W. to Alpha Mills Rd. This gasmain then crosses to the south side of the road at Alpha Mills Rd. and continues along Mississauga Rd. until Kitimat Rd.

There is also an existing 1.25” dia. IP gasmain along the south side of Mississauga Rd. from Barbertown Rd. to Erin Centre Blvd. There are nine existing gas service connection crossings on Mississauga Rd between Eglinton Ave. W. and Matlock Ave.

There is an existing 2” dia. IP gasmain along the south side of Queen St. from Reid Dr. to Britannia Rd. W.

On Britannia Rd. W., there is an existing 4” dia. high pressure (HP) gasmain along the east side of the road between Erin Mills Pkwy. and just south of Pioneer Dr. This gasmain crosses Britannia Rd. W. at Pioneer Dr. to continue along the west side of Britannia Rd. W. until just north of Pioneer Dr. There is also a crossing on Britannia Rd. W. at Millcreek Dr. An existing 4” dia. IP gasmain is also located on both sides of Britannia Rd. W. between Pioneer Dr. and just north of Brookside Dr. There is an existing crossing on Britannia Rd. W. just north of Queen St. There are twenty-

two existing gas service connection crossings on Britannia Rd. W. from Erin Mills Pkwy. to Theodore Dr.

4.2.6 ROGERS COMMUNICATION

There are existing overhead Rogers plant along Eglinton Ave. W. on the east side of the road from Mississauga Rd. to Erin Mills Pkwy. There are also four existing underground Rogers crossings in this length of the road.

There are existing underground and overhead Rogers plant along Queen St. N./Mississauga Rd. with twenty-one existing crossings between Kitimat Rd. and Eglinton Ave. W.

Rogers' existing overhead and underground plant continues along Britannia Rd. W. between Erin Mills Pkwy. and River Grove Ave. Within this segment of Britannia Rd. W., thirteen Rogers crossings exist.

4.2.7 SUNCOR

There is an existing Suncor building / Petro-Canada gas station located at 26 Queen St. N. At this gas station, there are four existing gas tanks, one kiosk and associated piping and equipment for the gas service.

4.2.8 ZAYO

There is existing Zayo conduit and fiber on Mississauga Rd. at Kitimat Rd. There are also existing Zayo underground ducts on Mississauga Rd., north of Matlock Ave. An existing underground Zayo duct crosses Mississauga Rd. just south of Matlock Ave. and continues east along Matlock Ave.

Note that there is outstanding information to be provided by Zayo. Once this has been received, this memo will be updated to reflect the new data.

5. TASK 2 – EXISTING COMPOSITE UTILITY MODEL

Even though mark-ups were requested in CAD format through the utility circulation, the utility information was received in a different format including PDF and hand mark-ups. To incorporate the different information types, they had to be imported, aligned and scaled as required to be digitally traced. All received existing utility information was combined into the base composite utility model for existing utilities.

5.1 KEY ASSUMPTIONS

Below is a list of key assumptions that were made at the outset of the work for Task 2:

- Mark-ups provided by the Utility Owners are complete and up-to-date.
- Mark-ups provided are accurately placed with little to no discrepancy.

6. WEST TRUNK DIVERSION ALIGNMENT

One of the several factors to consider while choosing the most suitable placement of the West Trunk diversion alignment is the location of existing utility infrastructure. The goal is to choose an alignment which has the least impact to existing conditions, including utilities, if possible.

6.1 SUMMARY OF EXISTING UTILITIES BY PROPOSED CONCEPTUAL SHAFT LOCATION

The following section and Table 1 provides a summary of existing utilities collected by the utility circulation along with municipal storm and sanitary infrastructure populated by Hatch based on review of the study area located within each proposed conceptual shaft location of each EA alternative.

Table 1 – Existing Utilities within Proposed Conceptual Shaft Locations

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
EA Alternative 1 (Streetsville)			
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro	6
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None	2
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro	8
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit	• Alectra underground duct bank • Bell underground conduit	9

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• Bell pedestal • Cogeco underground cable • Enbridge gasmain (4'' dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Cogeco underground cable	
SA10.1	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4" dia. IP) • 675mm SAN sewer • Hydrant	None	5
SA13.3	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting • 250mm SAN sewer • 450mm STM sewer • 750mm WM	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) • Traffic lighting	8
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None	7 Caution: existing Alectra transformer
EA Alternative 2 (Britannia Woodlot)			
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro	6
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None	2

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro	8
SA3.2	• Alectra poles (1) • Bell underground conduit • Bell pedestal • Rogers overhead and underground fire cable • Cogeco underground cable • STM catchbasins (1)	• Bell underground conduit • Rogers overhead and underground fire cable • Cogeco underground cable	6
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4’’ dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable	9
SA5.1	• Enbridge gasmain (4” dia. HP) • Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting	• Bell underground conduit • Rogers underground and overhead fibre cable	6 Caution: existing 4” dia. HP gasmain.
SA6.2	• Alectra underground duct bank • Alectra poles (3) • Bell underground conduit	• Alectra underground duct bank • Alectra pole (1) • Bell underground conduit	9

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• Rogers underground and overhead fibre cable • Traffic lighting • 300mm WM • 750mm WM • Hydrant • STM catchbasins (2)	• Rogers underground and overhead fibre cable • 300mm WM	
SA7	• Alectra underground duct bank • Alectra poles (2) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 750mm STM sewer • 250mm SAN sewer	• Alectra underground duct bank	6
SA8	• Alectra poles (2) • Alectra underground conductor • 750mm WM	• Alectra underground conductor	3
SA10.1	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	None	5
SA11.2	• Alectra underground duct bank • Alectra poles (1) • Alectra transformer • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 250mm SAN sewer • 150mm WM • STM catchbasins (1)	• Alectra underground duct bank • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25” dia. IP) • 150mm WM	9 Caution: existing Alectra transformer
SA13.1	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) • Traffic lighting	8

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• 250mm SAN sewer • 450mm STM sewer • 750mm WM		
SA15	None	None	0
SA16.3	None	None	0
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	None	7 Caution: existing Alectra transformer
EA Alternative 3 (Britannia Straight)			
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit • Traffic lighting • Hydrant	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro	6
SA1	• 1200mm SAN sewer • 250mm SAN sewer	None	2
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro	8
SA3.2	• Alectra poles (1) • Bell underground conduit • Bell pedestal • Rogers overhead and underground fire cable	• Bell underground conduit • Rogers overhead and underground fire cable • Cogeco underground cable	6

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• Cogeco underground cable • STM catchbasins (1)		
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4'' dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable	9
SA5.1	• Enbridge gasmain (4" dia. HP) • Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting	• Bell underground conduit • Rogers underground and overhead fibre cable	6 Caution: existing 4" dia. HP gasmain.
SA6.2	• Alectra underground duct bank • Alectra poles (3) • Bell underground conduit • Rogers underground and overhead fibre cable • Traffic lighting • 300mm WM • 750mm WM • Hydrant • STM catchbasins (2)	• Alectra underground duct bank • Alectra pole (1) • Bell underground conduit • Rogers underground and overhead fibre cable • 300mm WM	9
SA9	• Alectra underground duct bank • Alectra underground conductor • Alectra poles (3) • Traffic lighting • 750mm WM	• Alectra underground conductor • Alectra pole (1)	5
SA10.1	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4" dia. IP)	None	5

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• 675mm SAN sewer • Hydrant		
SA11.2	• Alectra underground duct bank • Alectra poles (1) • Alectra transformer • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25" dia. IP) • 250mm SAN sewer • 150mm WM • STM catchbasins (1)	• Alectra underground duct bank • Bell underground conduit • Rogers underground and overhead fibre cable • Enbridge gasmain (1.25" dia. IP) • 150mm WM	9 Caution: existing Alectra transformer
SA13.1	• Alectra underground duct bank • Alectra poles (2) • Rogers overhead fibre cable • Bell underground conduit • Traffic lighting • 250mm SAN sewer • 450mm STM sewer • 750mm WM	• Alectra underground duct bank • Rogers overhead fibre cable • Bell underground conduit • Alectra pole (1) Traffic lighting	8
SA15	• None	• None	0
SA16.3	• None	• None	0
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	• None	7 Caution: existing Alectra transformer
EA Alternative 4 (Erin Centre Boulevard)			
SA0	• Alectra underground conductor • Alectra poles (2 hydro, 3 street) • Rogers underground conduit • Bell underground conduit	• Rogers underground conduit • Bell underground conduit • Traffic lighting • Overhead hydro	6

Compound	Utilities Identified within Compound	Utilities Identified within Conceptual Shaft Location (within Compound)	Total No. of Utilities at this Location*
	• Traffic lighting • Hydrant		
SA1	• 1200mm SAN sewer • 250mm SAN sewer	• None	2
SA2.3	• Alectra underground conductor • Alectra poles (3) • Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • 825mm SAN sewer • 1200mm SAN sewer • 4880mm x 3660mm STM box culvert • STM catchbasins (4)	• Enbridge gasmain (6” dia. IP) • Rogers overhead and underground fibre cable • Overhead hydro	8
SA4.1	• Alectra underground conductor • Alectra poles (2) • Bell underground conduit • Bell pedestal • Cogeco underground cable • Enbridge gasmain (4’’ dia. IP) • Traffic lighting • Hydrant • STM catchbasins (3)	• Alectra underground duct bank • Bell underground conduit • Cogeco underground cable	9
SA10.2	• Alectra poles (3) • Bell underground conduit • Enbridge gasmain (4” dia. IP) • 675mm SAN sewer • Hydrant	• None	5
SA17	• Alectra underground duct bank • Alectra transformer • Alectra poles (2) • Rogers overhead fibre cable • 250mm SAN sewer • 1200mm SAN sewer • 2400mm SAN sewer	• None	7 Caution: existing Alectra transformer

*Total No. of Utilities has been calculated as a sum of the different types of utilities within the listed compound. For example, there is an Alectra duct, a Alectra transformer, Alectra poles, Rogers cables, 250mm sanitary sewer, 1200mm sanitary sewer and 2400mm sanitary sewer in compound SA17, making a total of 7 utilities.

Based on the above table, EA Alternative 1 (Streetsville) has 45 existing utilities (with one existing hydro transformer). There are 84 existing utilities (with one existing HP gasmain and two existing hydro transformers) within EA Alternative 2 (Britannia Woodlot). EA Alternative 3 (Britannia Straight) has 80 existing utilities (with one existing HP gasmain and two existing hydro transformers). EA Alternative 4 (Erin Centre Boulevard) has 37 existing utilities (with one existing hydro transformer).

6.2 CONCLUSION

Based on the collected information and evaluation, EA Alternative 2 and EA Alternative 3 impact the most number of utilities due to the larger number of required shafts and staging areas, therefore making them the least preferred alternatives from a utilities perspective. EA Alternative 1 has significantly less shaft requirements and impacts less utilities. EA Alternative 4 has the least number of shafts and least number of utility impacts and therefore is the most preferred alternative from a utility impact perspective.

APPENDIX A – UTILITY OWNER INFORMATION LIST

HATCH

PEEL REGION - WEST TRUNK DIVERSION EA - UTILITY TRACKING MATRIX

Owner Information								Existing Condition (Preliminary Utility Investigation)		
ID	Utility Owner	Initial Notification/Markup Request sent to	Primary Contact Email	Contact Name	Title	Tel/Cell	Address	Initial Notification Document No. Sent on 06/20/2019	Markups Received	Link to Drawing
1	Enbridge Pipelines Inc.	est.reg.crossing@enbridge.com				1-800-668-2951	1086 Modeland Rd, Bldg. 1050 1st Floor	Enbridge Pipelines does not have any assets in this area. June 21, 2019		
2	Bell Canada	Bell.MOC@telecon.ca andrew.zuk@bell.ca		Andrew Zuk				Bell Canada does have assets in this area. All related files and email have been uploaded to Projectwise on July 15, 2019.		
3	Rogers Communications	simcoecirculations@rci.rogers.com						Rogers does have assets in this area. All related files and emails have been uploaded to Projectwise on July 31, 2019		
4	Cogeco Data Service	Utility.Circulations@cogecodata.com james.la@cogecodata.com		James La		(416) 847-0848		Cogeco does have assets in this area. Cogeco requests proposed drawings with an engineers signature in order to provide markups for exisiting infrastructure in project area.		
5	Telus	telusutilitymarkups@Telecon.ca stephen.hoy@telus.com	Retired Do not contact	Stephen Hoy				Telus does not have any assets in this area. June 28, 2019.		
6	Beanfield Metroconnect	tpucc@beanfield.com						Beanfield does not have any assets in this area. June 28, 2019.		
7	Enbridge Gas Distribution	Mark-Ups@enbridge.com						Enbridge Gas Distribution has assets in this area. All related files and emails are have been uploaded to Projectwise on July, 12,2019.		
8	British Petroleum (BP)	SurfaceRights@bp.com Julie.Gregson@bp.com		Julie Gregson				BP does not have any assets in this area. June 20,2019.		
9	Plains Midstream	landrequests@plainsmidstream.com						no response		
10	Sarnia Products Pipeline/ Imperial Oil Ltd/ Esso	thirdpartyrequests@esso.ca						no response		
11	Suncor Energy	djoyce@suncor.com		Ian Michelle	Outside Plant Manager, Telecom Engineering & Service Delivery, C09			Suncor Energy has assets in this area. All related files and emails are have been uploaded to Projectwise on July 23,2019.		
12	Hydro One Telecom	ian.mitchell@hydroone.com						Hydro One Telecom does not have any assets in this area. June 26, 2019.		
13	Alectra Utilities	redlines@alectrautilities.com Tirath.Garcha@alectrautilities.com		Tirath Garcha Cliff Lee				Alectra Utilities has assets in this area. All related files and emails are have been uploaded to Projectwise on July 12,2019.		
14	TNPI	clee@tnpi.ca		Darlene Quilty	Planning Co-ordinator			TNPI does not have any assest in this area. June 21,2019.		
15	Mhbcpla/TransCanada Pipelines	dquilty@mhbcplan.com		Dave Gadbois	Manager			TransCanada does not have any assets in this area. July 15,2019.		
16	Union Gas	Dgadbois@uniongas.com				905 946 6232	185 Clegg Road, R32 Markham, ON| L6G 1B7	Union Gas does not have any assest in this area. June 24, 2019		
17	Hydro One	greg.gowan@hydroone.com		Jody Thompson	Specialist, Network Provisioning			Hydro One does not have any assets in this area. June 20, 2019		
18	Bell 360	jody.thompson2@bell.ca					Bell 360 does have assets in this area. All related files and email have been uploaded to Projectwise on July 25, 2019.			
19	Zayo	utility.circulations@zayo.com joe.pimentel@zayo.com		Joe Pimentel	OSP Project Manager	416 728 8602	80 Worcester Road | Etobicoke, Ontario	Awaiting additional info.		

Last Updated : 8/6/2019

APPENDIX B – UTILITY CIRCULATION LETTERS

2800 Speakman Drive,
Mississauga Ontario, Canada, L5K 2RT
Tel: +1 (905) 855 7600
www.hatch.com

June 20, 2019

Enbridge Pipeline

est.reg.crossing@enbridge.com

Dear Sir or Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

Please note the contents of this letter is confidential and is strictly intended for the receiving party.

Hatch has been retained by Peel Region to undertake the detailed design, contract documents, Class EA and construction administration associated with the design of the proposed diversion trunk sanitary sewer. The overall project area is as presented in Figure 1.

The area which this request covers is defined as follows:

1. Within Mississauga Road/Queen Street ROW between 100m northwest of Kitimat Road and 100m southeast of Eglinton Avenue West;
2. Within Britannia Road West ROW between 100m northeast of River Grove Avenue to 100m southwest of Erin Mills Parkway;
3. Within Arch Road ROW between Matlock Avenue and Ellen Street;
4. Within Hogan Drive ROW between 50m northwest of Britannia Road West and 50m southeast of Belcaro Way;
5. Crossing Turney Woods Park from Hogan Drive to Erin Mills Parkway; and
6. Within Eglinton Avenue West ROW between 100m northeast of Royal Credit Boulevard to 100m southwest of Erin Mills Parkway.

We respectfully request that the following information be provided by the appropriate department in your company for the areas as shown in Figure 1 and as defined above:

- Any underground plant owned and/or operated by your company, and/or any other company your company is affiliated with; including all current active and/or decommissioned infrastructure; AND
- Any above-ground plant owned and/or operated by your company, and/or any other company your company is affiliated with; including all current active and/or decommissioned infrastructure. Above ground utility items include but are not limited to poles, handwells, street lighting cables, traffic signal cables, security cables, overhead catenary system cables, pole mounted wireless communications devices, CCTV cameras etc.; AND
- Any other plant that you may have knowledge of due to previous work/requests in the general work area, including any infrastructure that you may be leasing to or from another company. In this case, a general description of the utility and the lease agreement as well as the utility owner contact information would be appreciated.

2800 Speakman Drive,
Mississauga Ontario, Canada, L5K 2RT
Tel: +1 (905) 855 7600
www.hatch.com

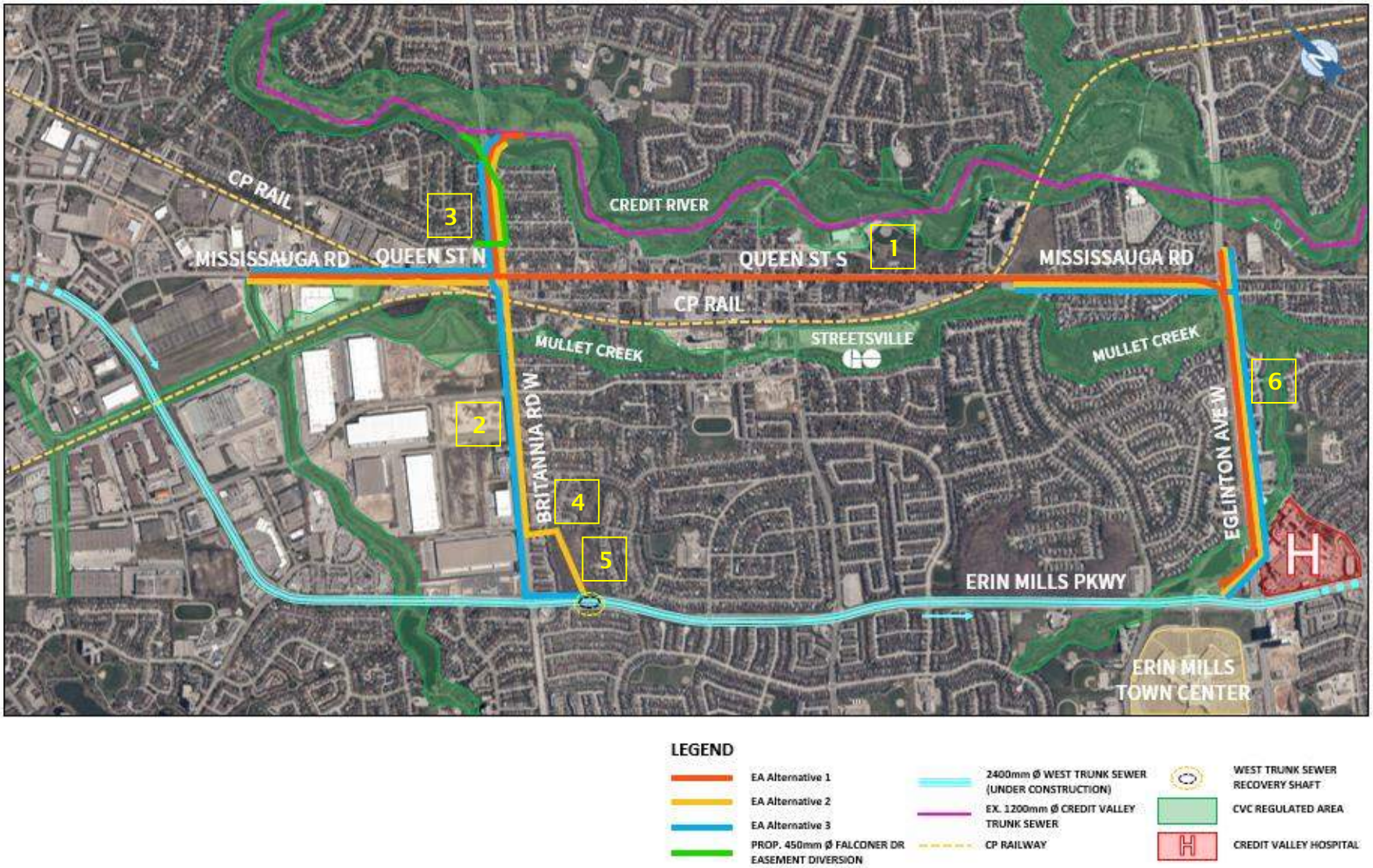

Figure 1: Project Area

2800 Speakman Drive,
Mississauga Ontario, Canada, L5K 2RT
Tel: +1 (905) 855 7600
www.hatch.com

Peel Region has placed a high priority on this work and immediate attention by the appropriate persons regarding this requisition is greatly appreciated. It is essential to the overall project schedule that we receive your response no later than **July 3, 2019**. It would be appreciated if the information is provided in CAD format (MicroStation) if available.

Should you have any further inquiries or require clarification, please do not hesitate to contact undersigned at the contact details below.

Yours truly,

Claudia Chan, P.Eng.
Engineer | Infrastructure
Hatch
t. 905.486.0773
claudia.chan@hatch.com

cc: G. Henderson; Hatch
M. Gelinas; Hatch

2800 Speakman Drive,
Mississauga Ontario, Canada, L5K 2RT
Tel: +1 (905) 855 7600
www.hatch.com

June 20, 2019

Sir/Madam
Utility Mark-Ups
British Petroleum (BP)

SurfaceRights@bp.com
Julie.Gregson@bp.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

Please note the contents of this letter is confidential and is strictly intended for the receiving party.

Hatch has been retained by Peel Region to undertake the detailed design, contract documents, Class EA and construction administration associated with the design of the proposed diversion trunk sanitary sewer. The overall project area is as presented in Figure 1.

The area which this request covers is defined as follows:

1. Within Mississauga Road/Queen Street ROW between 100m northwest of Kitimat Road and 100m southeast of Eglinton Avenue West;
2. Within Britannia Road West ROW between 100m northeast of River Grove Avenue to 100m southwest of Erin Mills Parkway;
3. Within Arch Road ROW between Matlock Avenue and Ellen Street;
4. Within Hogan Drive ROW between 50m northwest of Britannia Road West and 50m southeast of Belcaro Way;
5. Crossing Turney Woods Park from Hogan Drive to Erin Mills Parkway; and
6. Within Eglinton Avenue West ROW between 100m northeast of Royal Credit Boulevard to 100m southwest of Erin Mills Parkway.

We respectfully request that the following information be provided by the appropriate department in your company for the areas as shown in Figure 1 and as defined above:

- Any underground plant owned and/or operated by your company, and/or any other company your company is affiliated with; including all current active and/or decommissioned infrastructure; AND
- Any above-ground plant owned and/or operated by your company, and/or any other company your company is affiliated with; including all current active and/or decommissioned infrastructure. Above ground utility items include but are not limited to poles, handwells, street lighting cables, traffic signal cables, security cables, overhead catenary system cables, pole mounted wireless communications devices, CCTV cameras etc.; AND
- Any other plant that you may have knowledge of due to previous work/requests in the general work area, including any infrastructure that you may be leasing to or from another company. In this case, a general description of the utility and the lease agreement as well as the utility owner contact information would be appreciated.

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www.hatch.com

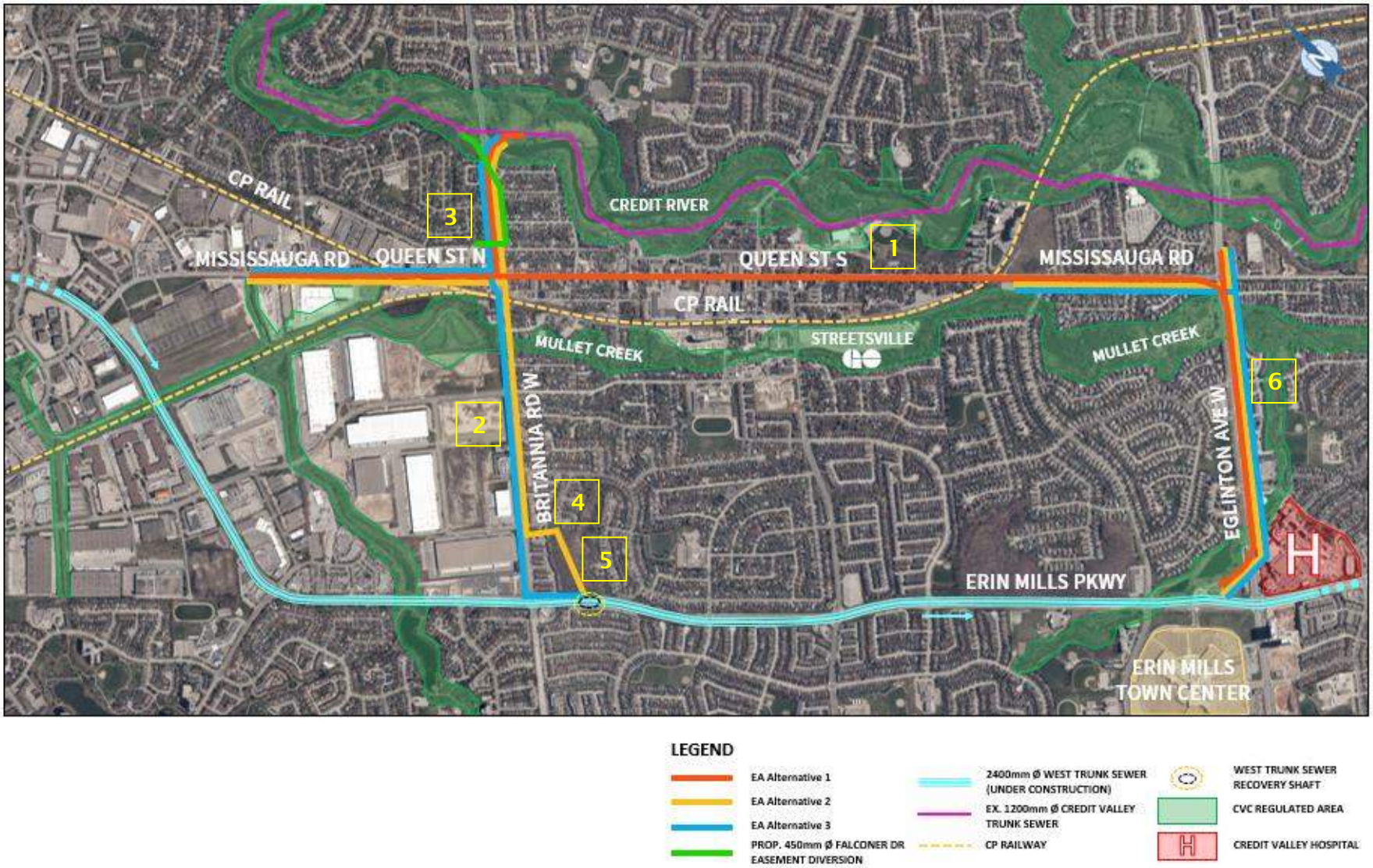

Figure 1: Project Area

2800 Speakman Drive,
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Yours truly,

Claudia Chan, P.Eng.
Engineer | Infrastructure
Hatch
t. 905.486.0773
claudia.chan@hatch.com

cc: G. Henderson; Hatch
M. Gelinas; Hatch

2800 Speakman Drive,
Mississauga Ontario, Canada, L5K 2RT
Tel: +1 (905) 855 7600
www.hatch.com

June 20, 2019

Sir/Madam
Utility Mark-Ups
Plains Midstream

landrequests@plainsmidstream.com
minho@plainsmidstream.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

Please note the contents of this letter is confidential and is strictly intended for the receiving party.

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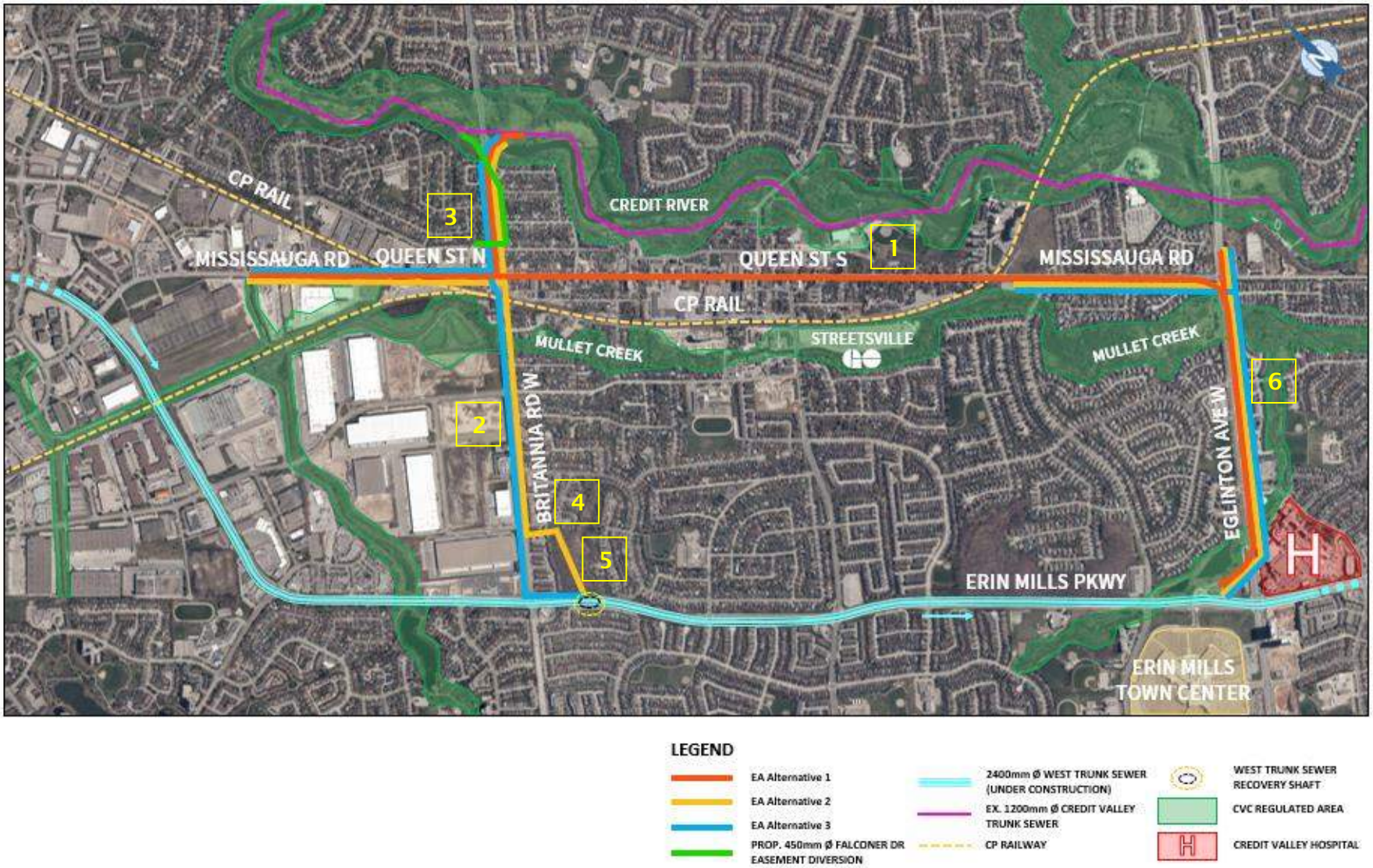

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June 20, 2019

Utility Mark-Ups
Sarnia Products Pipeline/ Imperial Oil Ltd/ Esso

thirdpartyrequests@esso.ca

Dear Sir or Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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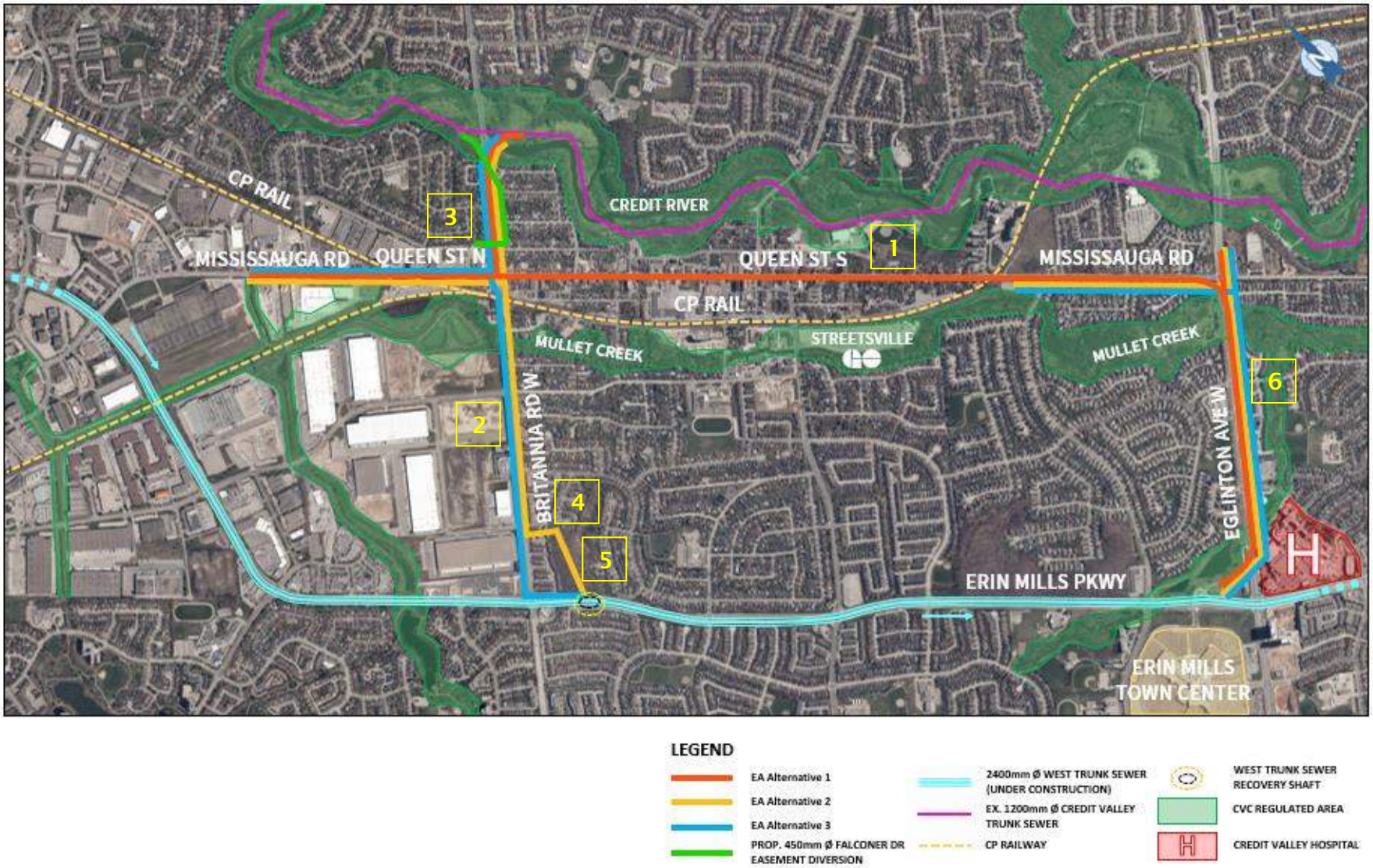

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M. Gelinas; Hatch

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June 20, 2019

Sir/Madam
Utility Mark-Ups
Cogeco Data Service

Utility.Circulations@cogecodata.com
james.la@cogecodata.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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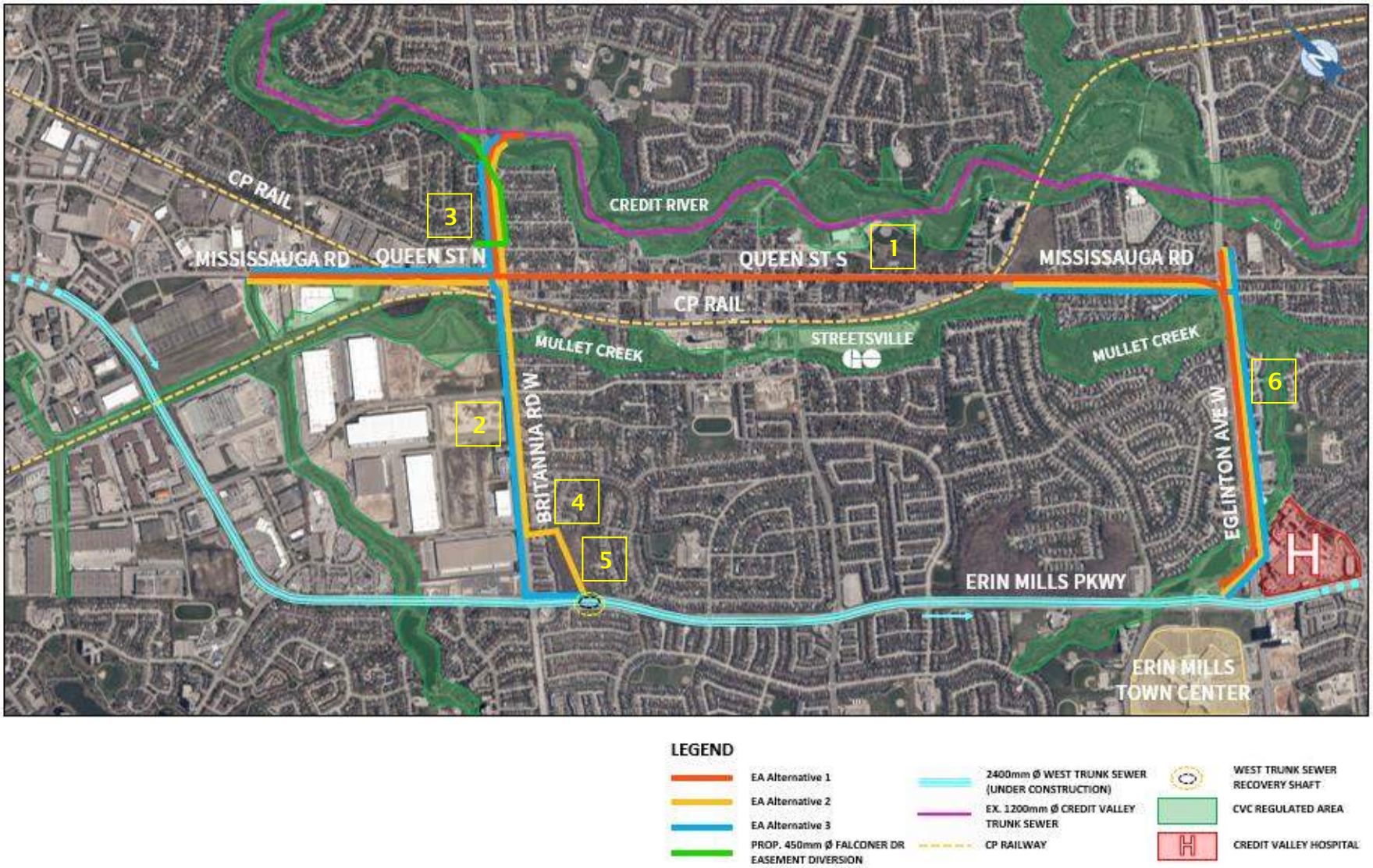

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cc: G. Henderson; Hatch
M. Gelinas; Hatch

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June 20, 2019

Sir/Madam
Utility Mark-Ups
Telus

telusutilitymarkups@netricom.com
stephen.hoy@telus.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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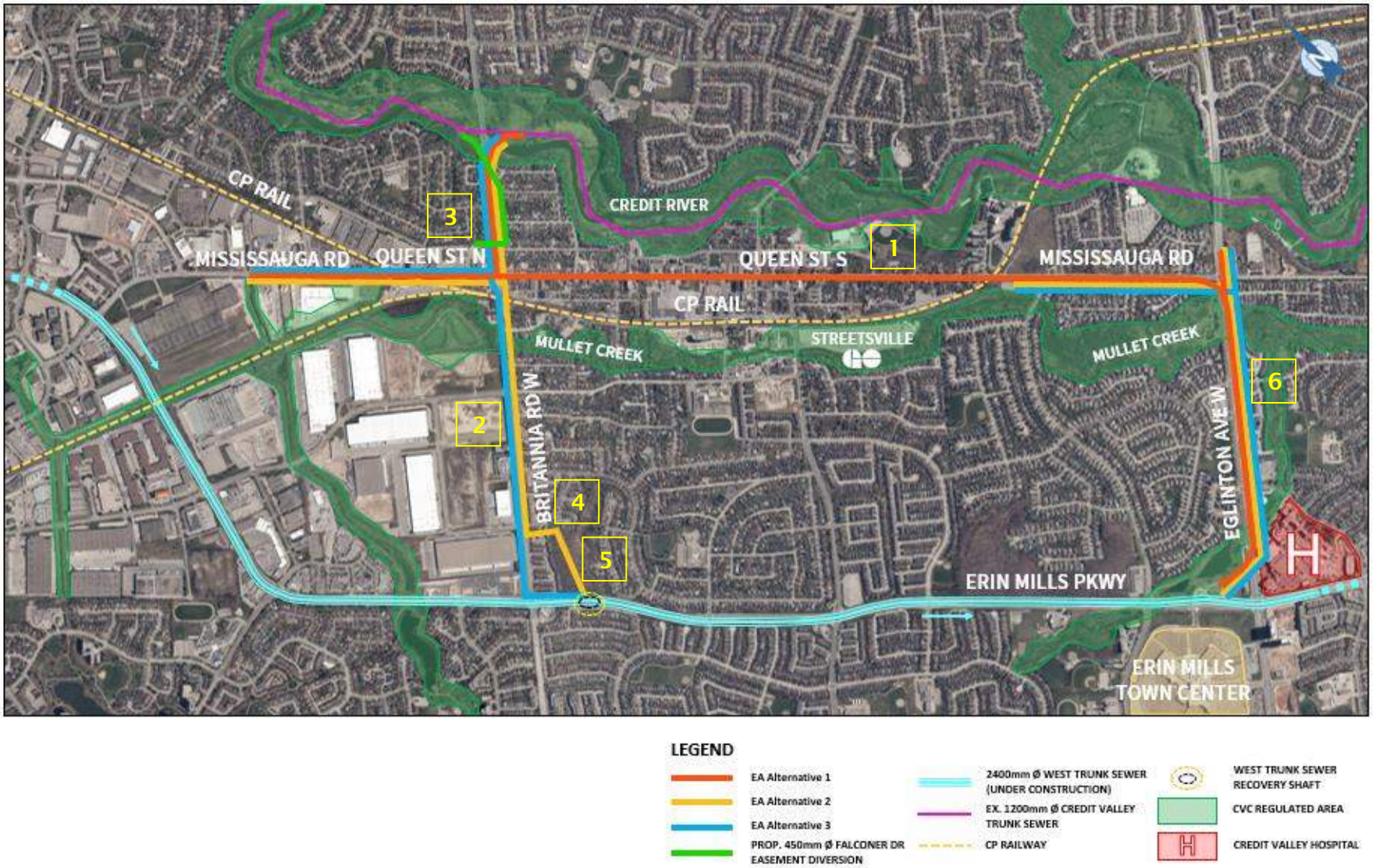

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M. Gelinas; Hatch

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www.hatch.com

June 20, 2019

Sir/Madam
Utility Mark-Ups
Beanfield Metroconnect

tpucc@beanfield.com

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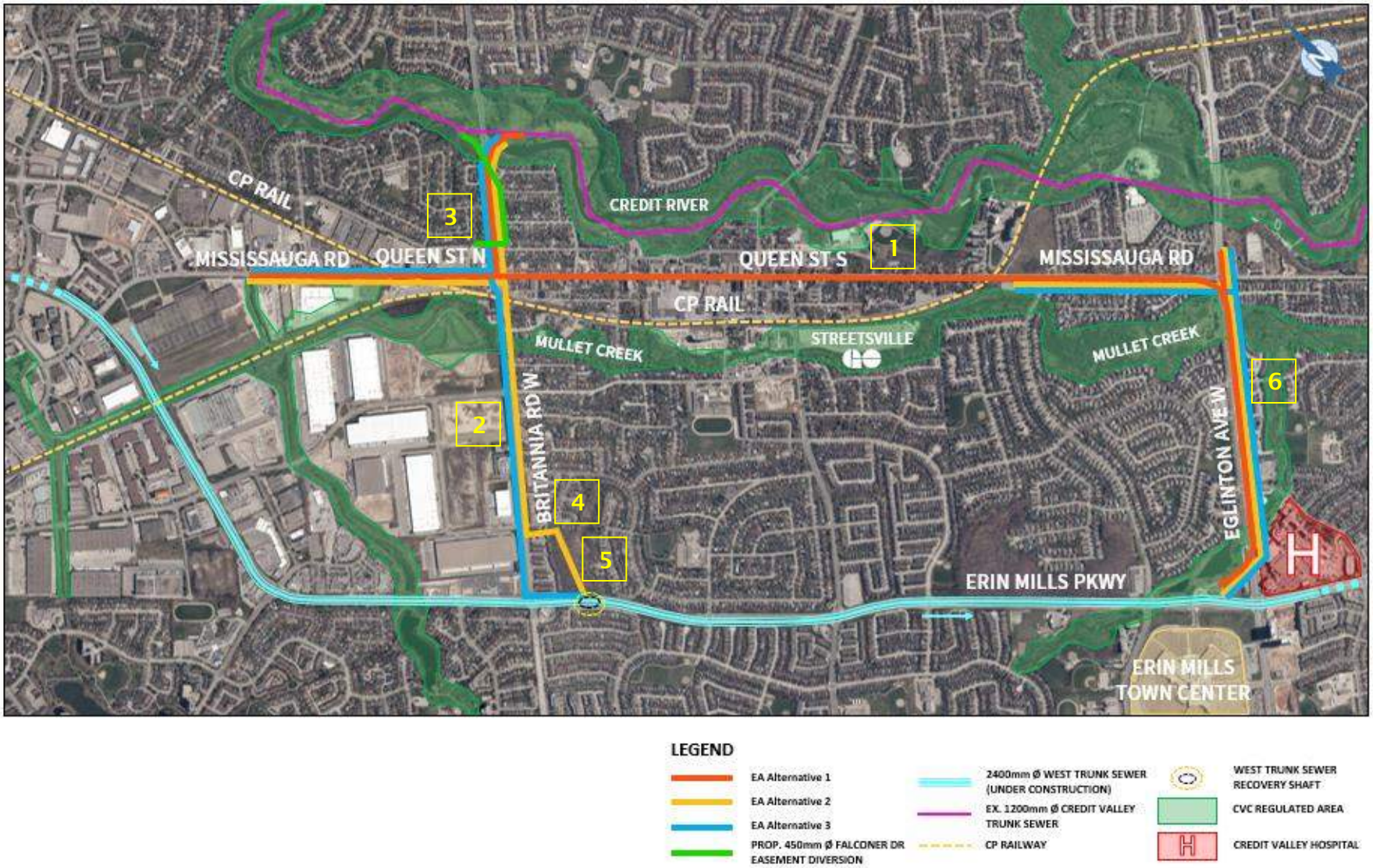

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June 20, 2019

Sir/Madam
Utility Mark-Ups
Enbridge Gas Distribution

Mark-Ups@enbridge.com
daniel.petrozziello@enbridge.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

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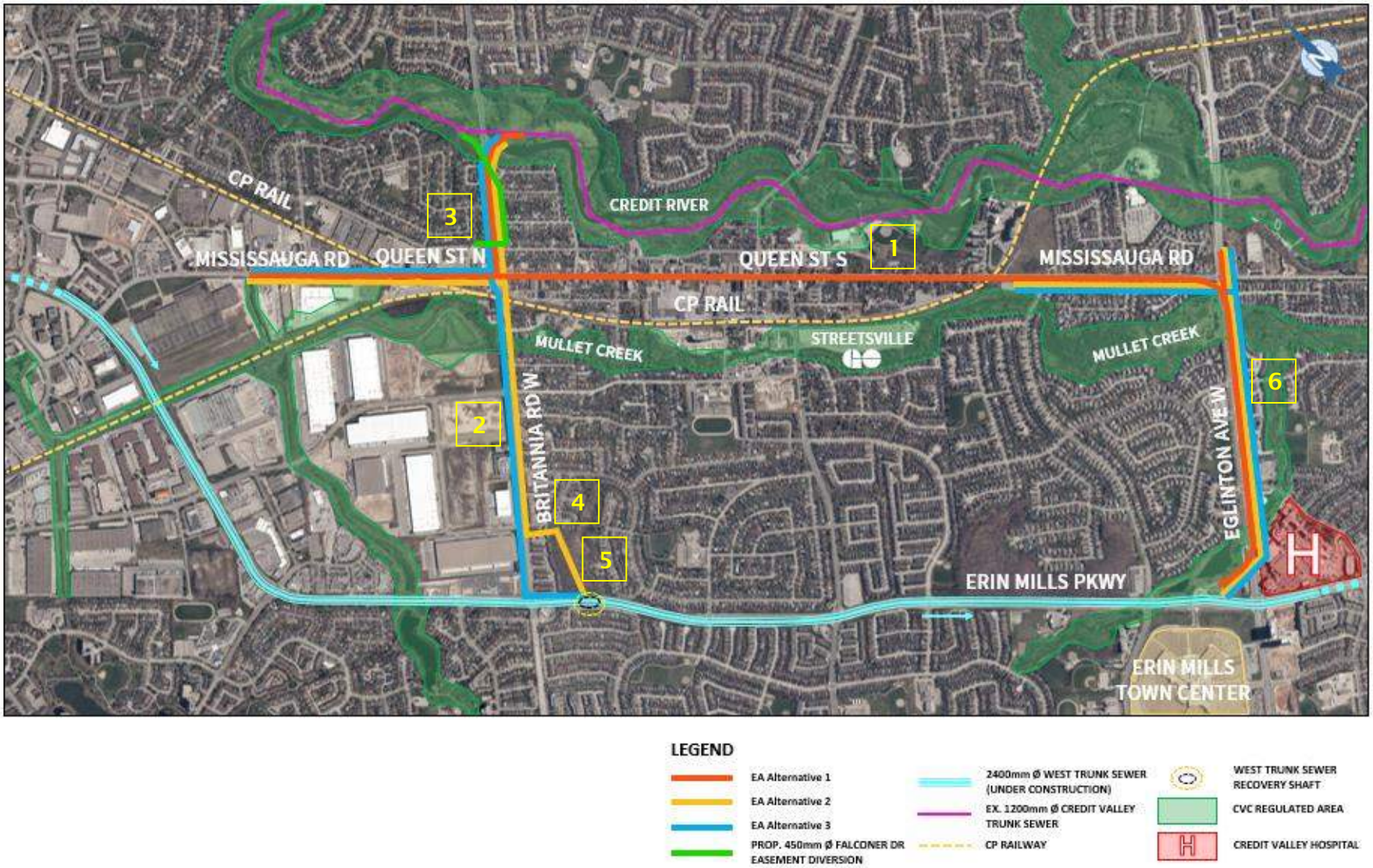

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June 20, 2019

David Joyce
Utility Mark-Ups
Suncor Energy
3275 Rebecca Street
Oakville, ON L6L 6N5

djoyce@suncor.com

Dear David Joyce,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

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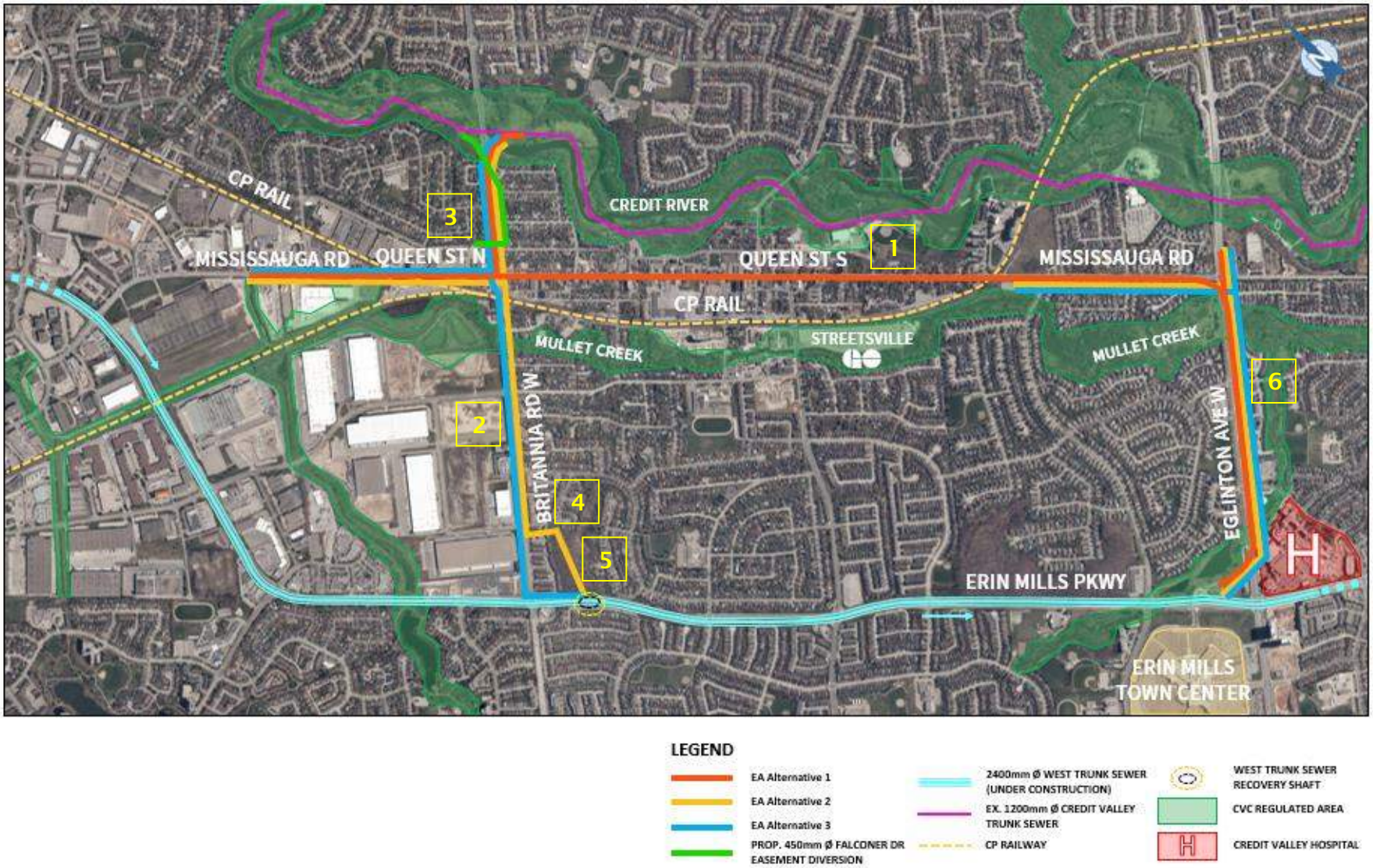

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June 20, 2019

Ian Mitchell
Outside Plant Manager, Telecom Engineering & Service Delivery, C09
Hydro One Telecom

ian.mitchell@hydroone.com

Dear Ian Mitchell,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

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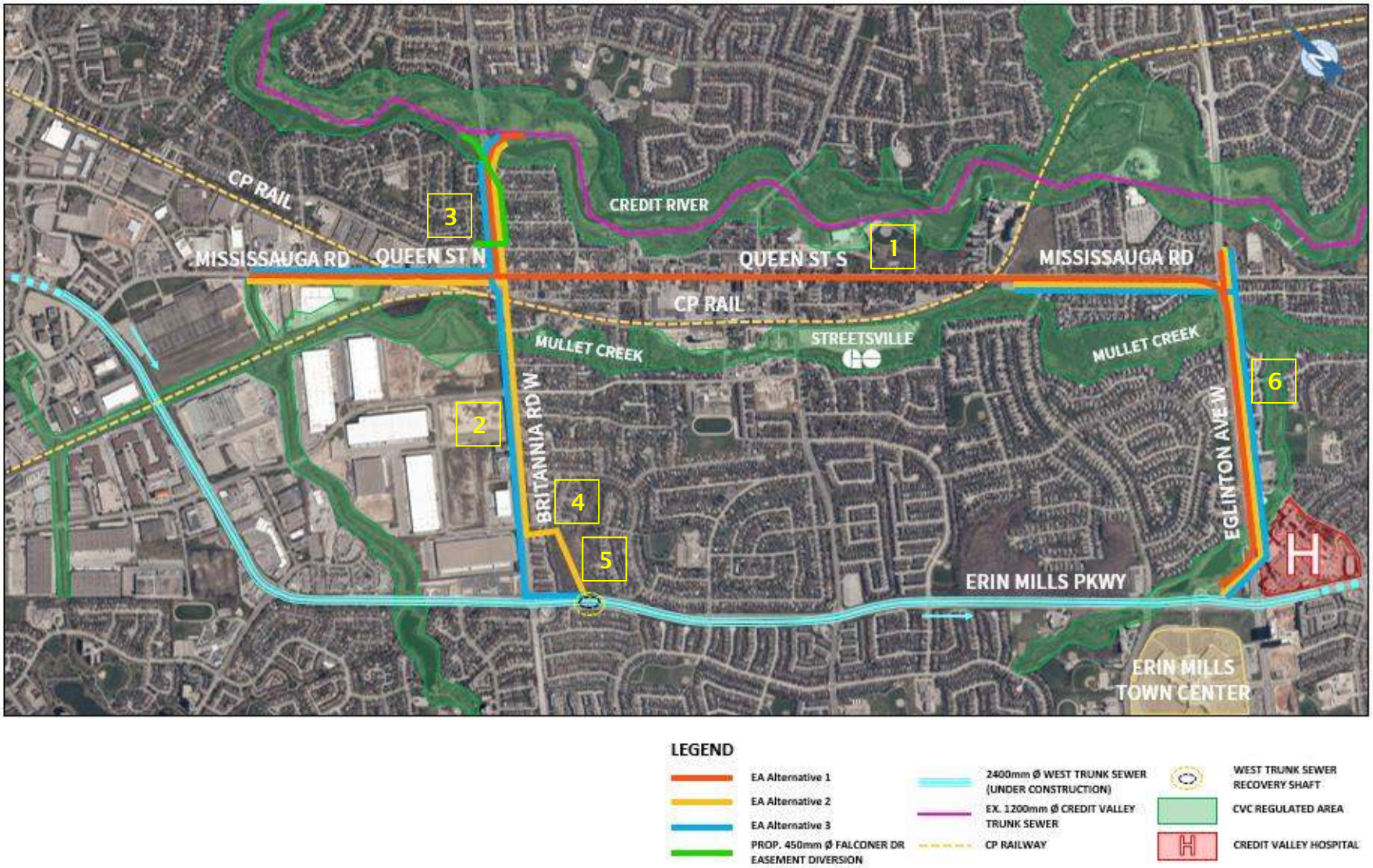

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2800 Speakman Drive,
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Tel: +1 (905) 855 7600
www.hatch.com

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Yours truly,

Claudia Chan, P.Eng.
Engineer | Infrastructure
Hatch
t. 905.486.0773
claudia.chan@hatch.com

cc: G. Henderson; Hatch
M. Gelinas; Hatch

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June 20, 2019

Cliff Lee
TNPI
45 Vogell Road, Suite 310
Richmond Hill, ON L4B 3P6

clee@tnpi.ca

Dear Cliff Lee,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

Please note the contents of this letter is confidential and is strictly intended for the receiving party.

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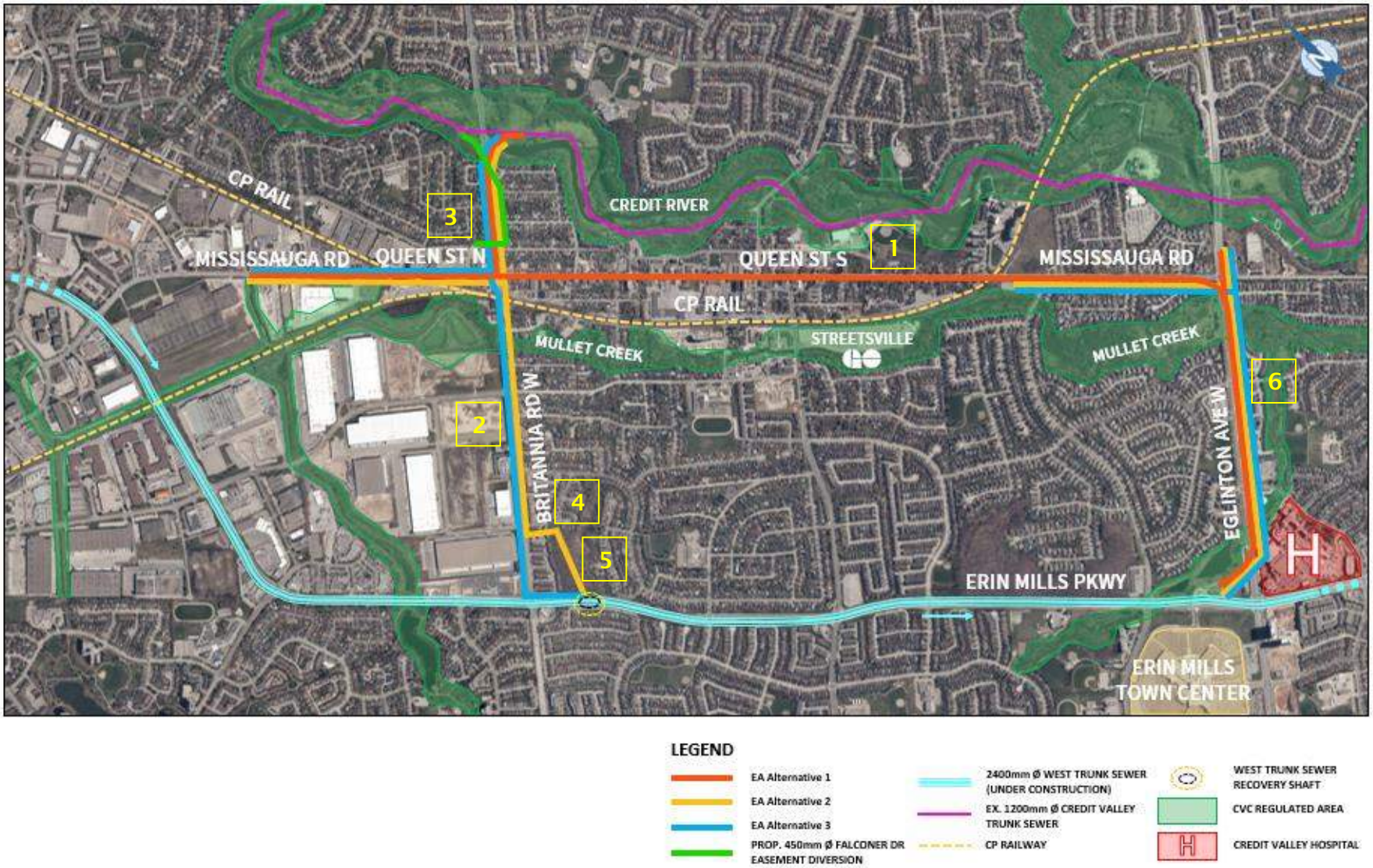

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June 20, 2019

Darlene Quilty
Planning Co-ordinator
Mhbcplan/TransCanada Pipelines
442 Brant Street, Suite 204
Burlington, ON L7R 2G4

dquilty@mhbcplan.com

Dear Darlene Quilty,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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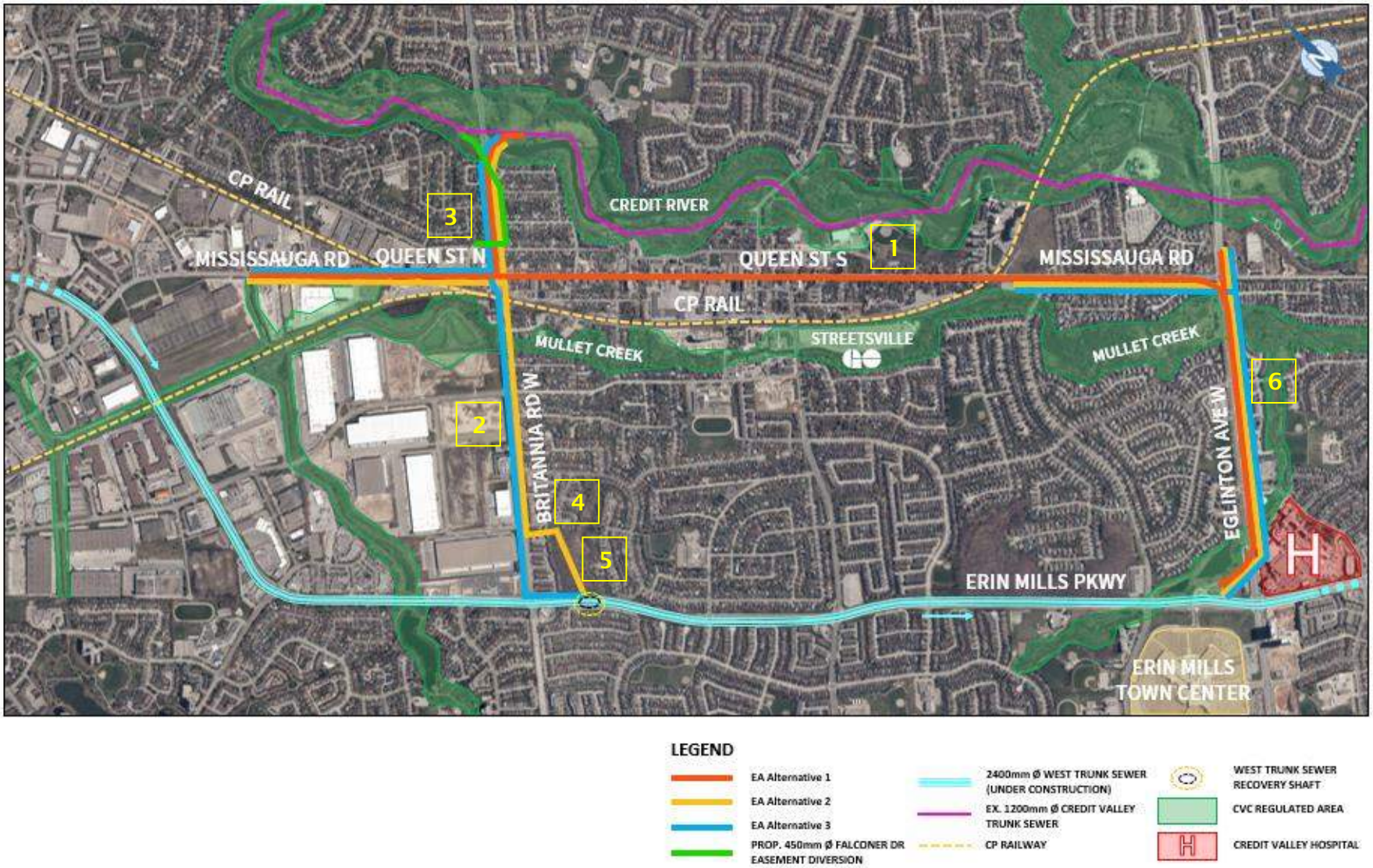

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June 20, 2019

Dave Gadbois
Manager
Union Gas

Dgadbois@uniongas.com

Dear Dave Gadbois,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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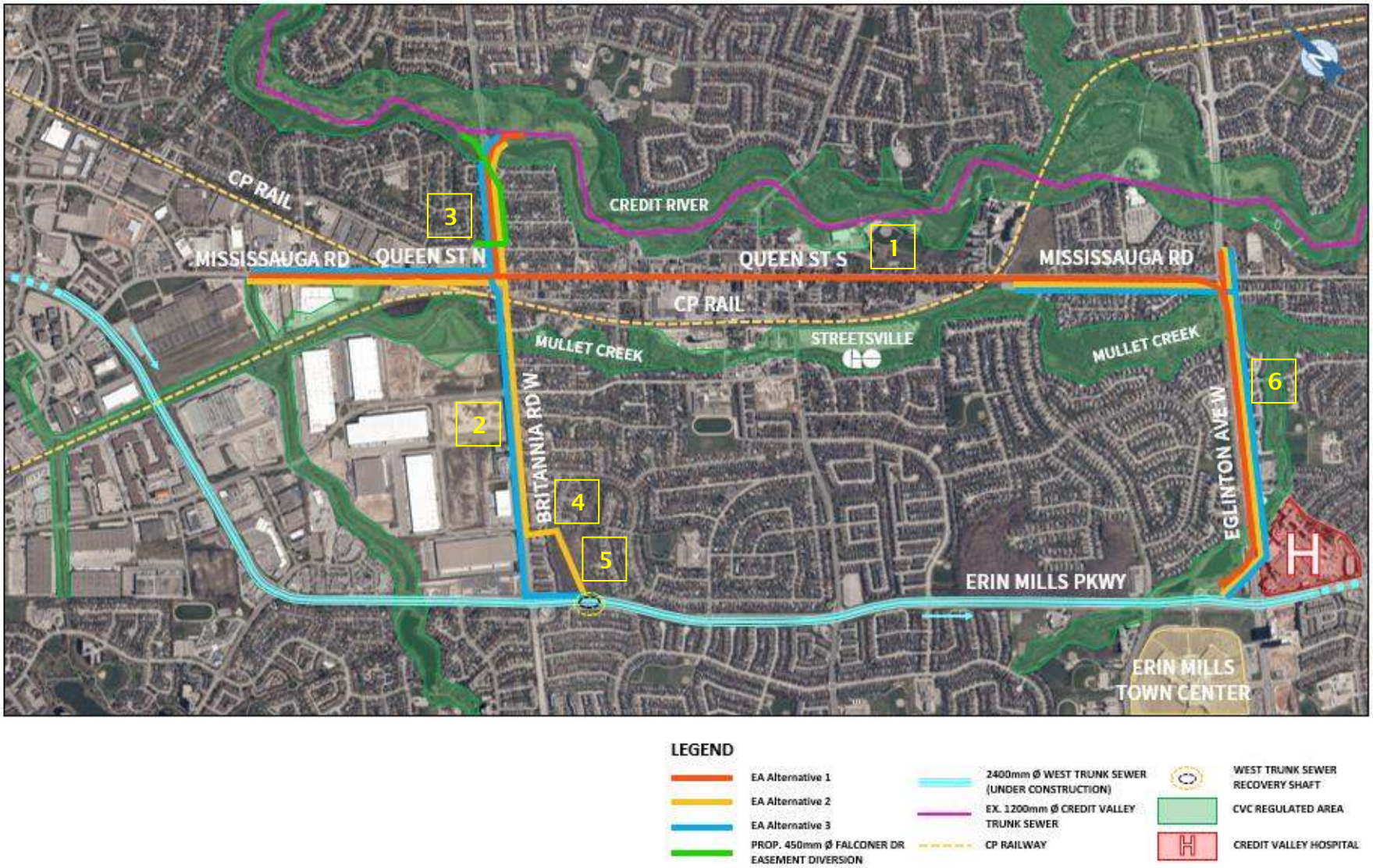

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M. Gelinas; Hatch

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June 20, 2019

Greg Gowan
Hydro One

greg.gowan@hydroone.com

Dear Greg Gowan,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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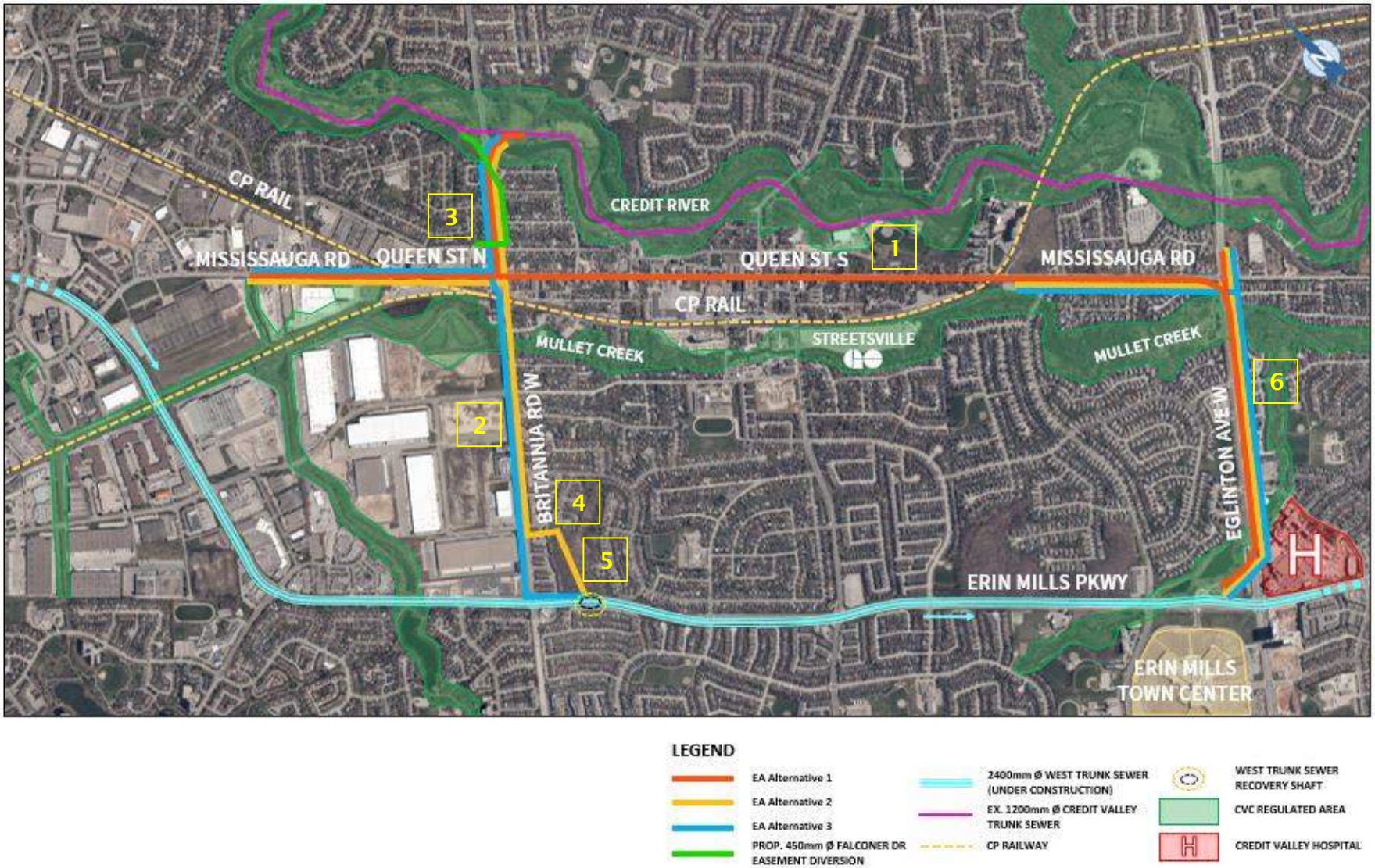

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M. Gelinas; Hatch

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June 20, 2019

Jody Thompson
Specialist, Network Provisioning
Bell 360

jody.thompson2@bell.ca

Dear Jody Thompson,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

Notification of Project and Request for Utility Markups

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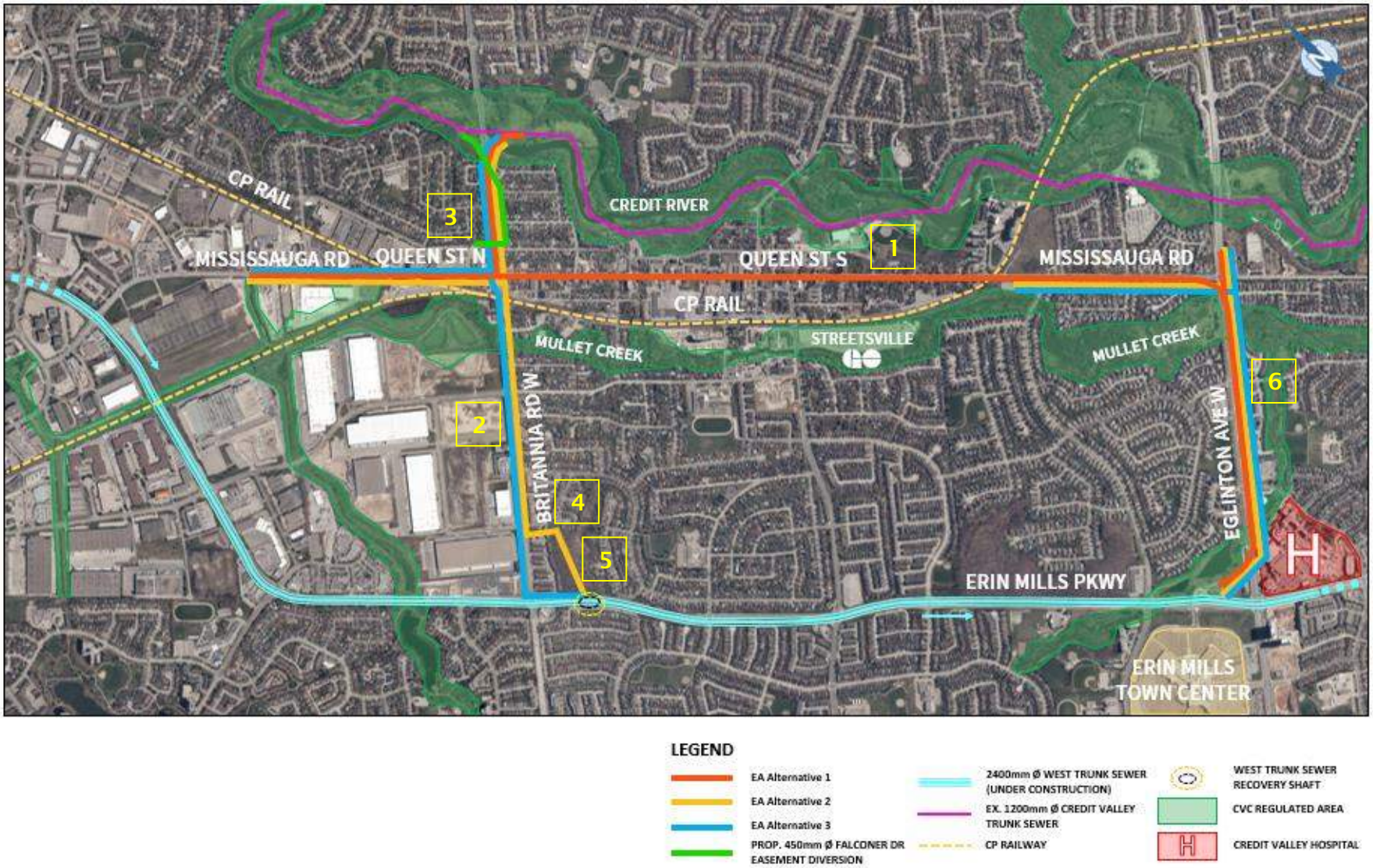

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June 20, 2019

Joe Pimentel
Zayo

joe.pimentel@zayo.com

Dear Joe Pimentel,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

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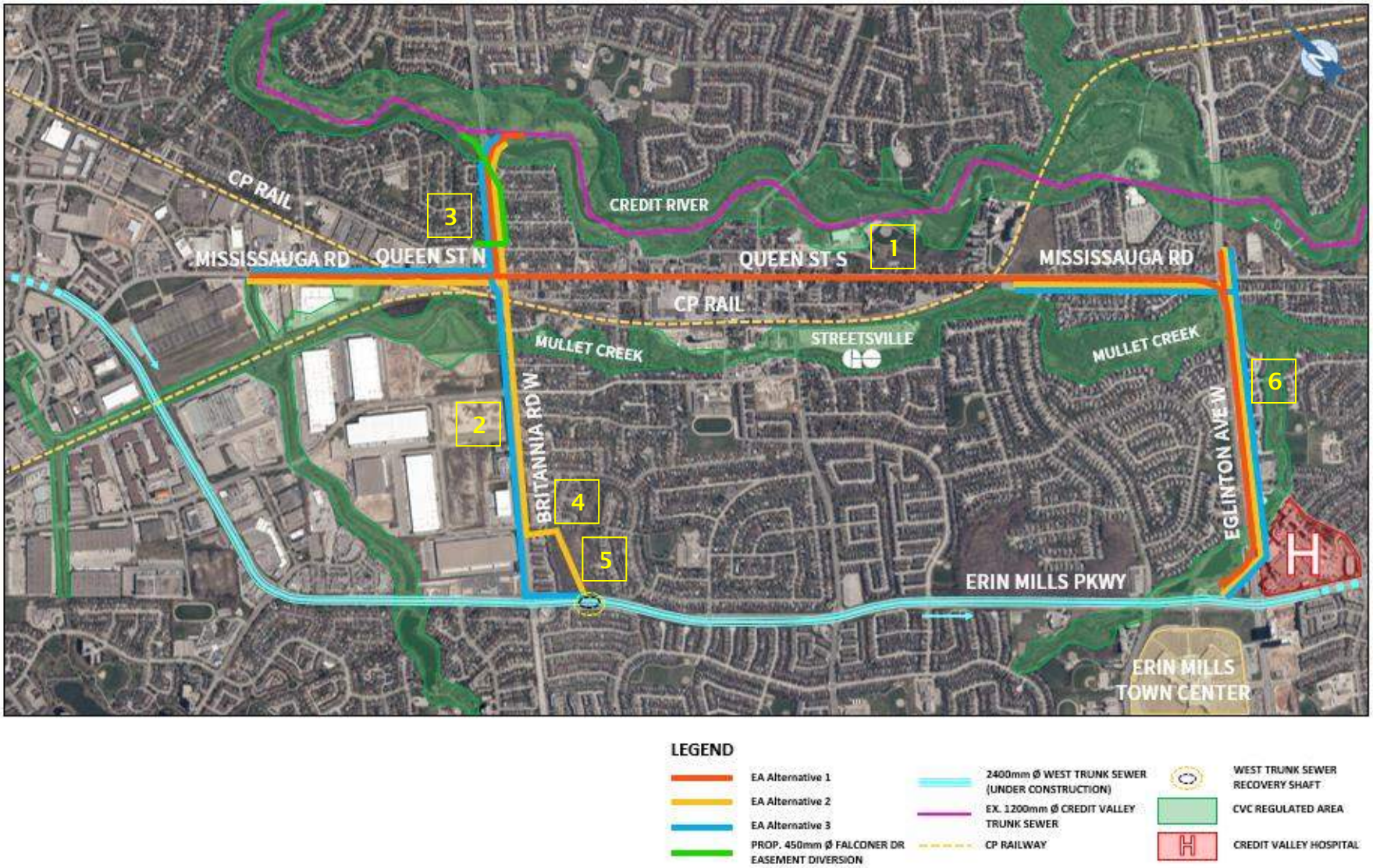

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June 20, 2019

Sir/Madam
Utility Mark-Ups
Rogers Communication

simcoecirculations@rci.rogers.com

Dear Sir/Madam,

Subject: PEEL REGION – DIVERSION OF THE WEST TRUNK SANITARY SEWER

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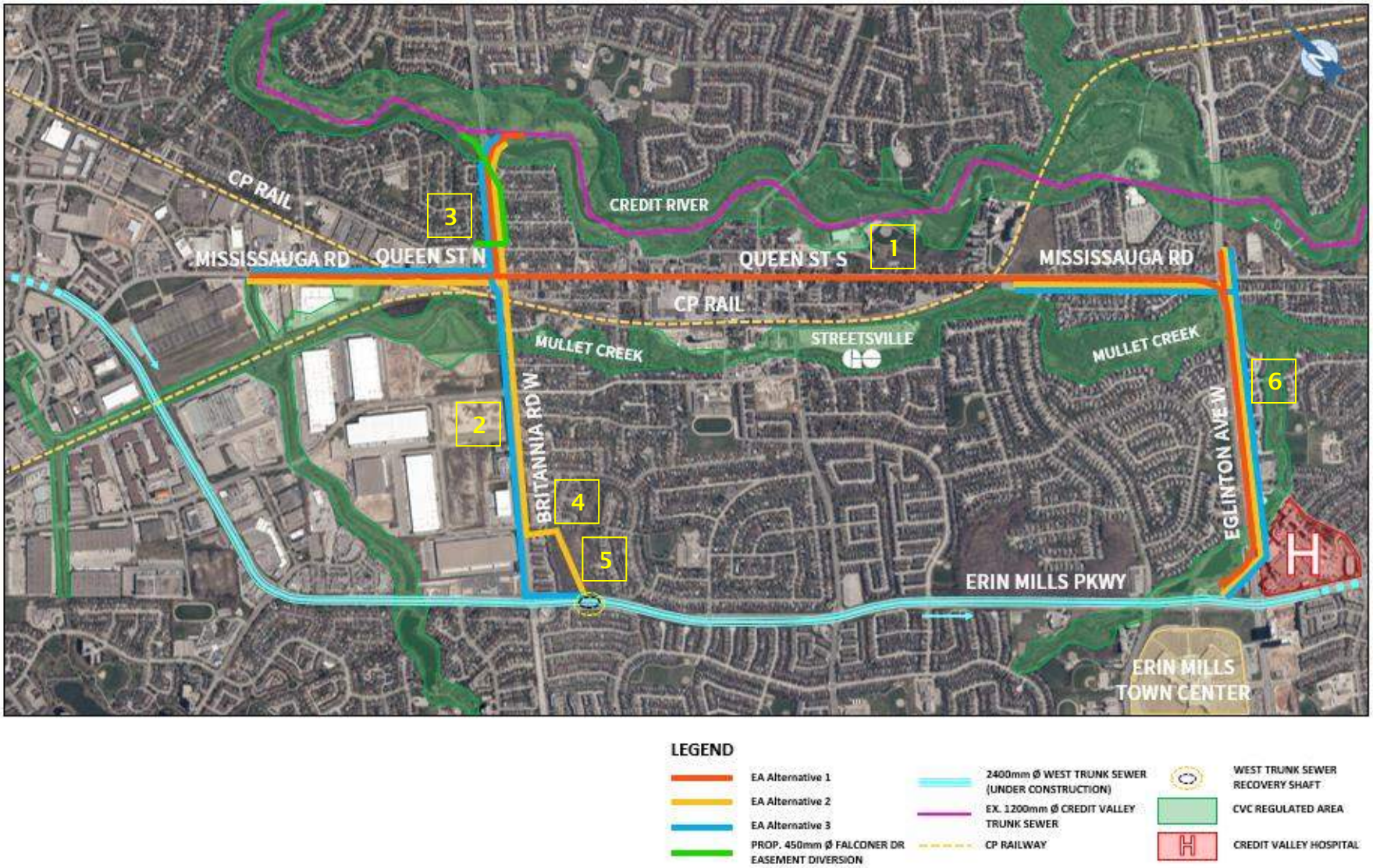

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June 20, 2019

Sir/Madam
Utility Mark-Ups
Bell Canada

Bell.MOC@telecon.ca
andrew.zuk@bell.ca

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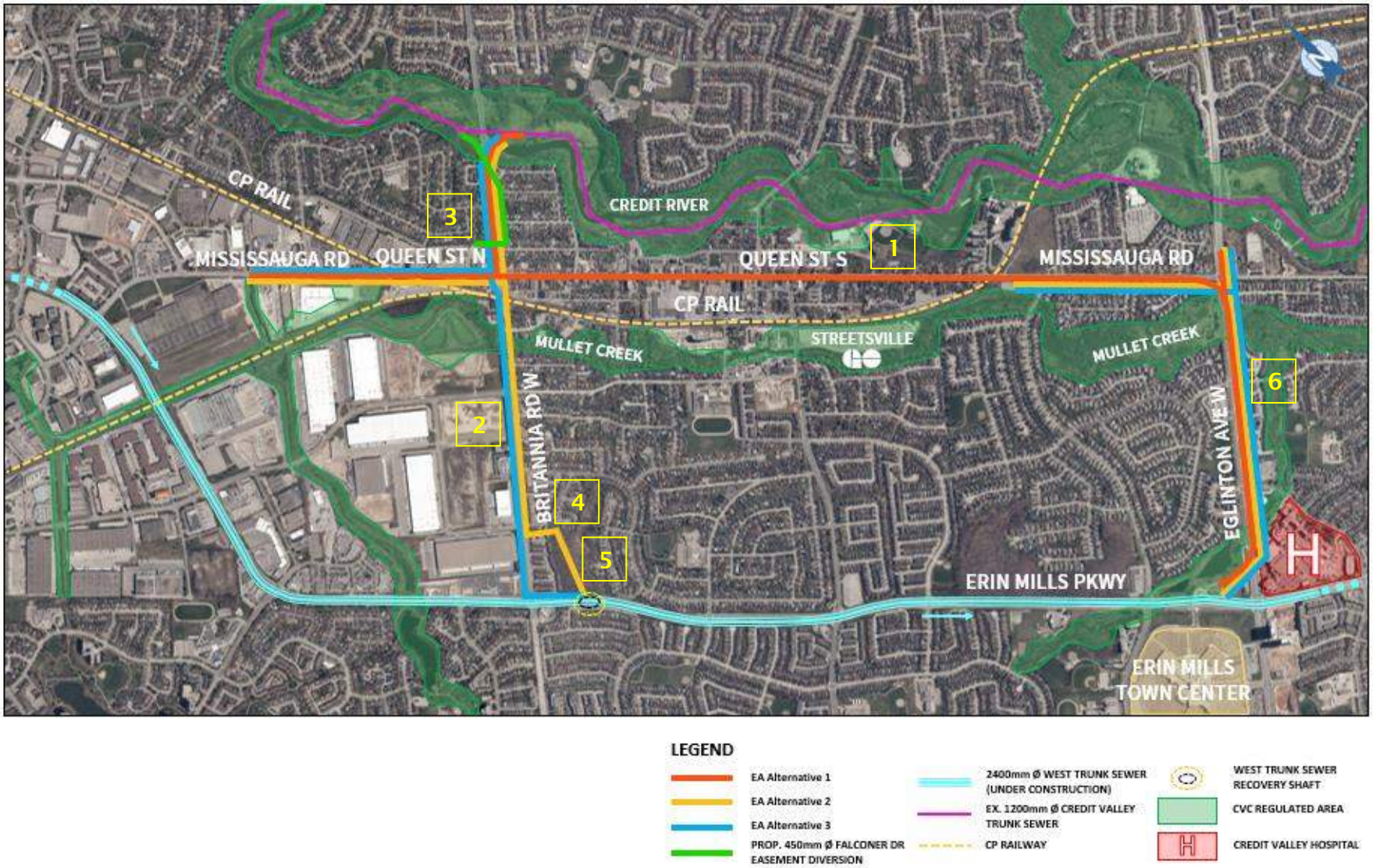

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Peel Region has placed a high priority on this work and immediate attention by the appropriate persons regarding this requisition is greatly appreciated. It is essential to the overall project schedule that we receive your response no later than **July 3, 2019**. It would be appreciated if the information is provided in CAD format (MicroStation) if available.

Should you have any further inquiries or require clarification, please do not hesitate to contact undersigned at the contact details below.

Yours truly,

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APPENDIX H

Property Impact Report

West Trunk Diversion (WTD)

Environmental Assessment Report for the Peel West Trunk Diversion

Property Impacts and Requirements

December 3, 2021

Report Prepared For:

Regional Municipality of Peel

Report Prepared By:

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Hatch Project: H-358800

Issue and Revision Record					
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2	2020-04-03	Derek Kan	Graeme Henderson	Marc Gelinas	Issued for Final EA
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4	2021-12-03	Derek Kan	Graeme Henderson	Marc Gelinas	Updated for Final EA

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ACRONYMS

CVCA	Credit Valley Conservation Authority
CVTS	Credit Valley Trunk Sewer
EA	Environmental Assessment
EPB TBM	Earth Pressure Balance Tunnel Boring Machine
Hatch	Hatch Corporation
MOECP	Ministry of the Environment, Conservation, and Parks
MTBM	Microtunnel Boring Machine
OPSS	Ontario Provincial Standard Specification
Peel Region	Regional Municipality of Peel
RFP	Request for Proposal
ROW	Right-of-way
SCADA	Supervisory Controls and Data Acquisition
TBM	Tunnel Boring Machine
TM	Technical Memorandum
WTD	West Trunk Diversion
WTS	West Trunk Sewer
WTT	West Trunk Twinning

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Regional Municipality of Peel (Peel Region) initiated a Class Environmental Assessment (Class EA) Study to identify the best method of diverting flows from the existing Credit Valley Trunk Sewer (CVTS) to the recently constructed West Trunk Sewer (WTS) to allow for inspection and rehabilitation of the existing CVTS. This diversion will also benefit Peel Region by providing operational flexibility, redundancy and capacity to better manage wet weather flows.

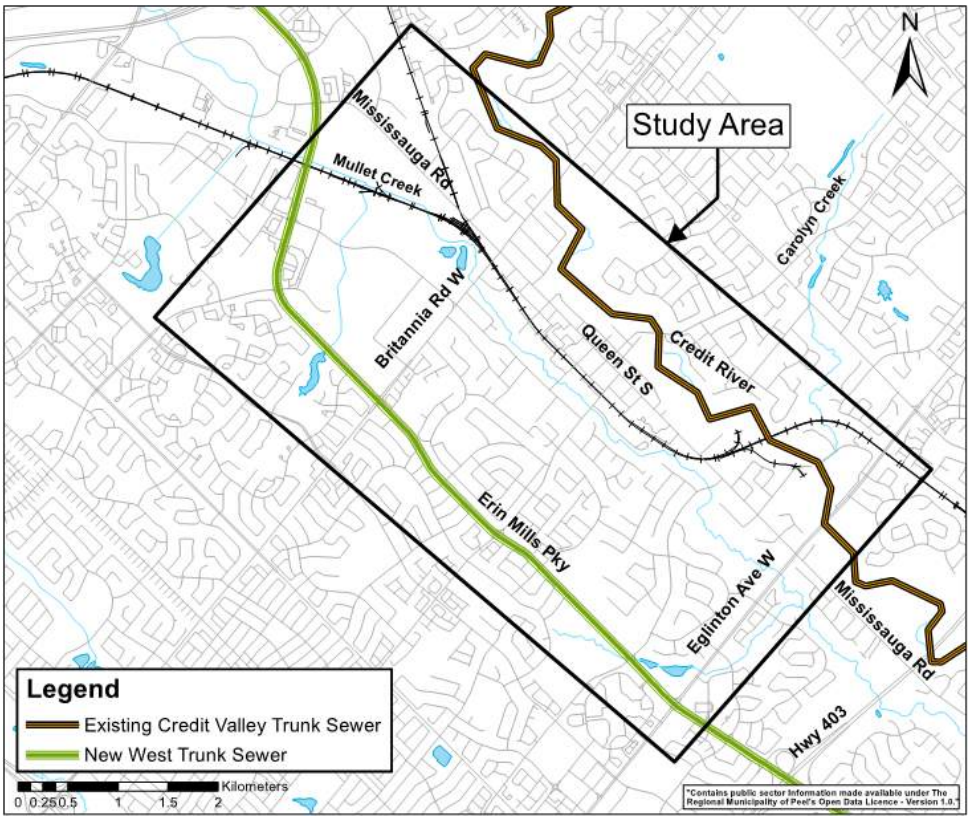


Figure 1 – Study Area of the Peel West Trunk Diversion Project

With the exception of Schedule A projects within municipal right-of-way which are pre-approved, all new municipal sewer construction projects in Ontario require approval under the *Environmental Assessment Act* (EA Act). The Municipal Engineers Association (MEA) Municipal Class EA process streamlines the planning and decision-making of municipal infrastructure with an approved procedure designed to protect the environment. The Municipal Class EA process provides a decision-making framework that enables the requirements of the EA Act to be met in an effective manner.

The West Trunk Diversion Project (WTD) serves as the groundwork to facilitate the future rehabilitation of the existing CVTS which was built in the late 1960s and has been servicing the

west portion of Peel Region since then. Peel Region has identified additional benefits of linking the WTS with the CVTS using newly installed permanent trunk sanitary sewers, first as a means to provide redundancy, and second, as a means to provide operational dynamicity by modulation of flows in the CVTS and WTS via the inclusion of automated Supervisory Controls and Data Acquisition (SCADA) system controlled gates.

1.2 PURPOSE OF DOCUMENT

Hatch has prepared this report to assess the property impacts and requirements of the four proposed Environmental Assessment (EA) alignment alternatives for the WTD project. This report documents multiple options for each shaft location including the total area required for each staging area option along with potential property impacts and local traffic impacts.

2. STUDY AREA

The WTD is located in the Streetsville neighbourhood of the City of Mississauga between the Credit River and Erin Mills Parkway from west of Britannia Road West to Eglinton Avenue. Four preliminary alignment alternatives are being considered to divert flows from the CVTS to the WTS in order to facilitate future rehabilitation works and manage peak wet weather flows.

The proposed routes run along major roads and will be in close proximity to residential, commercial, and industrial properties with construction taking place mostly below grade using trenchless tunnelling methods. Due to the nature of tunnel construction, working compounds are required at all tunnel shaft sites along the sanitary sewer alignment. Where possible, tunnel shaft sites shall be selected with minimizing impacts to the surrounding community as a primary consideration. Depending on the location of these shafts, easements may be required.

3. EA ALIGNMENT ALTERNATIVES

3.1 EA ALTERNATIVE 1 – STREETSVILLE

This proposed tunnel alignment runs through the Streetsville neighbourhood along Mississauga Road, Queen Street North, and Queen Street South before turning west along Eglinton Avenue West and connecting to the WTS on Erin Mills Parkway. A proposed tunnel connects the CVTS to this alignment at Queen Street North along Britannia Road West. This alternative uses a combination of earth pressure balance tunnel boring machine (EPB TBM) and microtunnel boring machine (MTBM) methods allowing for longer drive lengths where the EPB TBM can be used, and therefore a significantly reduced number of shafts.

3.2 EA ALTERNATIVE 2 – BRITANNIA WOODLOT

This proposed MTBM alignment connects to the CVTS and runs along Britannia Road West before jogging south through Turney Woods Park to connect to the WTS on Erin Mills Parkway. A proposed MTBM drive connects flows from Mississauga Road/Queen Street North to this alignment. A second MTBM alignment connects flows from Queen Street South/Mississauga Road and runs along Eglinton Avenue West to connect to the WTS on Erin Mills Parkway. This alternative uses only MTBM methods, which require shorter drive lengths and therefore more shafts.

3.3 EA ALTERNATIVE 3 – BRITANNIA STRAIGHT

This proposed MTBM alignment runs along Britannia Road West connecting the CVTS to the WTS on Erin Mills Parkway. A proposed MTBM drive connects flows from Mississauga Road/Queen Street North to this alignment. A second MTBM drive connects flows from Queen Street South/Mississauga Road and runs along Eglinton Avenue West to connect to the WTS on Erin Mills Parkway. This alternative uses only MTBM methods, which require shorter drive lengths and therefore more shafts.

3.4 EA ALTERNATIVE 4 – ERIN CENTRE BOULEVARD

This proposed tunnel alignment runs through the Streetsville neighbourhood along Mississauga Road, Queen Street North, and Queen Street South before turning west along Erin Centre Boulevard and connecting to the WTS on Erin Mills Parkway. A proposed tunnel connects the CVTS to this alignment at Queen Street North along Britannia Road West. This alternative uses a combination of earth pressure balance tunnel boring machine (EPB TBM) and microtunnel boring machine (MTBM) methods allowing for longer drive lengths where the EPB TBM can be used, and therefore a significantly reduced number of shafts.

The four proposed EA alignment alternatives are illustrated in Figure 2.

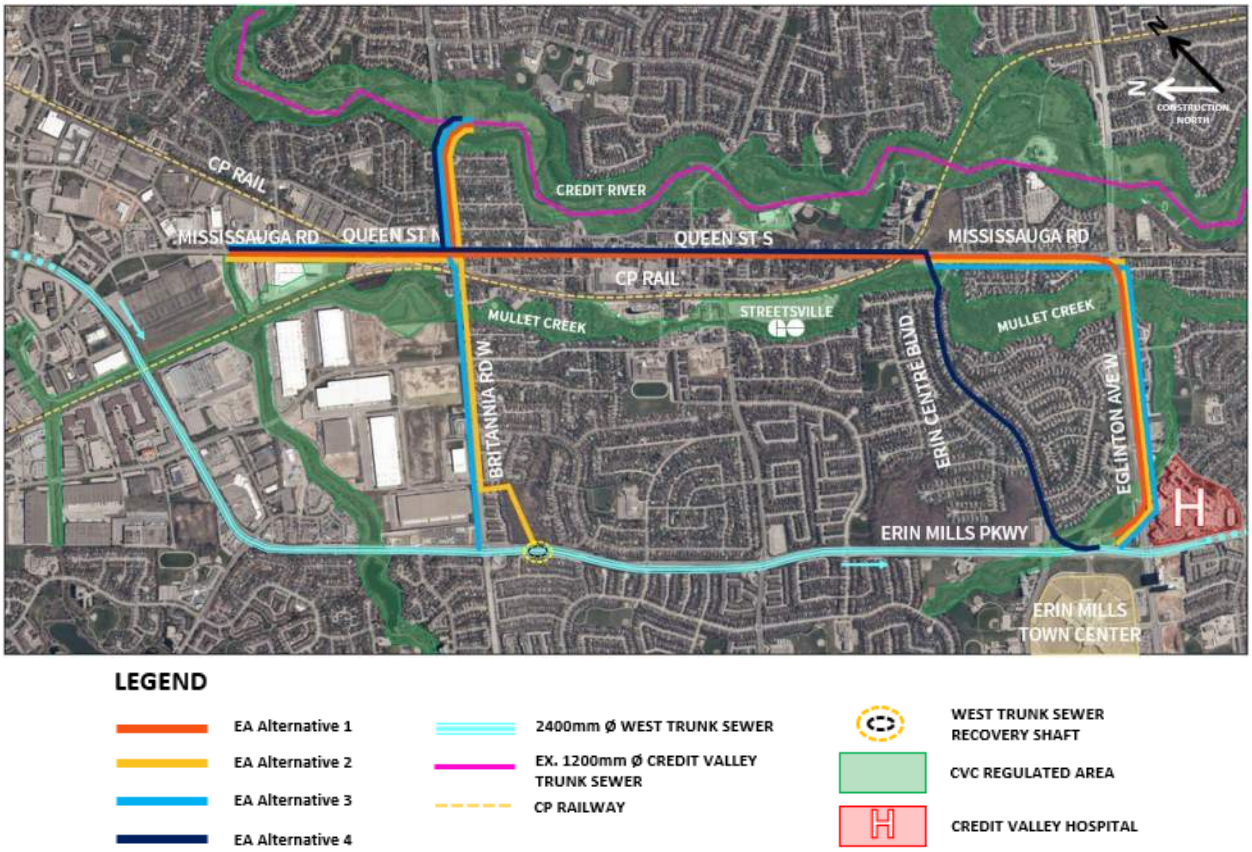


Figure 2 – EA Alignment Alternatives

4. PROPERTY IMPACTS

Proposed construction working compound areas have been selected with minimizing impacts to the surrounding community as a primary consideration and maximizing available space required for tunneling operations as an additional consideration. Easements are required if the staging area is located on land that the Region does not own. If the working compound is within the public road right-of-way (ROW) then no easement is required. A conservative easement width of 12m was adopted for all tunnel and microtunnel alignments for the purposes of determining property impacts during the EA phase.

The shaft locations and tunnel alignments shown for the preferred alignment in Appendix A are for reference purposes only and subject to change during detailed design.

4.1 EA ALTERNATIVE 1 – STREETSVILLE

The alignment of the proposed EA Alternative 1 and associated shaft/staging area locations is illustrated in Figure 3. This alternative features the predominant use of an EPB TBM for the 2400mm diameter sanitary sewer sections along with a portion completed by MTBM drives for the 1200mm diameter sanitary sewer lengths. To accommodate either trenchless reception or launch shafts, multiple compound locations and sizes have been reviewed where applicable for certain staging areas (e.g., SA2.1, SA4.5, etc.) to optimize usage of space. Preliminary draft Property Impact Plans which identify total staging area and any anticipated easement requirements for sections of working compounds outside of Regional Right-of-Way (ROW) can be found in Appendix A.

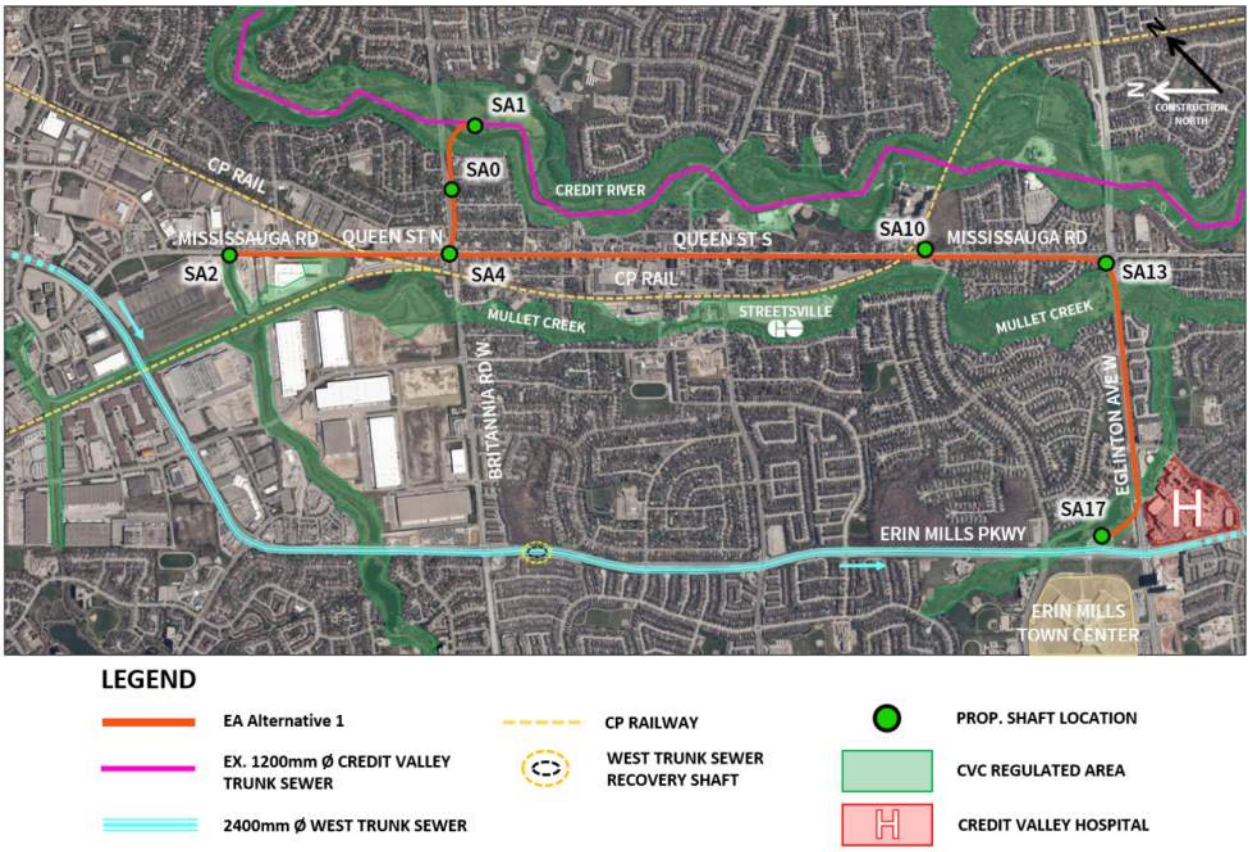


Figure 3 – EA Alternative 1 Shaft Locations

A brief description of the location and local property impact of each staging area for this alignment is provided below.

4.1.1 SA0 – BRITANNIA RD W & ELLESBORO DR

This staging area is located in the open space south of the Britannia Road West and Ellesboro Drive intersection. One launch shaft is required for the WTD connection to the CVTS. The WTD shaft is needed due to microtunnel drive length restrictions between the CVTS and SA4 located at the intersection of Britannia Road West and Queen Street North. SA0 occupies portions of land owned by the Region of Peel that have been confirmed to be available for construction. No property acquisition is required to accommodate SA0 as proposed.

4.1.2 SA1 – TIMOTHY STREET MEMORIAL PARK

This staging area is located within a field in the Timothy Street Memorial Park immediately south of Britannia Road West and adjacent to the east bank of the Credit River. The staging area has been tailored to suit preliminary maintenance hole locations required to capture flows from a local sanitary sewer connection flowing west through the park to the CVTS and divert flows out of the CVTS.

Multiple shafts and maintenance holes are required within SA1 to facilitate the Credit River crossing reception shaft and the CVTS WTD connections. The exact location of the working compound will depend on the location of the CVTS. This staging area lies within the CVCA regulated area. A portion of the staging area is within existing easements for the CVTS and an associated sewer connection. A permanent easement is proposed to provide future access to the chambers via the existing trail path. An easement is also required for the microtunnel crossing under the Credit River.

4.1.3 SA2 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located on Mississauga Road north of Alpha Mills Road. A shaft in this location is needed to divert flows from two existing sanitary sewers which connect to MH1800256 as per the RFP 2018-482P layout. SA2.1 is located within the open space parcel east of Mississauga Road. SA2.2 is located on the road where traffic can either be reduced to one lane on either side to accommodate a shaft in the middle of the road or shunted to the east to facilitate a shaft on the west side of the road. SA2.3 is located to the west of Mississauga Road along a truck trailer storage yard and will impact the adjacent southbound lane on Mississauga Road with a temporary extension into the next lane to facilitate connection to the existing sanitary sewer. SA2.3 is the preferred option allowing for the shaft to be in close proximity to the existing maintenance hole and connecting sewers without overly impacting travelled ROW. This working compound requires minor property acquisition and will likely require temporary access to be provided to facilitate land owner access to the truck trailer storage.

4.1.4 SA4 – QUEEN ST N & BRITANNIA RD W

This staging area is located at the intersection of Queen Street North and Britannia Road West. A shaft is required at this location to facilitate the connection of the proposed sewer along Britannia Road West that connects to the CVTS. SA4.1 is located at the northeast corner of the intersection and will impact the business on the corner along with the westbound right turn lane on Britannia Road West and the northbound lane on Queen Street North. SA4.2 is located in the middle of Queen Street North where traffic will be reduced to one lane on both sides of the working compound. SA4.3 is located on the southeast corner of the intersection and will impact the business on the corner along with the northbound right turn lane on Queen Street South and the eastbound lane on Britannia Road West. Furthermore, this area and the southwest corner of the intersection are planned for future landscaping upgrades as part of the Streetsville Garden Package development. SA4.4 is located in the middle of Queen Street South where traffic will be reduced to one lane on both sides of the working compound. SA4.5 is located in the middle of Britannia Road West and requires the shunting of traffic to the east at the intersection along Queen Street. SA4.1 is the preferred option due to its minimal traffic impact and the property easement in consideration being more practical for staging area use than SA4.3.

4.1.5 SA10 – MISSISSAUGA RD & REID DR

This staging area is located in the open space parcel south of Reid Drive and the CP Rail tracks east of Mississauga Road. This area will act as the main compound for the construction of the

project, providing sufficient space for storage and a site office. A shaft in this location will also facilitate the diversion of flows from the existing sewer that flows east connecting to the CVTS. Consideration should be given to the future mixed residential/commercial development in this area, with timelines and details of the development to be further investigated. SA10.1 and SA10.2 generally cover the same footprint in this parcel between the CP Rail tracks and Erin Centre Boulevard, but have different permanent easement requirements based on the alignment of the proposed sewer and location of shaft. SA10.1 is the preferred option due to the shaft location which facilitates an alignment along Mississauga Road without any permanent easements crossing the future development access road and can be accommodated without any lane closures.

4.1.6 SA13 – MISSISSAUGA RD & EGLINTON AVE W

This staging area is located at the intersection of Mississauga Road and Eglinton Avenue West. A shaft is required at this location due to facilitate a change in direction in the proposed sewer. SA13.1 and SA13.3 are located on the northwest corner of the intersection and will occupy the adjacent westbound lane on Eglinton Avenue West. SA13.2 is located on the northeast corner of the intersection and will occupy a westbound lane along with the right turn lane on Eglinton Avenue West and the northbound lane on Mississauga Road. SA13.3 is the preferred option as it is intended as the location for a turning shaft for tunneling, allowing for a small footprint and reduced traffic impact.

4.1.7 SA17 – ERIN MILLS PKWY

This staging area will make use of the existing compound used for construction of the WTS, located to the east of Erin Mills Parkway across from Erin Mills Town Centre. A shaft in this location facilitates the final discharge connection of the proposed sewer to the WTS while also diverting flows out of an existing 1200mm diameter sewer. This alignment only requires property takings from the City of Mississauga.

A summary of the potential compound/shaft staging area locations and associated property requirements for EA Alternative 1 is provided in Table 1. Preferred options for each staging area are highlighted. The areas provided for each working compound are an approximation.

Table 1 – EA Alternative 1 Property Requirements

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Temp. Easement Area (m^2)	Perm. Easement Area (m^2)	Total Area incl. Existing Easements and ROW (m^2)	Additional Easement for Tunnel (m^2)	Notes
SA0	1	S of Britannia Rd W & Ellesboro Dr	43.589974, -79.720091	132040301	-	-	3,500	1,700	Owned by Region of Peel
SA1	1	Timothy Street Memorial Park	43.591677, -79.716570	131990775	5,200	5,200	17,000	1,300	Within CVCA Regulated Area
SA2	1	E of Mississauga Rd	43.596060, -79.732496	132060150, 132060151	-	-	4,300	-	
	2	Mississauga Rd	43.594527, -79.731116	-	-	-	2,400	-	Reduce traffic to one lane on either side or shunting of all traffic to the east
	3	W of Mississauga Rd	6500 Mississauga Rd	131290022, 131290023	1,250	850	3,800	-	Southbound lane on Mississauga Rd. Temporary extension into adjacent lane.
SA4	1	NE corner at Britannia Rd W	3 Queen St N	132050208	400	300	1,400	200	Westbound right turn lane on Britannia Rd W and northbound lane on Queen St N
	2	Queen St N	43.588473, -79.722930	-	-	-	780	-	Reduce traffic to one lane on either side
	3	SE corner at Britannia Rd W	3A Queen St S	PLAN 43R-21013	-	-	750	-	Northbound right turn lane on Queen St S and eastbound lane on Britannia Rd W
	4	Queen St S	43.587905, -79.722160	-	-	-	480	-	Reduce traffic to one lane on either side
	5	Britannia St W	43.588021, -79.722656	-	-	-	600	-	Reduce traffic to one lane on either side. Requires the shunting of traffic east at the intersection along Queen St
SA10	1	SE of Mississauga Rd & Reid Dr	43.574350, -79.703328	131960713	9,100	1,700	12,000	-	
	2	E of Mississauga Rd & Erin Centre Blvd	43.573654, -79.702536	131960713	9,600	1,200	12,500	-	Northbound lane on Mississauga Rd
SA13	1	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	135010042	-	-	1,750	-	Westbound lane on Eglinton Ave W
	2	NE corner of Mississauga Rd & Eglinton Ave W	43.568796, -79.696045	-	-	-	1,100	-	Westbound lane and right turn lane on Eglinton Ave W and northbound lane on Mississauga Rd
	3	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	-	-	-	1,200	-	Westbound lane on Eglinton Ave W
SA17	1	E of Erin Mills Pkwy	43.560621, -79.708441	131200014, 131200090	-	-	6,000	3,250	Use existing WTS compound

4.2 EA ALTERNATIVE 2 – BRITANNIA WOODLOT

The alignment of proposed EA Alternative 2 and associated shafts/staging area locations are illustrated in Figure 4. This alternative features the exclusive use of MTBM methods for the installation of 1200mm diameter sanitary sewer lengths. To accommodate either trenchless reception or launch shafts, multiple compound locations and sizes have been reviewed where applicable for certain staging areas (e.g., SA2.1, SA4.5, etc.) to optimize usage of space. For applicable staging area options, preliminary draft Property Impact Plans which identify anticipated easement requirements for sections of working compounds outside of Regional Right-of-Way (ROW) can be found in Appendix A.

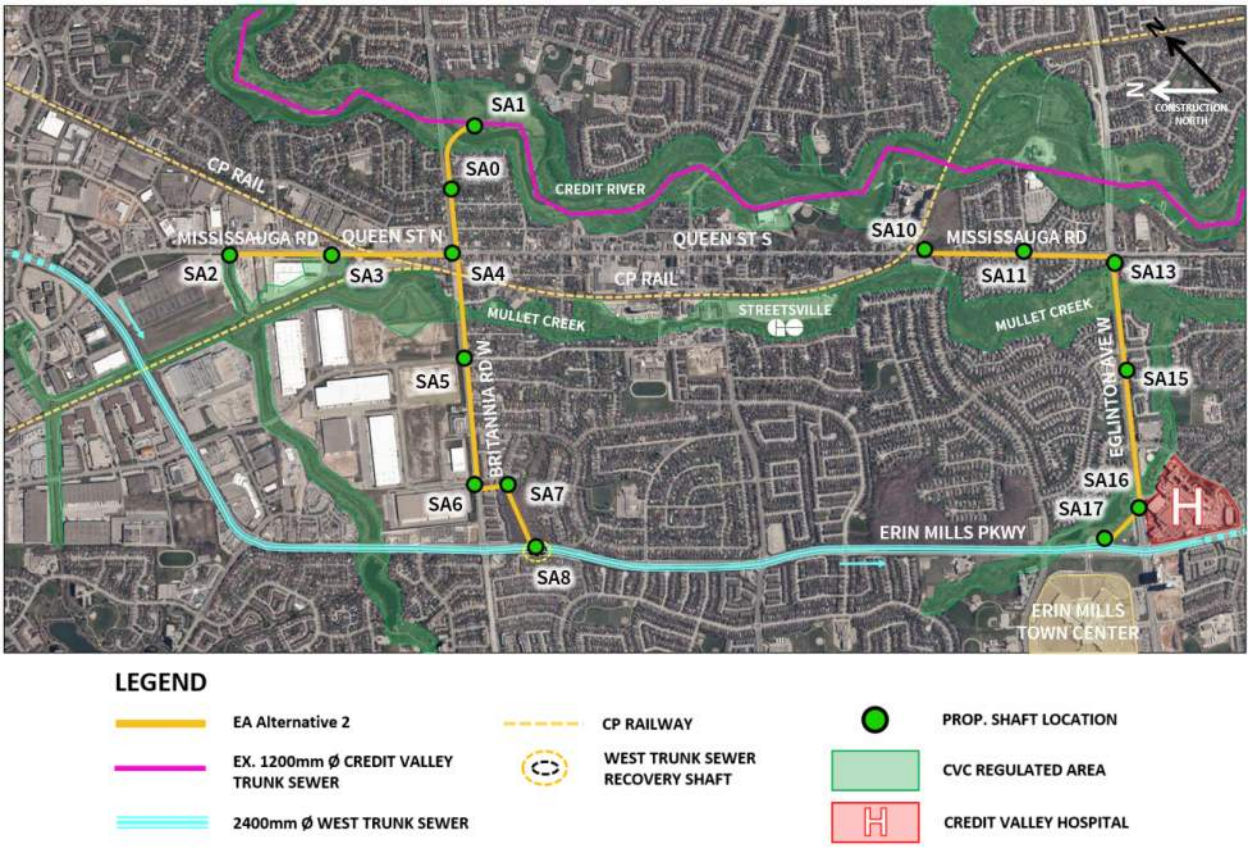


Figure 4 – EA Alternative 2 Shaft Locations

A brief description of the location and local property impact of each staging area for this alignment is provided below.

4.2.1 SA0 – BRITANNIA RD W & ELLESBORO DR

This staging area is located in the open space south of the Britannia Road West and Ellesboro Drive intersection. One launch shaft is required for the WTD connection to the CVTS. The WTD shaft is needed due to microtunnel drive length restrictions between the CVTS and SA4 located at the intersection of Britannia Road West and Queen Street North. SA0 occupies portions of land

owned by the Region of Peel that have been confirmed to be available for construction. No property acquisition is required to accommodate SA0 as proposed.

4.2.2 PE0 – RIVERVIEW PARK

A permanent easement is required along the trail path in Riverview Park north of Britannia Road West to accommodate the Falconer Drive Diversion connection to the CVTS.

4.2.3 SA1 – TIMOTHY STREET MEMORIAL PARK

This staging area is located within a field in the Timothy Street Memorial Park immediately south of Britannia Road West and adjacent to the east bank of the Credit River. The staging area has been tailored to suit preliminary maintenance hole locations required to capture flows from a local sanitary sewer connection flowing west through the park to the CVTS and divert flows out of the CVTS.

Multiple shafts and maintenance holes are required within SA1 to facilitate the Credit River crossing reception shaft and the CVTS WTD connections. The exact location of the working compound will depend on the location of the CVTS. This staging area lies within the CVCA regulated area. A portion of the staging area is within existing easements for the CVTS and an associated sewer connection. A permanent easement is proposed to provide future access to the chambers via the existing trail path. An easement is also required for the microtunnel crossing under the Credit River.

4.2.4 SA2 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located on Mississauga Road north of Alpha Mills Road. A shaft in this location is needed to divert flows from two existing sanitary sewers which connect to MH1800256 as per the RFP 2018-482P layout. SA2.1 is located within the open space parcel east of Mississauga Road. SA2.2 is located on the road where traffic can either be reduced to one lane on either side to accommodate a shaft in the middle of the road or shunted to the east to facilitate a shaft on the west side of the road. SA2.3 is located to the west of Mississauga Road along a truck trailer storage yard and will impact the adjacent southbound lane on Mississauga Road with a temporary extension into the next lane to facilitate connection to the existing sanitary sewer. SA2.3 is the preferred option allowing for the shaft to be in close proximity to the existing maintenance hole and connecting sewers without overly impacting travelled ROW. This working compound requires minor property acquisition and will likely require temporary access to be provided to facilitate land owner access to the truck trailer storage.

4.2.5 SA3 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located south of the Mississauga Road and Alpha Mills Road intersection. A shaft is needed in this location due to MTBM drive length limitations. SA3.1 is located on the boulevard to the west of Mississauga Road. SA3.2 is located on the same boulevard just south of SA3.1 and will occupy one southbound lane on Mississauga Road. SA3.3 is a combination of SA3.1 and SA3.2. SA3.4 is located to the west of Mississauga Road and will occupy one

southbound lane on Mississauga Road along with a portion of the adjacent parking lot. All options lie partially or fully within the CVCA Regulated Area. SA3.2 is the preferred option as it allows the shaft to be completely within the ROW and provides an adequate area to be used as a launch shaft in both directions.

4.2.6 SA4 – QUEEN ST N & BRITANNIA RD W

This staging area is located at the intersection of Queen Street North and Britannia Road West. A shaft is required at this location to facilitate the connection of the proposed sewer along Britannia Road West that connects to the CVTS. SA4.1 is located at the northeast corner of the intersection and will impact the business on the corner along with the westbound right turn lane on Britannia Road West and the northbound lane on Queen Street North. SA4.2 is located in the middle of Queen Street North where traffic will be reduced to one lane on both sides of the working compound. SA4.3 is located on the southeast corner of the intersection and will impact the business on the corner along with the northbound right turn lane on Queen Street South and the eastbound lane on Britannia Road West. Furthermore, this area and the southwest corner of the intersection are planned for future landscaping upgrades as part of the Streetsville Garden Package development. SA4.4 is located in the middle of Queen Street South where traffic will be reduced to one lane on both sides of the working compound. SA4.5 is located in the middle of Britannia Road West and requires the shunting of traffic to the east at the intersection along Queen Street. SA4.1 is the preferred option due to its minimal traffic impact and the property easement in consideration being more practical for staging area use than SA4.3.

4.2.7 SA5 – BRITANNIA RD W & MILLCREEK DR

This staging area is located at the intersection of Britannia Road West and Millcreek Drive. A shaft is needed in this location due to MTBM drive length limitations. SA5.1 is located on the boulevard at the northeast corner of the intersection and will occupy the westbound right turn lane on Britannia Road West. SA5.2 is located on the boulevard at the northwest corner of the intersection and will obstruct one westbound lane on Britannia Road West. SA5.1 is the preferred option, but SA5.2 is also an acceptable alternative depending on easement negotiations.

4.2.8 SA6 – BRITANNIA RD W & HOGAN DR

This staging area is located at the intersection of Britannia Road West and Hogan Drive. A shaft is needed in this location to facilitate a change in direction of the proposed sewer. SA6.1 extends beyond the boulevard at the northeast corner of the intersection and will occupy the westbound right turn lane on Britannia Road West. SA6.2 is located on the boulevard at the northwest corner of the intersection and will occupy the adjacent westbound lane on Britannia Road West. SA6.2 is preferred as the compound is located further from the occupied area of the adjacent business compared to SA6.1.

4.2.9 SA7 – TURNEY WOODS PARK

This staging area is located in a forested area adjacent to Pagosa Court. A shaft is needed in this location to facilitate a change in direction of the proposed sewer. The location of this compound

prevents the need for a compound at the intersection of Britannia Road West and Erin Mills Parkway. This option requires the removal of mature trees and construction in close proximity to residential properties.

4.2.10 SA8 – ERIN MILLS PKWY

This staging area is located to the south of Britannia Road West along Erin Mills Parkway. A shaft in this location facilitates the connection of the proposed sewer to the WTS. The proposed compound will make use of the existing compound used as rescue shaft during the construction of the WTS.

4.2.11 SA10 – MISSISSAUGA RD & REID DR

This staging area is located in the open space parcel south of Reid Drive and the CP Rail tracks east of Mississauga Road. This area will act as the main compound for the construction of the project, providing sufficient space for storage and a site office. A shaft in this location will also facilitate the diversion of flows from the existing sewer that flows east connecting to the CVTS. Consideration should be given to the future mixed residential/commercial development in this area, with timelines and details of the development to be further investigated. SA10.1 and SA10.2 generally cover the same footprint in this parcel between the CP Rail tracks and Erin Centre Boulevard, but have different permanent easement requirements based on the alignment of the proposed sewer and location of shaft. SA10.1 is the preferred option due to the shaft location which facilitates an alignment along Mississauga Road without any permanent easements crossing the future development access road and can be accommodated without any lane closures.

4.2.12 SA11 – MISSISSAUGA RD & BARBERTOWN RD

This staging area is located at the intersection of Mississauga Road and Barbertown Road. A shaft is needed in this location due to MTBM drive length limitations. SA11.1 is located in the boulevard on the northeast corner of the intersection. It requires the removal of mature trees and occupies the westbound lane on Barbertown Road and the northbound lane on Mississauga Road. Furthermore, development has been approved within the limits of SA11.1 and there is a heritage building in close proximity. SA11.2 is located in the boulevard on the northwest corner of the intersection. It is a smaller working compound, only suitable as a reception shaft and will occupy the southbound lane on Mississauga Road. It also requires a bus stop and overhead power lines to be moved. SA11.2 is the preferred option as SA11.1 is too close to an existing heritage designated building.

4.2.13 SA13 – MISSISSAUGA RD & EGLINTON AVE W

This staging area is located at the intersection of Mississauga Road and Eglinton Avenue West. A shaft is required at this location due to MTBM drive length limitations and to facilitate a change in direction in the proposed sewer. SA13.1 and SA13.3 are located on the northwest corner of the intersection and will occupy the adjacent westbound lane on Eglinton Avenue West. SA13.2 is located on the northeast corner of the intersection and will occupy a westbound lane along with

the right turn lane on Eglinton Avenue West and the northbound lane on Mississauga Road. SA13.1 is the preferred option due to its larger area to facilitate launch and reception of a MTBM and the flexibility to expand into the easement if required.

4.2.14 SA15 – EGLINTON AVE & THE CHASE

This staging area is located west of The Chase on the median of Eglington Avenue West. A shaft is needed in this location due to MTBM drive length limitations. This staging area will occupy the adjacent westbound and eastbound lanes as well as the eastbound left hand turn lane adjacent to the median.

4.2.15 SA16 – EGLINGTON AVE W & HOSPITAL ENTRANCE

This staging area is located north of Eglinton Avenue West across from an entrance to the Credit Valley Hospital. A shaft is needed in this location due to MTBM drive length limitations and to facilitate a change in direction of the proposed sewer. SA16.1 is located in the open space parcel north of Eglinton Avenue West and adjacent to the entrance to a developer's presentation centre entrance. It will obstruct the adjacent westbound lane on Eglinton Avenue West. SA16.2 is located at the entrance of the presentation centre and extends west along the entrance driveway. It will also obstruct the adjacent westbound lane on Eglinton Avenue West. SA16.3 is located in the parking lot adjacent to the Credit Valley Hospital helipad. SA16.3 is the preferred option as it has no impacts to the travelled ROW or intersections.

4.2.16 SA17 – ERIN MILLS PKWY

This staging area will make use of the existing compound used for construction of the WTS, located to the east of Erin Mills Parkway across from Erin Mills Town Centre. A shaft in this location facilitates the final discharge connection of the proposed sewer to the WTS while also diverting flows out of an existing 1200mm diameter sewer. This alignment only requires property takings from the City of Mississauga.

A summary of the potential shaft locations and associated property requirements for EA Alternative 2 is provided in Table 2. Preferred options for each staging area are highlighted. The areas provided for each working compound are an approximation.

Table 2 – EA Alternative 2 Property Requirements

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Total Area incl. Existing Easements and ROW (m^2)	Notes
SA0	1	S of Britannia Rd W & Ellesboro Dr	43.589974, -79.720091	132040301	3,500	Owned by Region of Peel
SA1	1	Timothy Street Memorial Park	43.591677, -79.716570	131990775	17,000	Within CVCA Regulated Area
SA2	1	E of Mississauga Rd	43.596060, -79.732496	132060150, 132060151	4,300	
	2	Mississauga Rd	43.594527, -79.731116	-	2,400	Reduce traffic to one lane on either side or shunting of all traffic to the east
	3	W of Mississauga Rd	6500 Mississauga Rd	131290022, 131290023	3,800	Southbound lane on Mississauga Rd. Temporary extension into adjacent lane.
SA3	1	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	1,800	Partially in CVCA Regulated Area
	2	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	1,700	Southbound lane on Mississauga Rd Within CVCA Regulated Area
	3	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	3,500	Southbound lane on Mississauga Rd Partially in CVCA Regulated Area
	4	Mississauga Rd	6190 Mississauga Rd	131290018	1,300	Southbound lane on Mississauga Rd Within CVCA Regulated Area
SA4	1	NE corner at Britannia Rd W	3 Queen St N	132050208	1,400	Westbound right turn lane on Britannia Rd W and northbound lane on Queen St N
	2	Queen St N	43.588473, -79.722930	-	780	Reduce traffic to one lane on either side
	3	SE corner at Britannia Rd W	3A Queen St S	PLAN 43R-21013	750	Northbound right turn lane on Queen St S and eastbound lane on Britannia Rd W
	5	Britannia Rd W	43.588021, -79.722656	-	600	Reduce traffic to one lane on either side. Requires the shunting of traffic east at the intersection along Queen St
SA5	1	NE corner at Britannia Rd W & Millcreek Dr	43.585345, -79.726539	REG PLAN 43M-1780 (BLOCK 2)	2,000	Westbound right turn lane on Britannia Rd W
	2	NW corner at Britannia Rd W & Millcreek Dr	43.584647, -79.726862	REG PLAN 43M-1780 (BLOCK 3)	2,500	Westbound lane on Britannia Rd W
SA6	1	NE corner at Britannia Rd W	2475 Hogan Dr	131290144	1,500	Westbound right turn lane on Britannia Rd W
	2	NW corner at Britannia Rd W	2450 Hogan Dr	REG PLAN 43M-1780 (BLOCK 1)	1,500	Westbound lane on Britannia Rd W
SA7	1	Turney Woods Park	43.579910, -79.729734	131260206	1,500	Removal of mature trees and close proximity to residential properties

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Total Area incl. Existing Easements and ROW (m^2)	Notes
SA8	1	Erin Mills Pkwy	43.577135, -79.731464	-	1,500	Northbound left turn lane on Erin Mills Parkway
SA10	1	SE of Mississauga Rd & Reid Dr	43.574350, -79.703328	131960713	12,000	
	2	E of Mississauga Rd & Erin Centre Blvd	43.573654, -79.702536	131960713	12,500	Northbound lane on Mississauga Rd
SA11	1	NE corner at Mississauga Rd & Barbertown Rd	43.571326, -79.699429	131960745, 131960746	1,450	Removal of mature trees Westbound lane on Barbertown Rd and northbound lane on Mississauga Rd
	2	NW corner at Mississauga Rd & Barbertown Rd	43.571119, -79.699611	-	825	Southbound lane on Mississauga Rd
SA13	1	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	135010042	1,750	Westbound lane on Eglinton Ave W
	2	NE corner of Mississauga Rd & Eglinton Ave W	43.568796, -79.696045	-	1,100	Westbound lane and right turn lane on Eglinton Ave W and northbound lane on Mississauga Rd
	3	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	-	1,200	Westbound lane on Eglinton Ave W
SA15	1	Eglinton Ave W	43.564705, -79.700311	-	720	Eastbound lane and westbound lane on Eglinton Ave W
SA16	1	Eglinton Ave W	43.561026, -79.704844	131200010	2,900	Westbound lane on Eglinton Ave W
	2	Eglinton Ave W	2475 Eglinton Ave W	131200086, 131200012	1,850	Westbound lane on Eglinton Ave W
	3	Eglinton Ave W	43.561307, -79.703441	133840016	2,100	Adjacent to Credit Valley Hospital helipad
SA17	1	E of Erin Mills Parkway	43.560621, -79.708441	131200014, 131200090	6,000	Use existing WTS compound

4.3 EA ALTERNATIVE 3 – BRITANNIA STRAIGHT

The alignment of proposed EA Alternative 3 and associated shafts/staging area locations are illustrated in Figure 5. This alternative features the exclusive use of MTBM methods for the installation of 1200mm diameter sanitary sewer lengths. To accommodate either trenchless reception or launch shafts, multiple compound locations and sizes have been reviewed where applicable for certain staging areas (e.g., SA2.1, SA4.5, etc.) to optimize usage of space. For applicable staging area options, preliminary draft Property Impact Plans which identify anticipated easement requirements for sections of working compounds outside of Regional Right-of-Way (ROW) can be found in Appendix A.

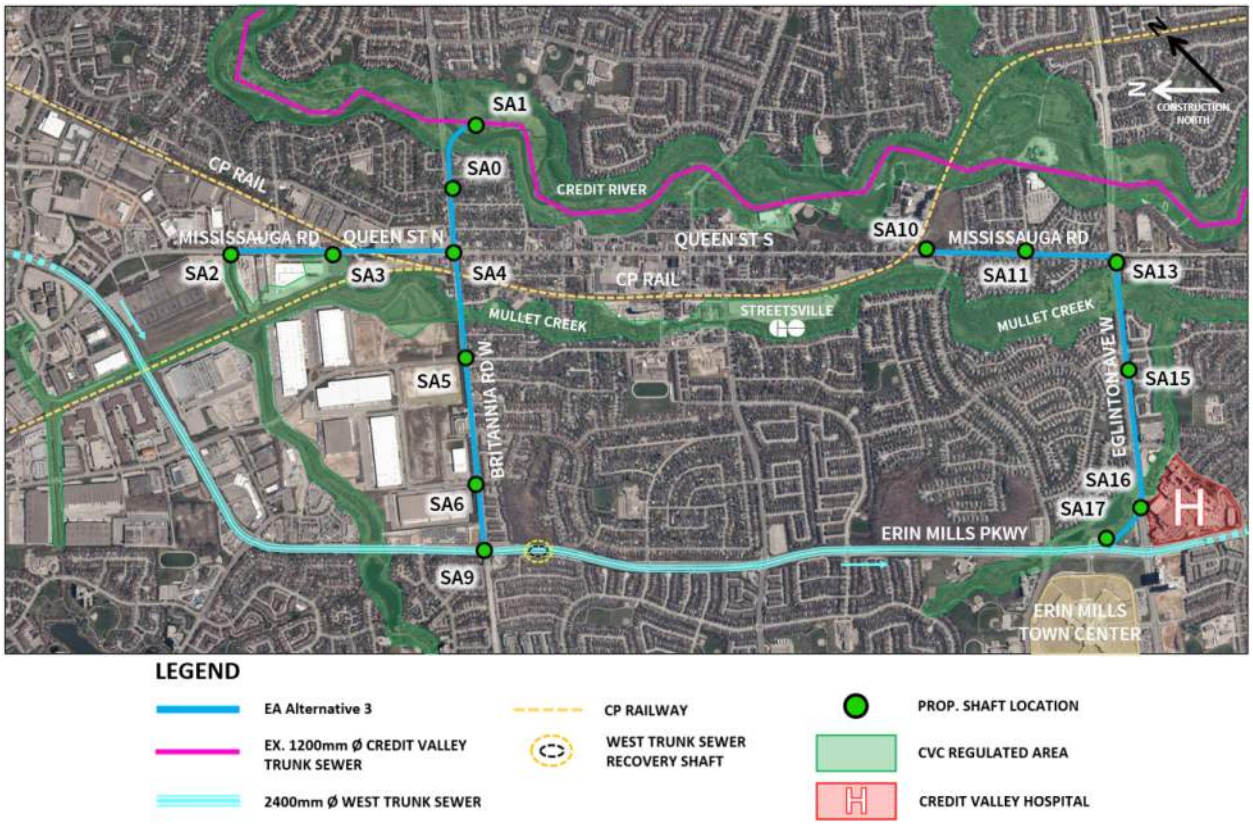


Figure 5 – EA Alternative 3 Shaft Locations

A brief description of the location and local property impact of each staging area for this alignment is provided below.

4.3.1 SA0 – BRITANNIA RD W & ELLESBORO DR

This staging area is located in the open space south of the Britannia Road West and Ellesboro Drive intersection. One launch shaft is required for the WTD connection to the CVTS. The WTD shaft is needed due to microtunnel drive length restrictions between the CVTS and SA4 located at the intersection of Britannia Road West and Queen Street North. SA0 occupies portions of land

owned by the Region of Peel that have been confirmed to be available for construction. No property acquisition is required to accommodate SA0 as proposed.

4.3.2 PE0 – RIVERVIEW PARK

A permanent easement is required along the trail path in Riverview Park north of Britannia Road West to accommodate the Falconer Drive Diversion connection to the CVTS.

4.3.3 SA1 – TIMOTHY STREET MEMORIAL PARK

This staging area is located within a field in the Timothy Street Memorial Park immediately south of Britannia Road West and adjacent to the east bank of the Credit River. The staging area has been tailored to suit preliminary maintenance hole locations required to capture flows from a local sanitary sewer connection flowing west through the park to the CVTS and divert flows out of the CVTS.

Multiple shafts and maintenance holes are required within SA1 to facilitate the Credit River crossing reception shaft and the CVTS WTD connections. The exact location of the working compound will depend on the location of the CVTS. This staging area lies within the CVCA regulated area. A portion of the staging area is within existing easements for the CVTS and an associated sewer connection. A permanent easement is proposed to provide future access to the chambers via the existing trail path. An easement is also required for the microtunnel crossing under the Credit River.

4.3.4 SA2 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located on Mississauga Road north of Alpha Mills Road. A shaft in this location is needed to divert flows from two existing sanitary sewers which connect to MH1800256 as per the RFP 2018-482P layout. SA2.1 is located within the open space parcel east of Mississauga Road. SA2.2 is located on the road where traffic can either be reduced to one lane on either side to accommodate a shaft in the middle of the road or shunted to the east to facilitate a shaft on the west side of the road. SA2.3 is located to the west of Mississauga Road along a truck trailer storage yard and will impact the adjacent southbound lane on Mississauga Road with a temporary extension into the next lane to facilitate connection to the existing sanitary sewer. SA2.3 is the preferred option allowing for the shaft to be in close proximity to the existing maintenance hole and connecting sewers without overly impacting travelled ROW. This working compound requires minor property acquisition and will likely require temporary access to be provided to facilitate land owner access to the truck trailer storage.

4.3.5 SA3 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located south of the Mississauga Road and Alpha Mills Road intersection. A shaft is needed in this location due to MTBM drive length limitations. SA3.1 is located on the boulevard to the west of Mississauga Road. SA3.2 is located on the same boulevard just south of SA3.1 and will occupy one southbound lane on Mississauga Road. SA3.3 is a combination of SA3.1 and SA3.2. SA3.4 is located to the west of Mississauga Road and will occupy one

southbound lane on Mississauga Road along with a portion of the adjacent parking lot. All options lie partially or fully within the CVCA Regulated Area. SA3.2 is the preferred option as it allows the shaft to be completely within the ROW and provides an adequate area to be used as a launch shaft in both directions.

4.3.6 SA4 – QUEEN ST N & BRITANNIA RD W

This staging area is located at the intersection of Queen Street North and Britannia Road West. A shaft is required at this location to facilitate the connection of the proposed sewer along Britannia Road West that connects to the CVTS. SA4.1 is located at the northeast corner of the intersection and will impact the business on the corner along with the westbound right turn lane on Britannia Road West and the northbound lane on Queen Street North. SA4.2 is located in the middle of Queen Street North where traffic will be reduced to one lane on both sides of the working compound. SA4.3 is located on the southeast corner of the intersection and will impact the business on the corner along with the northbound right turn lane on Queen Street South and the eastbound lane on Britannia Road West. Furthermore, this area and the southwest corner of the intersection are planned for future landscaping upgrades as part of the Streetsville Garden Package development. SA4.4 is located in the middle of Queen Street South where traffic will be reduced to one lane on both sides of the working compound. SA4.5 is located in the middle of Britannia Road West and requires the shunting of traffic to the east at the intersection along Queen Street. SA4.1 is the preferred option due to its minimal traffic impact and the property easement in consideration being more practical for staging area use than SA4.3.

4.3.7 SA5 – BRITANNIA RD W & MILLCREEK DR

This staging area is located at the intersection of Britannia Road West and Millcreek Drive. A shaft is needed in this location due to MTBM drive length limitations. SA5.1 is located on the boulevard at the northeast corner of the intersection and will occupy the westbound right turn lane on Britannia Road West. SA5.2 is located on the boulevard at the northwest corner of the intersection and will obstruct one westbound lane on Britannia Road West. SA5.1 is the preferred option, but SA5.2 is also acceptable depending on easement negotiations.

4.3.8 SA6 – BRITANNIA RD W & HOGAN DR

This staging area is located at the intersection of Britannia Road West and Hogan Drive. A shaft is needed in this location to facilitate a change in direction of the proposed sewer. SA6.1 extends beyond the boulevard at the northeast corner of the intersection and will occupy the westbound right turn lane on Britannia Road West. SA6.2 is located on the boulevard at the northwest corner of the intersection and will occupy the adjacent westbound lane on Britannia Road West. SA6.2 is preferred as the compound is located further from the occupied area of the adjacent business compared to SA6.1.

4.3.9 SA9 – ERIN MILLS PKWY & BRITANNIA RD W

This staging area is located on the median of Erin Mills Parkway north of the intersection with Britannia Rd W. A shaft in this location facilitates the connection of the proposed sewer to the WTS. It will occupy the adjacent northbound and southbound lanes.

4.3.10 SA10 – MISSISSAUGA RD & REID DR

This staging area is located in the open space parcel south of Reid Drive and the CP Rail tracks east of Mississauga Road. This area will act as the main compound for the construction of the project, providing sufficient space for storage and a site office. A shaft in this location will also facilitate the diversion of flows from the existing sewer that flows east connecting to the CVTS. Consideration should be given to the future mixed residential/commercial development in this area, with timelines and details of the development to be further investigated. SA10.1 and SA10.2 generally cover the same footprint in this parcel between the CP Rail tracks and Erin Centre Boulevard, but have different permanent easement requirements based on the alignment of the proposed sewer and location of shaft. SA10.1 is the preferred option due to the shaft location which facilitates an alignment along Mississauga Road without any permanent easements crossing the future development access road and can be accommodated without any lane closures.

4.3.11 SA11 – MISSISSAUGA RD & BARBERTOWN RD

This staging area is located at the intersection of Mississauga Road and Barbertown Road. A shaft is needed in this location due to MTBM drive length limitations. SA11.1 is located in the boulevard on the northeast corner of the intersection. It requires the removal of mature trees and occupies the westbound lane on Barbertown Road and the northbound lane on Mississauga Road. Furthermore, development has been approved within the limits of SA11.1 and there is a heritage building in close proximity. SA11.2 is located in the boulevard on the northwest corner of the intersection. It is a smaller working compound, only suitable as a reception shaft and will occupy the southbound lane on Mississauga Road. It also requires a bus stop and overhead power lines to be moved. SA11.2 is the preferred option as SA11.1 is too close to an existing heritage designated building.

4.3.12 SA13 – MISSISSAUGA RD & EGLINTON AVE W

This staging area is located at the intersection of Mississauga Road and Eglinton Avenue West. A shaft is required at this location due to MTBM drive length limitations and to facilitate a change in direction in the proposed sewer. SA13.1 and SA13.3 are located on the northwest corner of the intersection and will occupy the adjacent westbound lane on Eglinton Avenue West. SA13.2 is located on the northeast corner of the intersection and will occupy a westbound lane along with the right turn lane on Eglinton Avenue West and the northbound lane on Mississauga Road. SA13.1 is the preferred option due to its larger area to facilitate launch and reception of a MTBM and the flexibility to expand into the easement if required.

4.3.13 SA15 – EGLINTON AVE & THE CHASE

This staging area is located west of The Chase on the median of Eglington Avenue West. A shaft is needed in this location due to MTBM drive length limitations. This staging area will occupy the adjacent westbound and eastbound lanes as well as the eastbound left hand turn lane adjacent to the median.

4.3.14 SA16 – EGLINGTON AVE W & HOSPITAL ENTRANCE

This staging area is located north of Eglinton Avenue West across from an entrance to the Credit Valley Hospital. A shaft is needed in this location due to MTBM drive length limitations and to facilitate a change in direction of the proposed sewer. SA16.1 is located in the open space parcel north of Eglinton Avenue West and adjacent to the entrance to a developer's presentation centre entrance. It will obstruct the adjacent westbound lane on Eglinton Avenue West. SA16.2 is located at the entrance of the presentation centre and extends west along the entrance driveway. It will also obstruct the adjacent westbound lane on Eglinton Avenue West. SA16.3 is located in the parking lot adjacent to the Credit Valley Hospital helipad. SA16.3 is the preferred option as it has no impacts to the travelled ROW or intersections.

4.3.15 SA17 – ERIN MILLS PKWY

This staging area will make use of the existing compound used for construction of the WTS, located to the east of Erin Mills Parkway across from Erin Mills Town Centre. A shaft in this location facilitates the final discharge connection of the proposed sewer to the WTS while also diverting flows out of an existing 1200mm diameter sewer. This alignment only requires property takings from the City of Mississauga.

A summary of the potential shaft locations and associated property requirements for EA Alternative 3 is provided in Table 3. Preferred options for each staging area are highlighted. The areas provided for each working compound are an approximation.

Table 3 – EA Alternative 3 Property Requirements

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Total Area incl. Existing Easements and ROW (m^2)	Notes
SA0	1	S of Britannia Rd W & Ellesboro Dr	43.589974, -79.720091	132040301	3,500	Owned by Region of Peel
SA1	1	Timothy Street Memorial Park	43.591677, -79.716570	131990775	17,000	Within CVCA Regulated Area
SA2	1	E of Mississauga Rd	43.596060, -79.732496	132060150, 132060151	4,300	
	2	Mississauga Rd	43.594527, -79.731116	-	2,400	Reduce traffic to one lane on either side or shunting of all traffic to the east
	3	W of Mississauga Rd	6500 Mississauga Rd	131290022, 131290023	3,800	Southbound lane on Mississauga Rd. Temporary extension into adjacent lane.
SA3	1	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	1,800	Partially in CVCA Regulated Area
	2	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	1,700	Southbound lane on Mississauga Rd Within CVCA Regulated Area
	3	SW of Alpha Mills Rd	6190 Mississauga Rd	131290018	3,500	Southbound lane on Mississauga Rd Partially in CVCA Regulated Area
	4	Mississauga Rd	6190 Mississauga Rd	131290018	1,300	Southbound lane on Mississauga Rd Within CVCA Regulated Area
SA4	1	NE corner at Britannia Rd W	3 Queen St N	132050208	1,400	Westbound right turn lane on Britannia Rd W and northbound lane on Queen St N
	2	Queen St N	43.588473, -79.722930	-	780	Reduce traffic to one lane on either side
	3	SE corner at Britannia Rd W	3A Queen St S	PLAN 43R-21013	750	Northbound right turn lane on Queen St S and eastbound lane on Britannia Rd W
	5	Britannia Rd W	43.588021, -79.722656	-	600	Reduce traffic to one lane on either side. Requires the shunting of traffic east at the intersection along Queen St
SA5	1	NE corner at Britannia Rd W & Millcreek Dr	43.585345, -79.726539	REG PLAN 43M-1780 (BLOCK 2)	2,000	Westbound right turn lane on Britannia Rd W
	2	NW corner at Britannia Rd W & Millcreek Dr	43.584647, -79.726862	REG PLAN 43M-1780 (BLOCK 3)	2,500	Westbound lane on Britannia Rd W
SA6	1	NE corner at Britannia Rd W	2475 Hogan Dr	131290144	1,500	Westbound right turn lane on Britannia Rd W
	2	NW corner at Britannia Rd W	2450 Hogan Dr	REG PLAN 43M-1780 (BLOCK 1)	1,500	Westbound lane on Britannia Rd W
SA9	1	N of Erin Mills Pkwy & Britannia Rd W	43.578872, -79.733786	-	1,500	Northbound and southbound lane on Erin Mills Pkwy

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Total Area incl. Existing Easements and ROW (m^2)	Notes
SA10	1	SE of Mississauga Rd & Reid Dr	43.574350, -79.703328	131960713	12,000	
	2	E of Mississauga Rd & Erin Centre Blvd	43.573654, -79.702536	131960713	12,500	Northbound lane on Mississauga Rd
SA11	1	NE corner at Mississauga Rd & Barbertown Rd	43.571326, -79.699429	131960745, 131960746	1,450	Removal of mature trees Westbound lane on Barbertown Rd and northbound lane on Mississauga Rd
	2	NW corner at Mississauga Rd & Barbertown Rd	43.571119, -79.699611	-	825	Southbound lane on Mississauga Rd
SA13	1	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	135010042	1,750	Westbound lane on Eglinton Ave W
	2	NE corner of Mississauga Rd & Eglinton Ave W	43.568796, -79.696045	-	1,100	Westbound lane and right turn lane on Eglinton Ave W and northbound lane on Mississauga Rd
	3	NW corner of Mississauga Rd & Eglinton Ave W	43.568573, -79.696280	-	1,200	Westbound lane on Eglinton Ave W
SA15	1	Eglinton Ave W	43.564705, -79.700311	-	720	Eastbound lane and westbound lane on Eglinton Ave W
SA16	1	Eglinton Ave W	43.561026, -79.704844	131200010	2,900	Westbound lane on Eglinton Ave W
	2	Eglinton Ave W	2475 Eglinton Ave W	131200086, 131200012	1,850	Westbound lane on Eglinton Ave W
	3	Eglinton Ave W	43.561307, -79.703441	133840016	2,100	Adjacent to Credit Valley Hospital helipad
SA17	1	E of Erin Mills Parkway	43.560621, -79.708441	131200014, 131200090	6,000	Use existing WTS compound

4.4 EA ALTERNATIVE 4 – ERIN CENTRE BOULEVARD

The alignment of proposed EA Alternative 4 and associated shafts/staging area locations are illustrated in Figure 6. This alternative features the predominant use of an EPB TBM for the 2400mm diameter sanitary sewer sections along with a portion completed by MTBM drives for the 1200mm diameter sanitary sewer lengths. To accommodate either trenchless reception or launch shafts, multiple compound locations and sizes have been reviewed where applicable for certain staging areas (e.g., SA2.1, SA4.5, etc.) to optimize usage of space. Preliminary draft Property Impact Plans which identify total staging area and any anticipated easement requirements for sections of working compounds outside of Regional Right-of-Way (ROW) can be found in Appendix A.

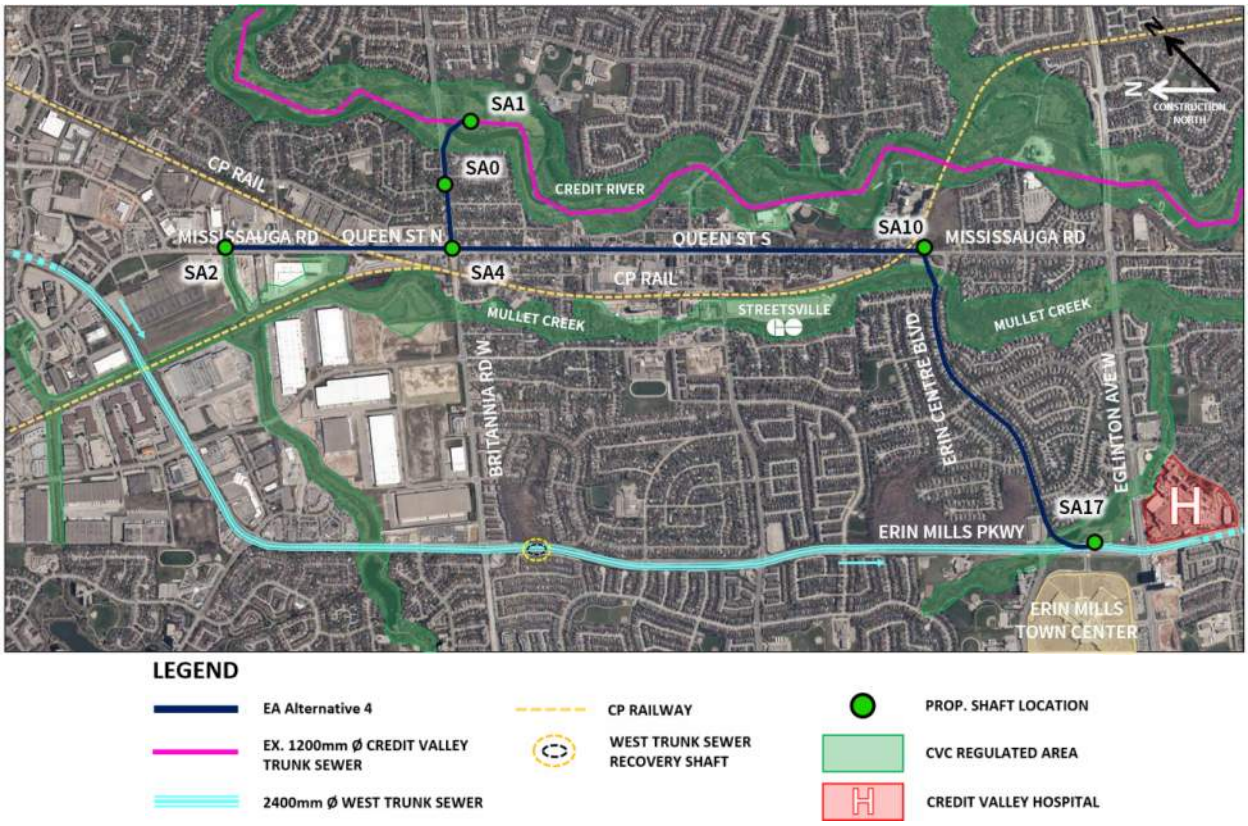


Figure 6 – EA Alternative 4 Shaft Locations

As noted in the Project File Report for the WTD Environmental Assessment Study, EA Alternative 4 is the preliminary preferred alignment which results in less socio-economic, natural, technical, and cost impacts. The easement requirements for this option were further divided into anticipated permanent and temporary easements based on preliminary shaft locations and tunnel alignments.

The shaft locations and tunnel alignments shown for the preferred alignment in Appendix A are for reference purposes only and subject to change during detailed design.

A brief description of the location and local property impact of each staging area for this alignment is provided below.

4.4.1 SA0 – BRITANNIA RD W & ELLESBORO DR

This staging area is located in the open space south of the Britannia Road West and Ellesboro Drive intersection. One launch shaft is required for the WTD connection to the CVTS. The WTD shaft is needed due to microtunnel drive length restrictions between the CVTS and SA4 located at the intersection of Britannia Road West and Queen Street North. SA0 occupies portions of land owned by the Region of Peel that have been confirmed to be available for construction. No property acquisition is required to accommodate SA0 as proposed.

4.4.2 SA1 – TIMOTHY STREET MEMORIAL PARK

This staging area is located within a field in the Timothy Street Memorial Park immediately south of Britannia Road West and adjacent to the east bank of the Credit River. The staging area has been tailored to suit preliminary maintenance hole locations required to capture flows from a local sanitary sewer connection flowing west through the park to the CVTS and divert flows out of the CVTS.

Multiple shafts and maintenance holes are required within SA1 to facilitate the Credit River crossing reception shaft and the CVTS WTD connections. The exact location of the working compound will depend on the location of the CVTS. This staging area lies within the CVCA regulated area. A portion of the staging area is within existing easements for the CVTS and an associated sewer connection. A permanent easement is proposed to provide future access to the chambers via the existing trail path. An easement is also required for the microtunnel crossing under the Credit River.

4.4.3 SA2 – MISSISSAUGA RD & ALPHA MILLS RD

This staging area is located on Mississauga Road north of Alpha Mills Road. A shaft in this location is needed to divert flows from two existing sanitary sewers which connect to MH1800256 as per the RFP 2018-482P layout. SA2.1 is located within the open space parcel east of Mississauga Road. SA2.2 is located on the road where traffic can either be reduced to one lane on either side to accommodate a shaft in the middle of the road or shunted to the east to facilitate a shaft on the west side of the road. SA2.3 is located to the west of Mississauga Road along a truck trailer storage yard and will impact the adjacent southbound lane on Mississauga Road with a temporary extension into the next lane to facilitate connection to the existing sanitary sewer. SA2.3 is the preferred option allowing for the shaft to be in close proximity to the existing maintenance hole and connecting sewers without overly impacting travelled ROW. This working compound requires minor property acquisition and will likely require temporary access to be provided to facilitate land owner access to the truck trailer storage.

4.4.4 SA4 – QUEEN ST N & BRITANNIA RD W

This staging area is located at the intersection of Queen Street North and Britannia Road West. A shaft is required at this location to facilitate the connection of the proposed sewer along Britannia Road West that connects to the CVTS. SA4.1 is located at the northeast corner of the intersection and will impact the business on the corner along with the westbound right turn lane on Britannia Road West and the northbound lane on Queen Street North. SA4.2 is located in the middle of Queen Street North where traffic will be reduced to one lane on both sides of the working compound. SA4.3 is located on the southeast corner of the intersection and will impact the business on the corner along with the northbound right turn lane on Queen Street South and the eastbound lane on Britannia Road West. Furthermore, this area and the southwest corner of the intersection are planned for future landscaping upgrades as part of the Streetsville Garden Package development. SA4.4 is located in the middle of Queen Street South where traffic will be reduced to one lane on both sides of the working compound. SA4.5 is located in the middle of Britannia Road West and requires the shunting of traffic to the east at the intersection along Queen Street. SA4.1 is the preferred option due to its minimal traffic impact and the property easement in consideration being more practical for staging area use than SA4.3.

4.4.5 SA10 – MISSISSAUGA RD & REID DR

This staging area is located in the open space parcel south of Reid Drive and the CP Rail tracks east of Mississauga Road. This area will act as the main compound for the construction of the project, providing sufficient space for storage and a site office. A shaft in this location will also facilitate the diversion of flows from the existing sewer that flows east connecting to the CVTS. Consideration should be given to the future mixed residential/commercial development in this area, with timelines and details of the development to be further investigated. SA10.1 and SA10.2 generally cover the same footprint in this parcel between the CP Rail tracks and Erin Centre Boulevard, but have different permanent easement requirements based on the alignment of the proposed sewer and location of shaft. SA10.2 is the preferred option due to the shaft location which facilitates an alignment that bends west along Erin Centre Boulevard within the ROW. This option will occupy the northbound lane on Mississauga Rd due to future development constraints with the shaft location.

4.4.6 SA13 – MISSISSAUGA RD & EGLINTON AVE W

This staging area is located at the intersection of Mississauga Road and Eglinton Avenue West. A shaft is required at this location due to facilitate a change in direction in the proposed sewer. SA13.1 and SA13.3 are located on the northwest corner of the intersection and will occupy the adjacent westbound lane on Eglinton Avenue West. SA13.2 is located on the northeast corner of the intersection and will occupy a westbound lane along with the right turn lane on Eglinton Avenue West and the northbound lane on Mississauga Road. SA13.3 is the preferred option as it is intended as the location for a turning shaft for tunneling, allowing for a small footprint and reduced traffic impact.

4.4.7 SA17 – ERIN MILLS PKWY

This staging area will make use of the existing compound used for construction of the WTS, located to the east of Erin Mills Parkway across from Erin Mills Town Centre. A shaft in this location facilitates the final discharge connection of the proposed sewer to the WTS while also diverting flows out of an existing 1200mm diameter sewer. This alignment only requires property takings from the City of Mississauga.

4.4.8 PE1 – ERIN CENTRE BLVD & ERIN MILLS PKWY

A permanent easement is required at the southeast corner of Erin Centre Boulevard and Erin Mills Parkway to accommodate the tunnel curve.

A summary of the potential shaft locations and associated property requirements for EA Alternative 4 is provided in Table 4. Preferred options for each staging area are highlighted. The areas provided for each working compound are an approximation.

Table 4 – EA Alternative 4 Property Requirements

Staging Area	Option	Location	Address/ Approximate Coordinates	PIN	Temp. Easement Area (m^2)	Perm. Easement Area (m^2)	Total Area incl. Existing Easements and ROW (m^2)	Additional Easement for Tunnel (m^2)	Notes
SA0	1	S of Britannia Rd W & Ellesboro Dr	43.589974, -79.720091	132040301	-	-	3,500	1,700	Owned by Region of Peel
SA1	1	Timothy Street Memorial Park	43.591677, -79.716570	131990775	5,200	5,200	17,000	1,300	Within CVCA Regulated Area
SA2	1	E of Mississauga Rd	43.596060, -79.732496	132060150, 132060151	-	-	4,300	-	
	2	Mississauga Rd	43.594527, -79.731116	-	-	-	2,400	-	Reduce traffic to one lane on either side or shunting of all traffic to the east
	3	W of Mississauga Rd	6500 Mississauga Rd	131290022, 131290023	1,250	850	3,800	-	Southbound lane on Mississauga Rd. Temporary extension into adjacent lane.
SA4	1	NE corner at Britannia Rd W	3 Queen St N	132050208	400	300	1,400	200	Westbound right turn lane on Britannia Rd W and northbound lane on Queen St N
	2	Queen St N	43.588473, -79.722930	-	-	-	780	-	Reduce traffic to one lane on either side
	3	SE corner at Britannia Rd W	3A Queen St S	PLAN 43R-21013	-	-	750	-	Northbound right turn lane on Queen St S and eastbound lane on Britannia Rd W
	4	Queen St S	43.587905, -79.722160	-	-	-	480	-	Reduce traffic to one lane on either side
	5	Britannia St W	43.588021, -79.722656	-	-	-	600	-	Reduce traffic to one lane on either side. Requires the shunting of traffic east at the intersection along Queen St
SA10	1	SE of Mississauga Rd & Reid Dr	43.574350, -79.703328	131960713	9,100	1,700	12,000	-	
	2	E of Mississauga Rd & Erin Centre Blvd	43.573654, -79.702536	131960713	9,600	1,200	12,500	-	Northbound lane on Mississauga Rd
SA17	1	E of Erin Mills Pkwy	43.560621, -79.708441	131200014, 131200090	-	-	6,000	3,250	Use existing WTS compound
PE1	1	SE corner of Erin Centre Blvd & Erin Mills Pkwy	5128 Elderview Ct	131200038	-	-	-	500	Permanent easement for tunnel alignment.

5. RECOMMENDATIONS

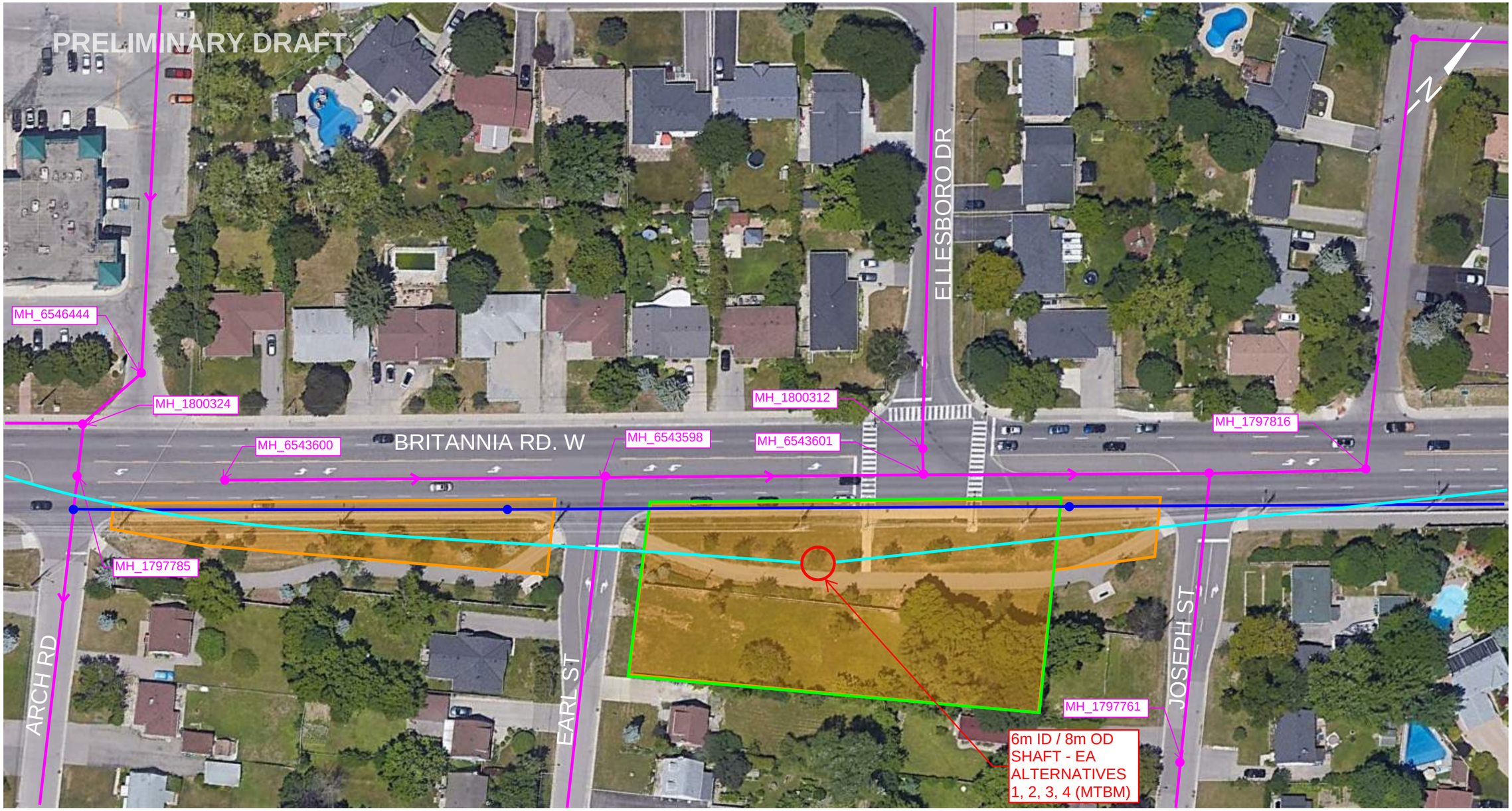
A summary of the property impacts and requirements for each EA alignment alternative is summarized in Table 5. The proposed staging areas for each alternative are divided into areas that do not require an easement and those that may require a temporary or permanent easement.

Table 5 – Summary of Staging Areas for Each Alternative

Staging Area Details	EA Alternative			
	1 - Streetsville	2 - Britannia Woodlot	3 - Britannia Straight	4 – Erin Centre Boulevard
Shafts within Municipal ROW	1	3	3	0
No Easement Required	2	2	2	2
Potential Easement Required	4	10	9	4
Total Staging Areas	7	15	14	6
Total Footprint of Preferred Staging Areas (m^2)	44,900	57,295	55,795	44,200

Based on property requirements EA Alternative 4 is the preferred alignment as it requires the least number of staging areas due to the predominant use of an EPB TBM and therefore presents the least impacts to property within the project area.

APPENDIX A – PROPERTY IMPACT PLANS



LEGEND

- EX. EASEMENT (APPROX. 5,200m²)
- TOTAL STAGING AREA (APPROX. 3,500m²)
- EX. SANITARY SEWER
- PROP. WEST TRUNK DIVERSION SEWER
- PROP. FALCONER DIVERSION SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

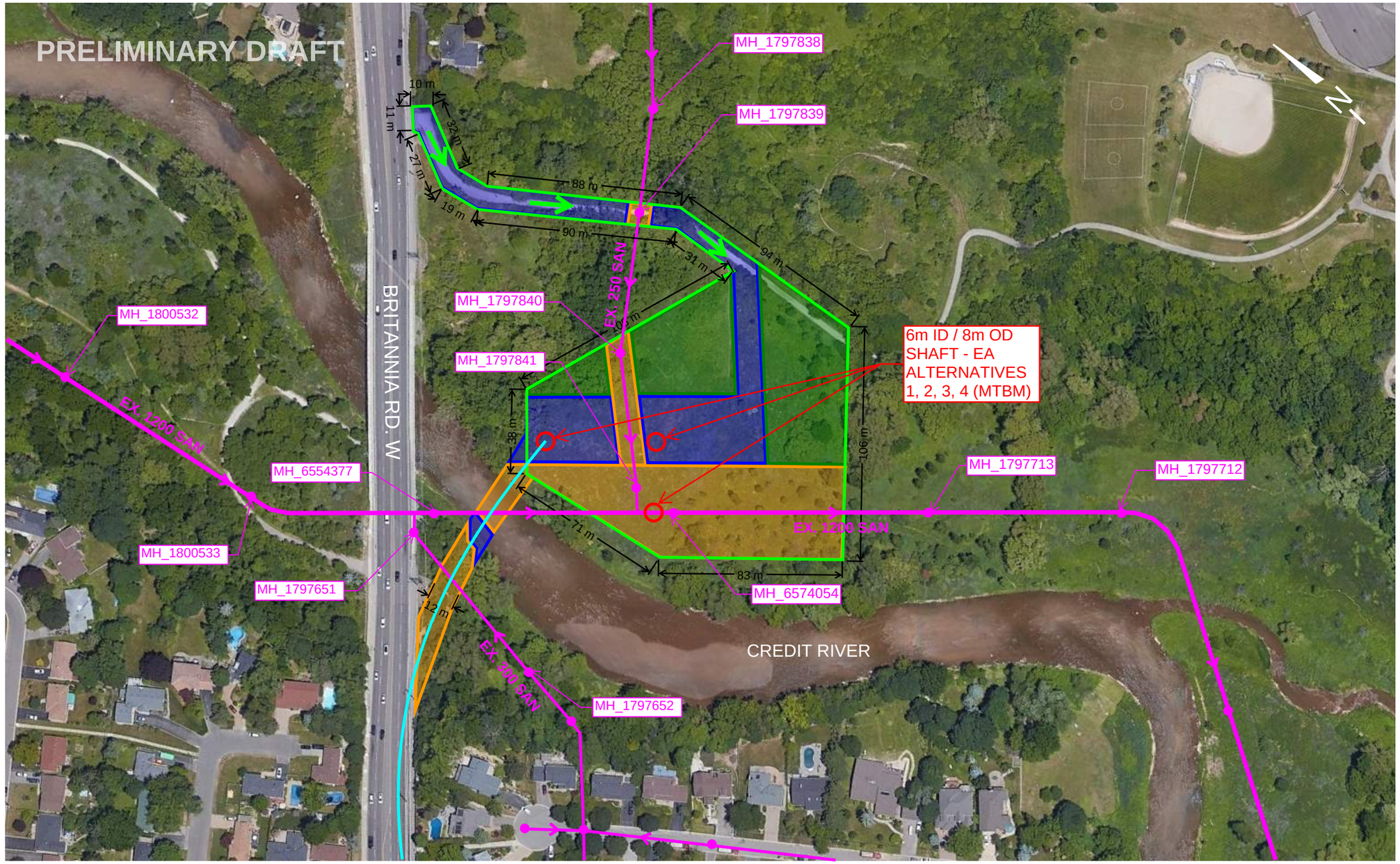
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W

Checked by G.H.	Drawn by D.K.	Project No.	08-2250
Date FEB 2020	Sheet 1 of 34	Plan No.	SA0



LEGEND

- EX. EASEMENT (APPROX. 7,500m²)
- PERMANENT EASEMENT (APPROX. 5,500m²)
- TEMPORARY EASEMENT (APPROX. 5,200m²)
- TOTAL STAGING AREA (APPROX. 17,000m²)
- STAGING AREA ACCESS PATH
- PROP. WEST TRUNK DIVERSION SEWER
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

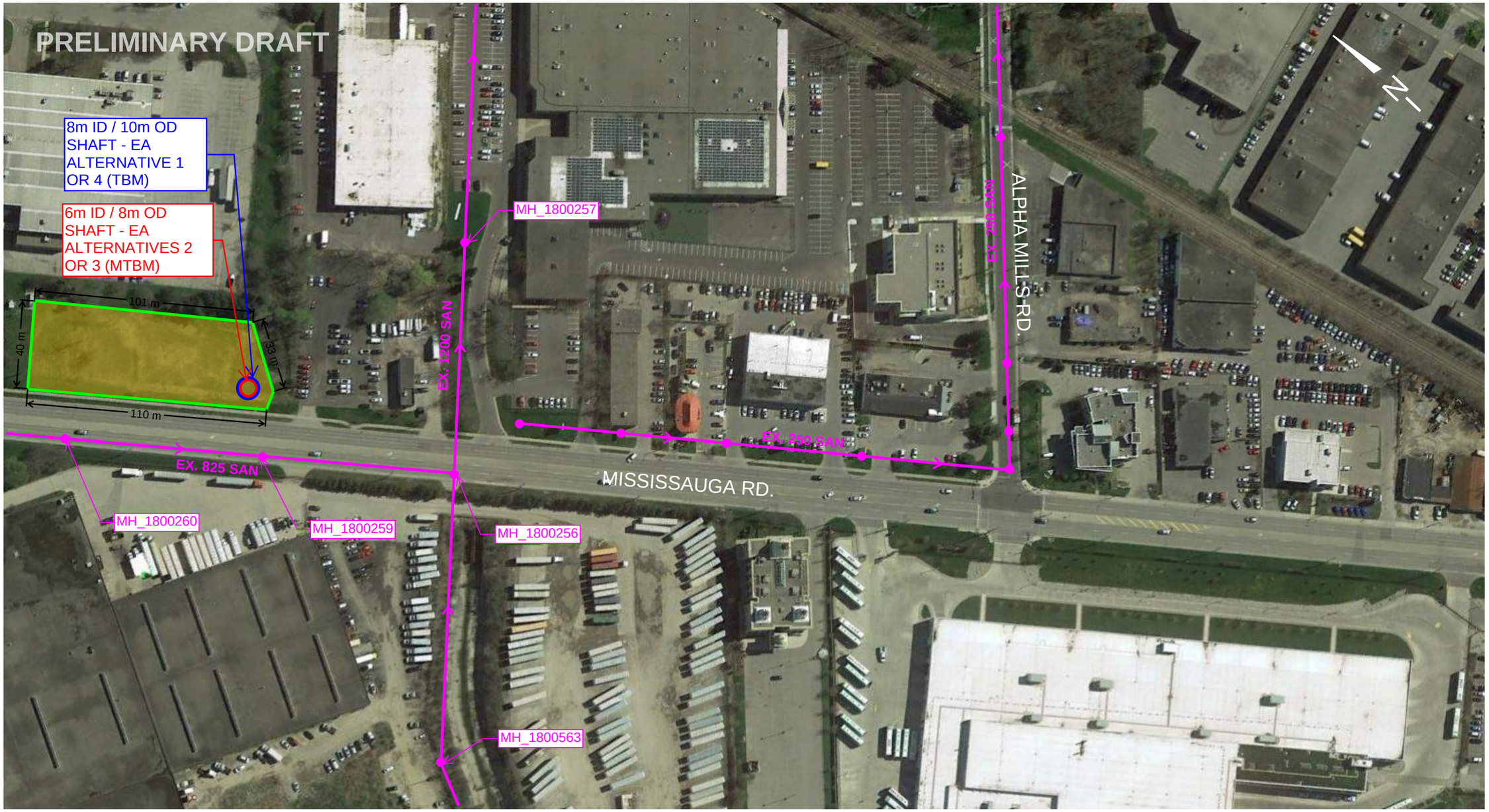
PROPERTY IMPACT PLAN

BRITANNIA RD W

Checked by	G.H.	Drawn by	D.K.
Date	FEB 2020	Sheet	2 of 34

Project No. 08-2250

Plan No. **SA1**



LEGEND

- TOTAL EASEMENT (APPROX. 4,300m²)
- TOTAL STAGING AREA (APPROX. 4,300m²)
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

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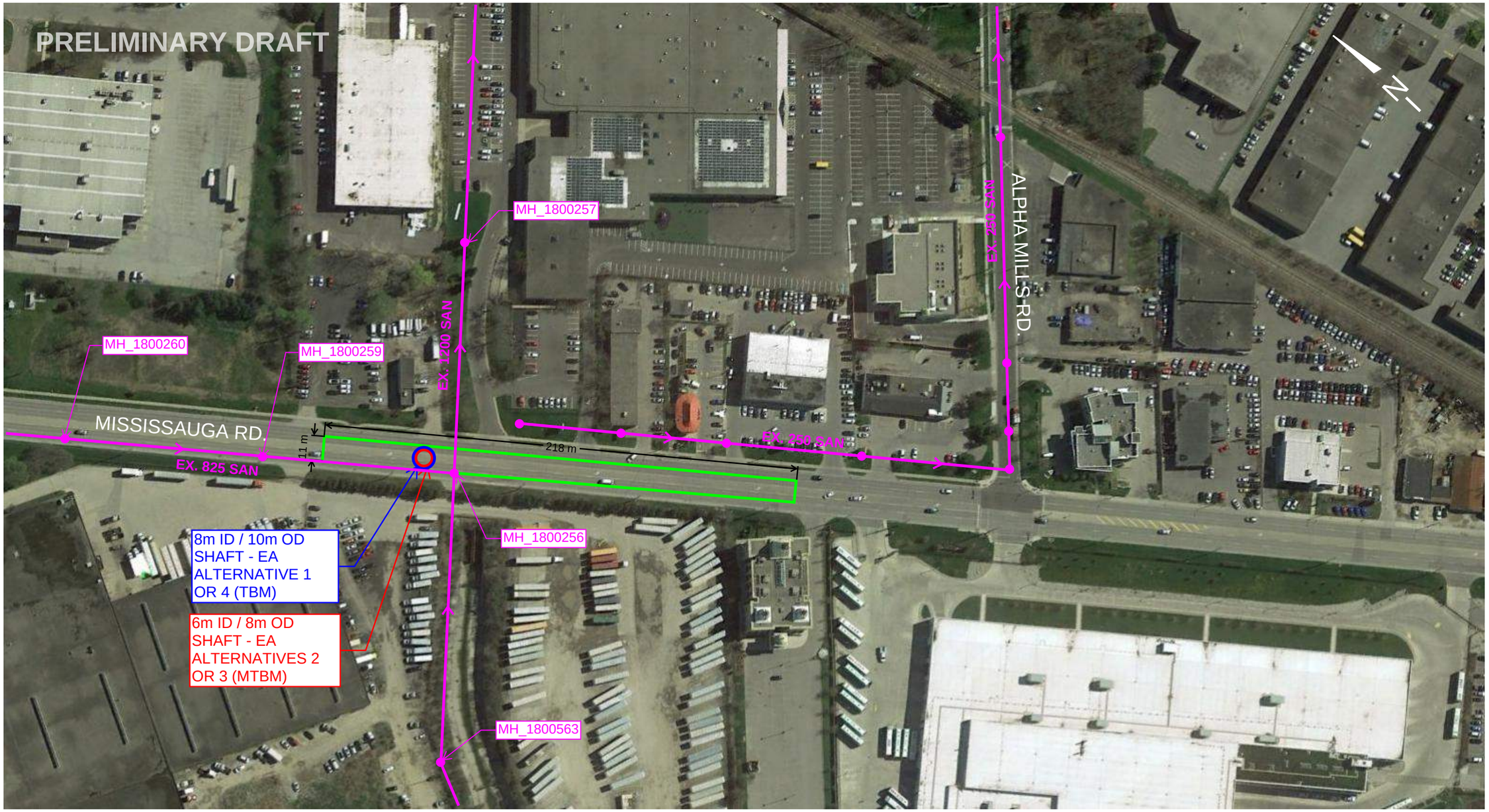
PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 3 of 34	Plan No.	SA2.1



LEGEND

TOTAL STAGING AREA (APPROX. 2,400m²)

EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

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PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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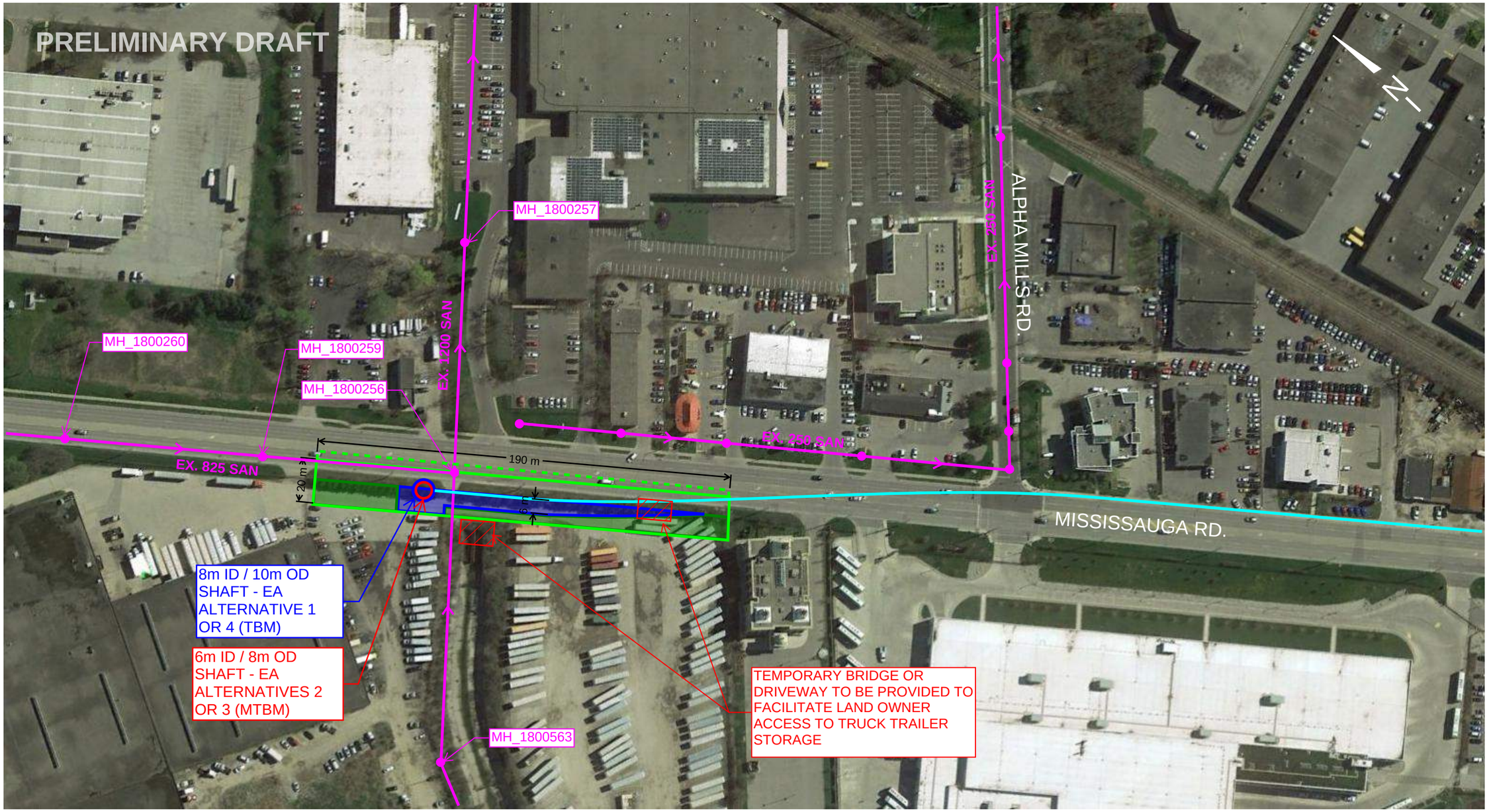

LEGEND

- PERMANENT EASEMENT (APPROX. 850m²)
- TEMPORARY EASEMENT (APPROX. 1,250m²)
- TOTAL STAGING AREA (APPROX. 3,800m²)
- TEMPORARY EXTENSION OF WORKING AREA
- PROP. WEST TRUNK DIVERSION SEWER
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by	G.H.	Drawn by	N.W.
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Plan No.	SA2.3		

LEGEND

TOTAL EASEMENT (APPROX. 1,250m²)

TOTAL STAGING AREA (APPROX. 1,800m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 6 of 34	Plan No.	SA3.1

LEGEND

TOTAL EASEMENT (APPROX. 800m²)

TOTAL STAGING AREA (APPROX. 1,700m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

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Date JULY 2019	Sheet 7 of 34	Plan No.	SA3.2

LEGEND

TOTAL EASEMENT (APPROX. 2,050m²)

TOTAL STAGING AREA (APPROX. 3,500m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

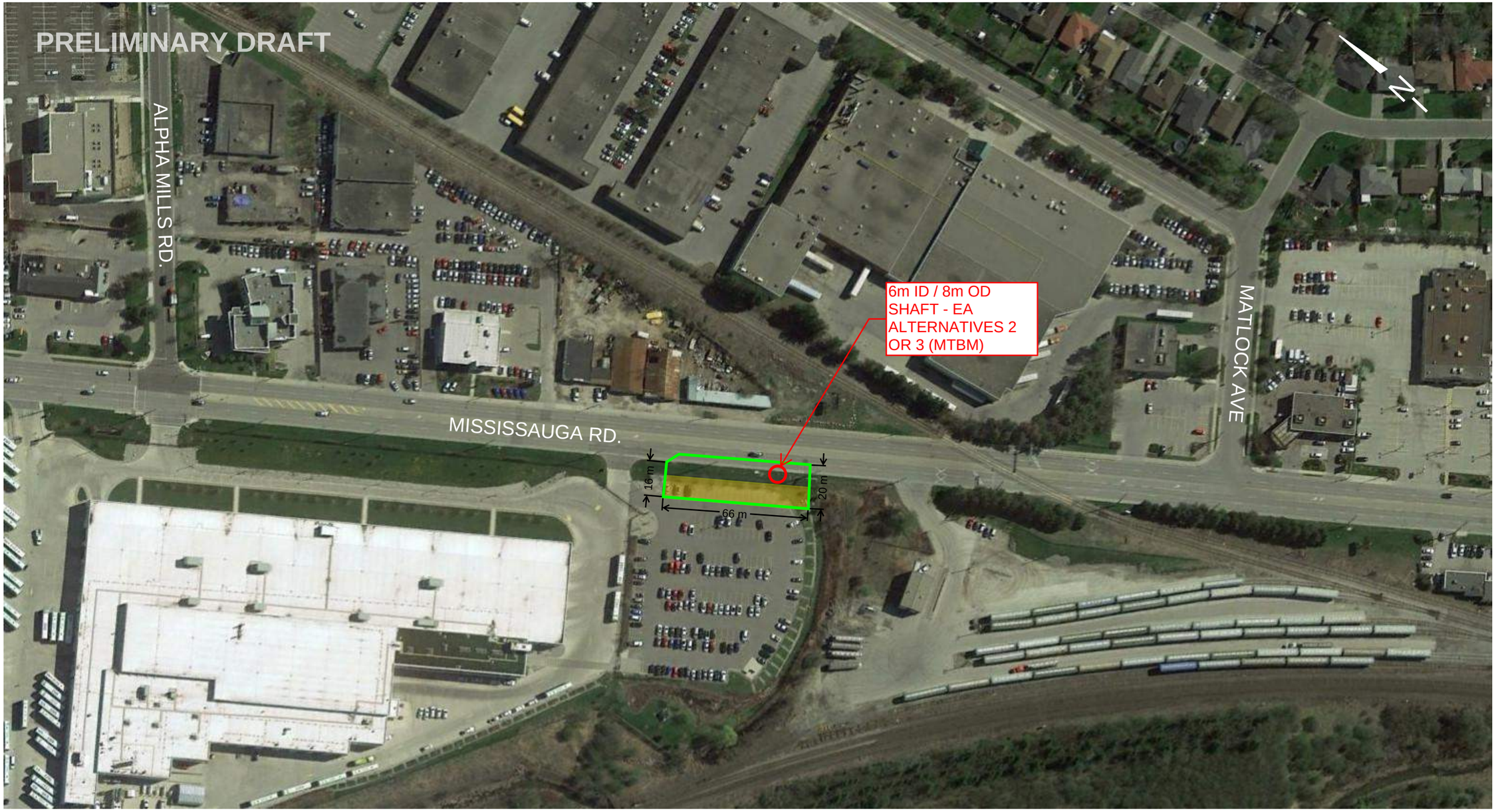
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 8 of 34	Plan No.	SA3.3



LEGEND

TOTAL EASEMENT (APPROX. 650m^2)

TOTAL STAGING AREA (APPROX. 1,300m^2)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ALPHA MILLS RD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 9 of 34	Plan No.	SA3.4

LEGEND

- PERMANENT EASEMENT (APPROX. 500m²)
- TEMPORARY EASEMENT (APPROX. 400m²)
- TOTAL STAGING AREA (APPROX. 1,400m²)
- PROP. WEST TRUNK DIVERSION SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

QUEEN ST N & BRITANNIA RD W

Checked by	G.H.	Drawn by	N.W.
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Plan No. **SA4.1**

LEGEND

TOTAL STAGING AREA (APPROX. 780m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

QUEEN ST N & BRITANNIA RD W

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LEGEND

TOTAL EASEMENT (APPROX. 250m²)

TOTAL STAGING AREA (APPROX. 750m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

QUEEN ST N & BRITANNIA RD W

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Project No. 08-2250

Plan No. **SA4.3**

LEGEND

TOTAL STAGING AREA
(APPROX. 460m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

QUEEN ST N & BRITANNIA RD W

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Plan No. **SA4.4**

LEGEND

TOTAL STAGING AREA (APPROX. 600m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

QUEEN ST N & BRITANNIA RD W

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Project No. 08-2250

Plan No. **SA4.5**

LEGEND

TOTAL EASEMENT (APPROX. 970m²)

TOTAL STAGING AREA (APPROX. 2,000m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & MILLCREEK DR

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LEGEND

TOTAL EASEMENT (APPROX. 970m²)

TOTAL STAGING AREA (APPROX. 2,500m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & MILLCREEK DR

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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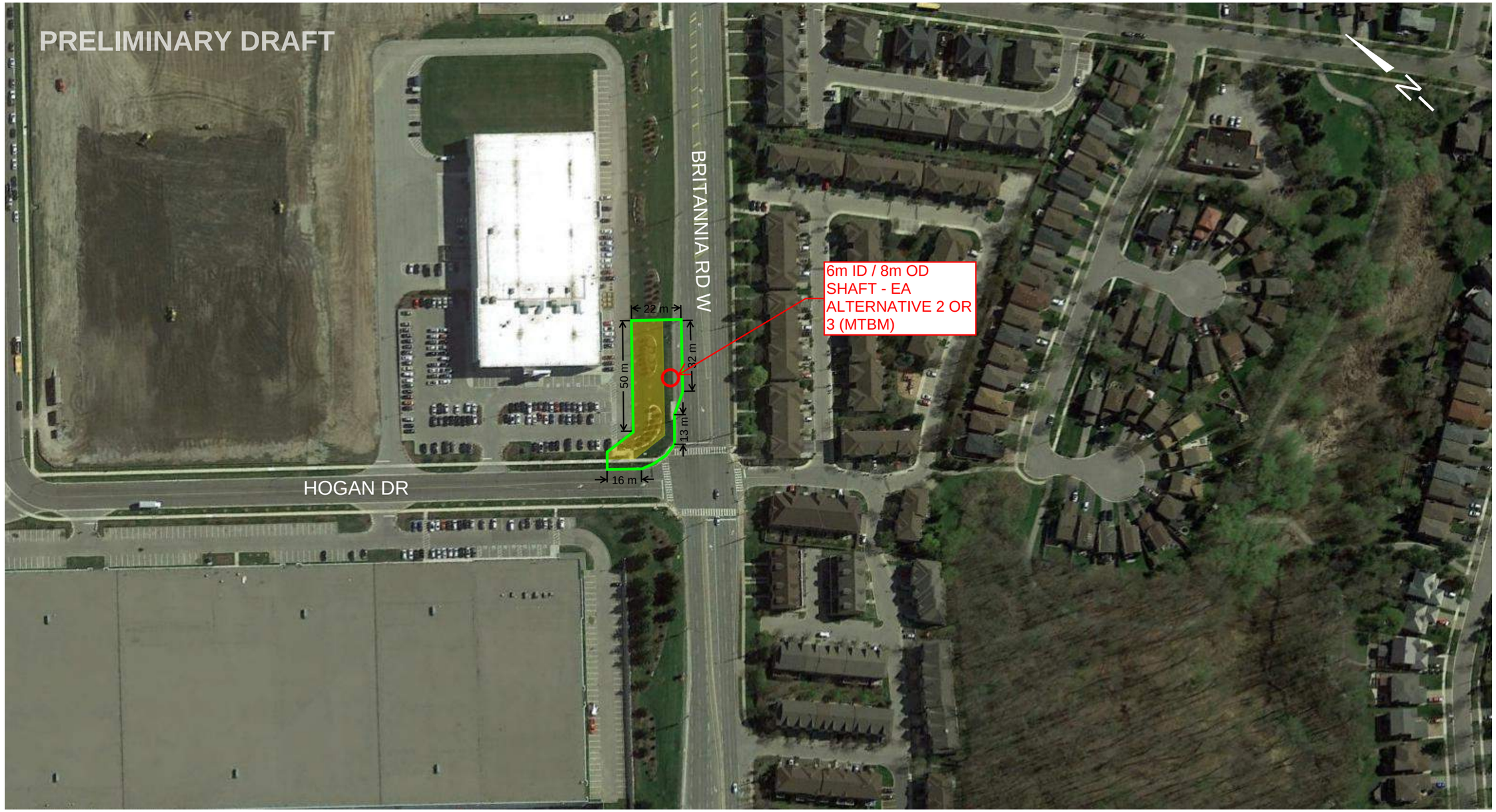

LEGEND

TOTAL EASEMENT (APPROX. 900m²)

TOTAL STAGING AREA (APPROX. 1,500m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & HOGAN DR

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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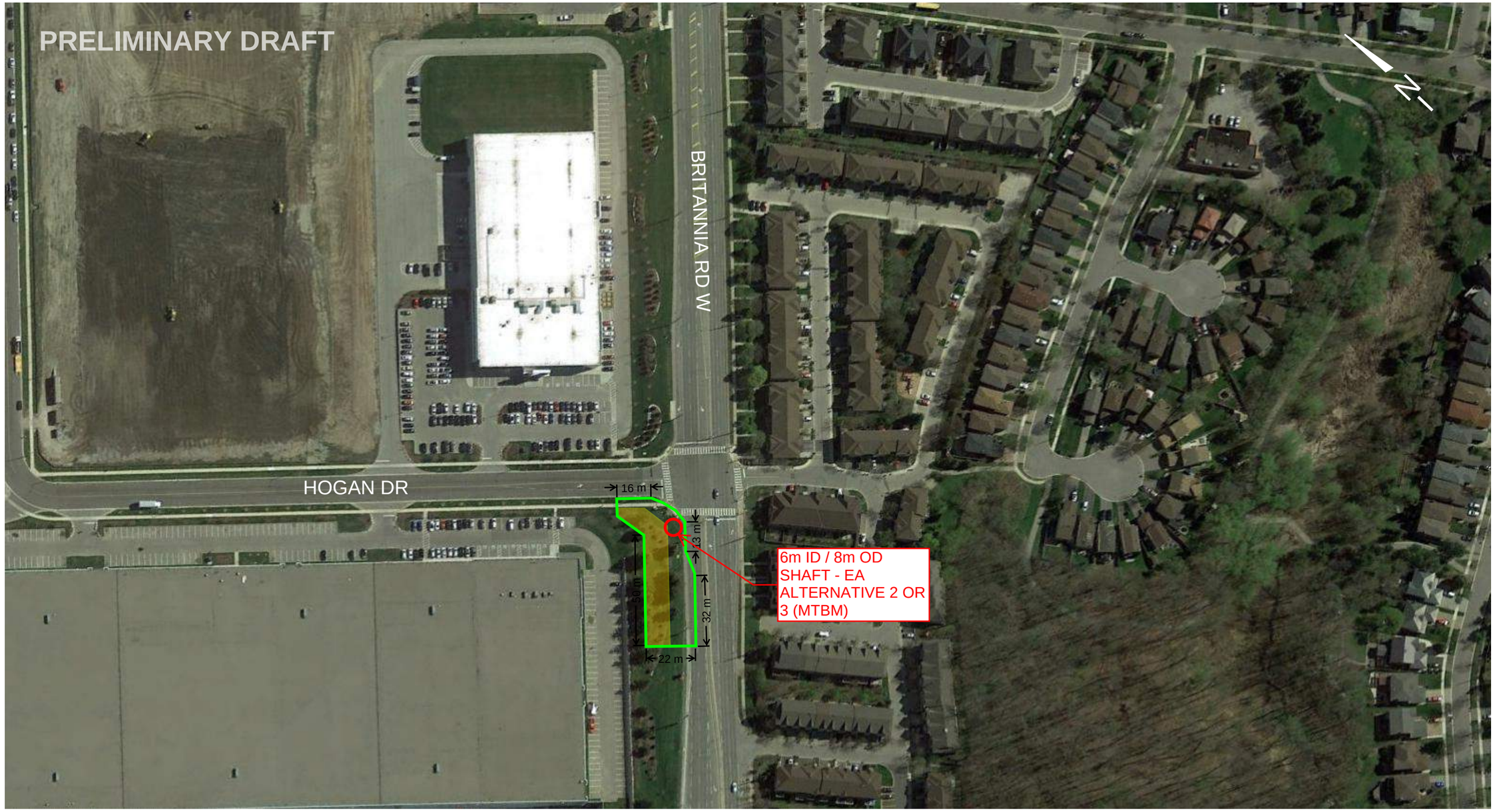

LEGEND

TOTAL EASEMENT (APPROX. 730m²)

TOTAL STAGING AREA (APPROX. 1,500m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & HOGAN DR

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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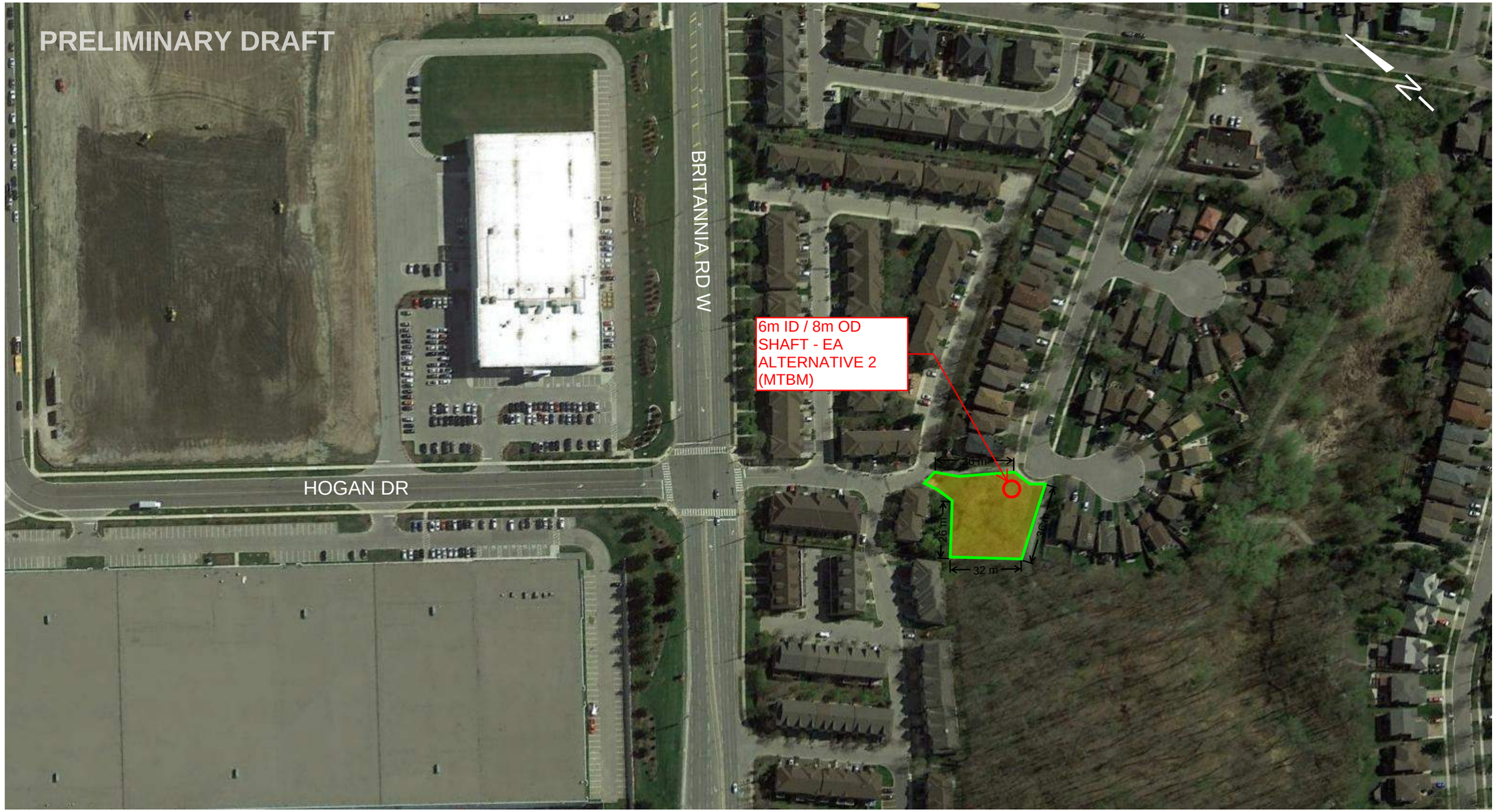

LEGEND

TOTAL EASEMENT (APPROX. 1,500m²)

TOTAL STAGING AREA (APPROX. 1,500m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & HOGAN DR

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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LEGEND

TOTAL STAGING AREA (APPROX. 1,500m²)

EX. WEST TRUNK SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

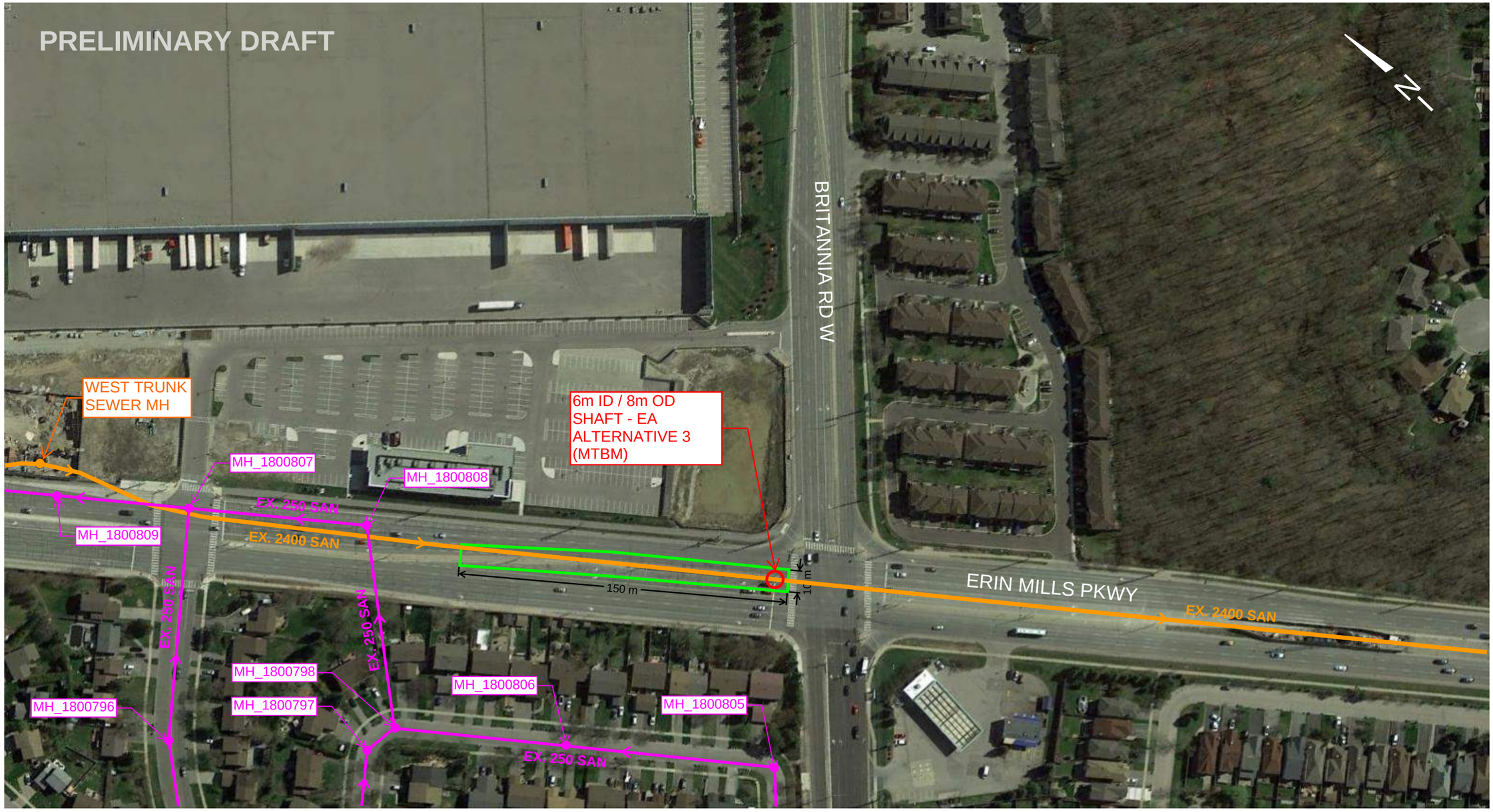
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & ERIN MILLS PKWY

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 20 of 34	Plan No.	SA8



LEGEND

- TOTAL STAGING AREA (APPROX. 1,500m²)
- EX. SANITARY SEWER
- EX. WEST TRUNK SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

BRITANNIA RD W & ERIN MILLS PKWY

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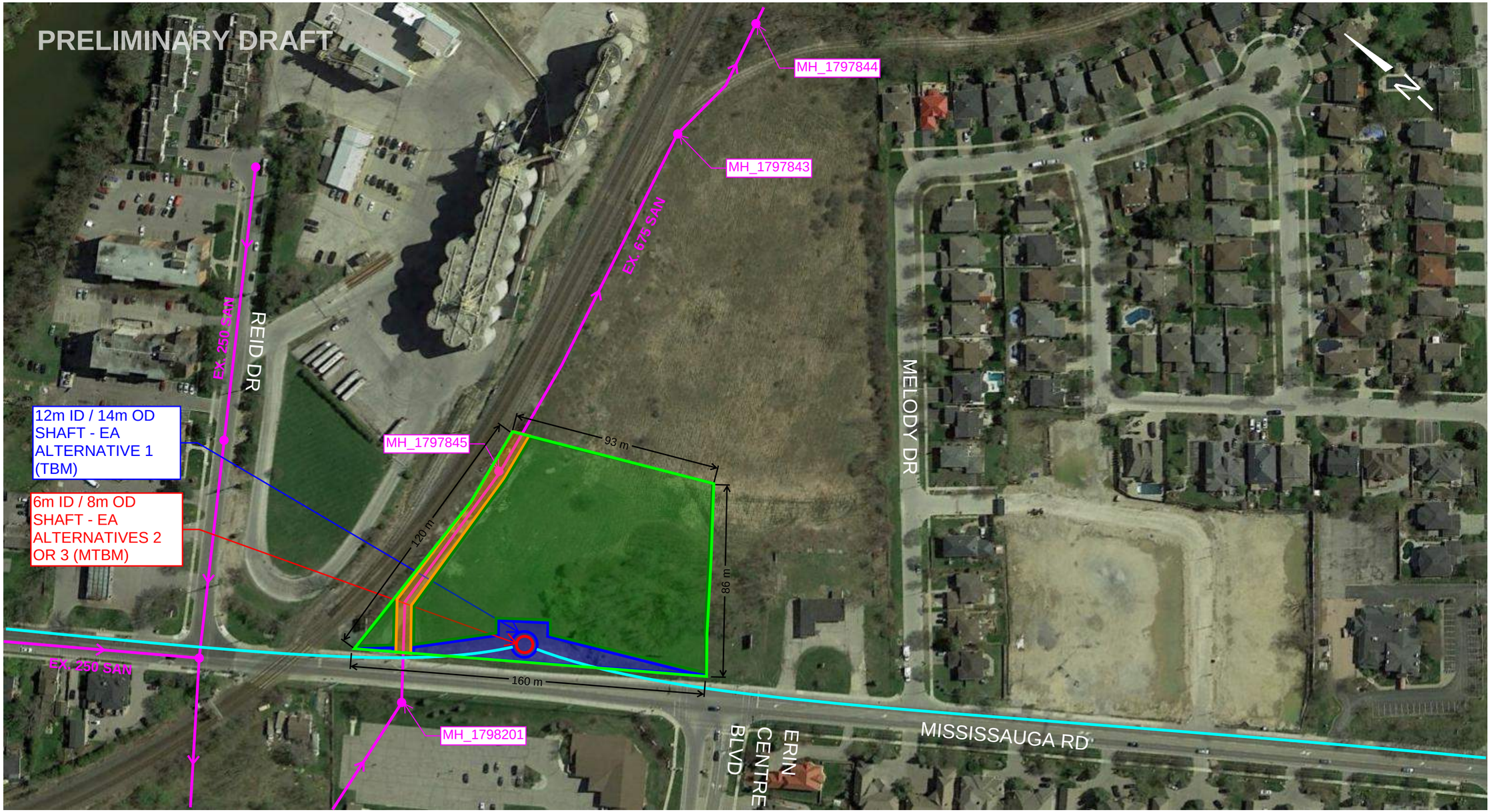
Date	JULY 2019	Sheet	21 of 34
Project No.	08-2250		
Plan No.	SA9		



LEGEND

- EX. EASEMENT (APPROX. 1,200m²)
- PERMANENT EASEMENT (APPROX. 1,700m²)
- TEMPORARY EASEMENT (APPROX. 9,100m²)
- TOTAL STAGING AREA (APPROX. 12,000m²)
- PROP. WEST TRUNK DIVERSION SEWER
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ERIN CENTRE BLVD

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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LEGEND

- EX. EASEMENT (APPROX. 1,200m²)
- PERMANENT EASEMENT (APPROX. 1,200m²)
- TEMPORARY EASEMENT (APPROX. 9,600m²)
- TOTAL STAGING AREA (APPROX. 12,500m²)
- PROP. WEST TRUNK DIVERSION SEWER
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ERIN CENTRE BLVD

Checked by	G.H.	Drawn by	D.K.
Date	JAN 2021	Sheet	23 of 34

Project No. 08-2250

Plan No. **SA10.2**

LEGEND

TOTAL EASEMENT (APPROX. 900m²)

TOTAL STAGING AREA (APPROX. 1,450m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

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WEST TRUNK DIVERSIONS

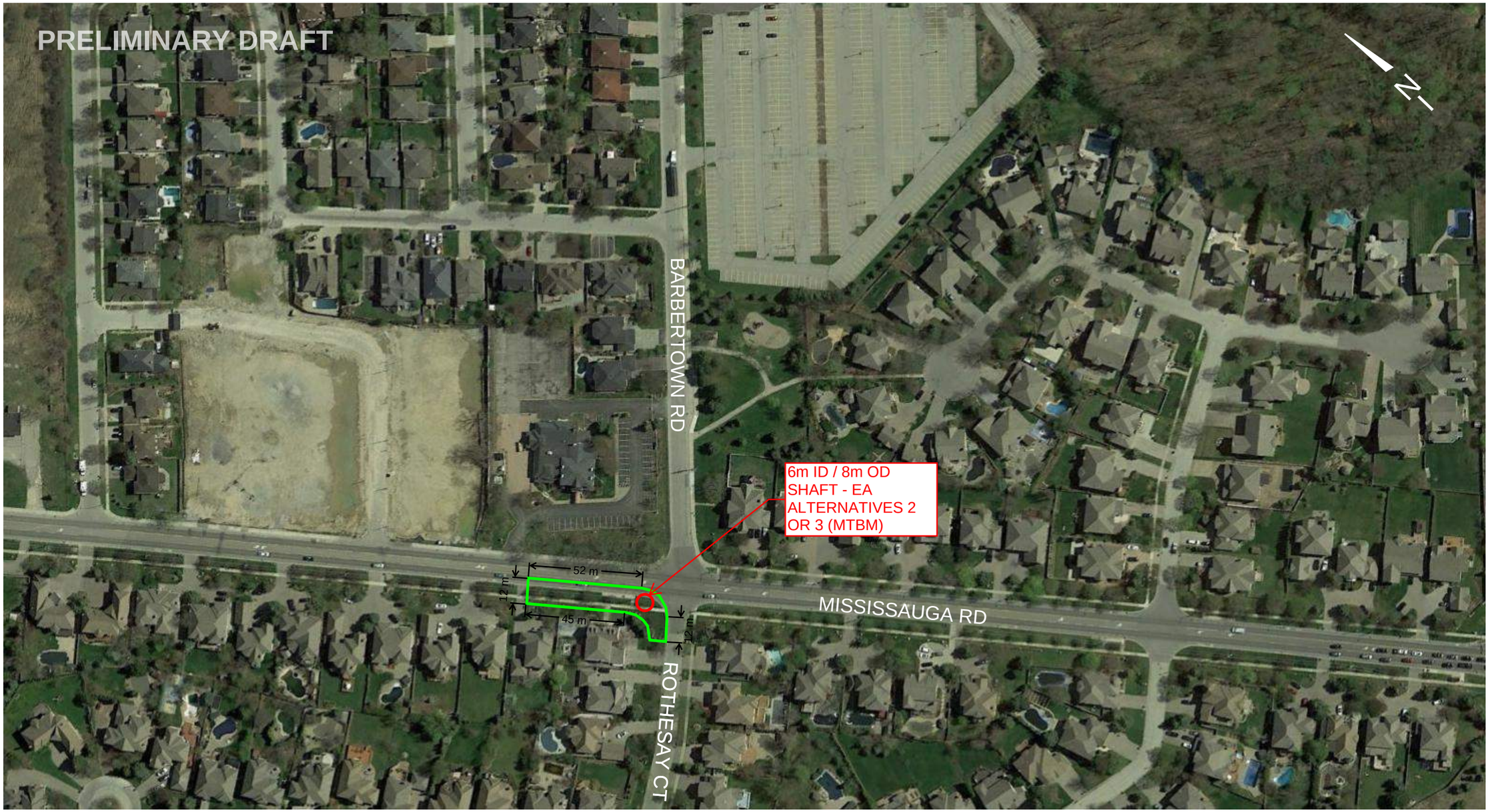
PROPERTY IMPACT PLAN

MISSISSAUGA RD & BARBERTOWN RD

Checked by	G.H.	Drawn by	N.W.
Date	JULY 2019	Sheet	24 of 34

Project No. 08-2250

Plan No. **SA11.1**



LEGEND

TOTAL STAGING AREA (APPROX. 825m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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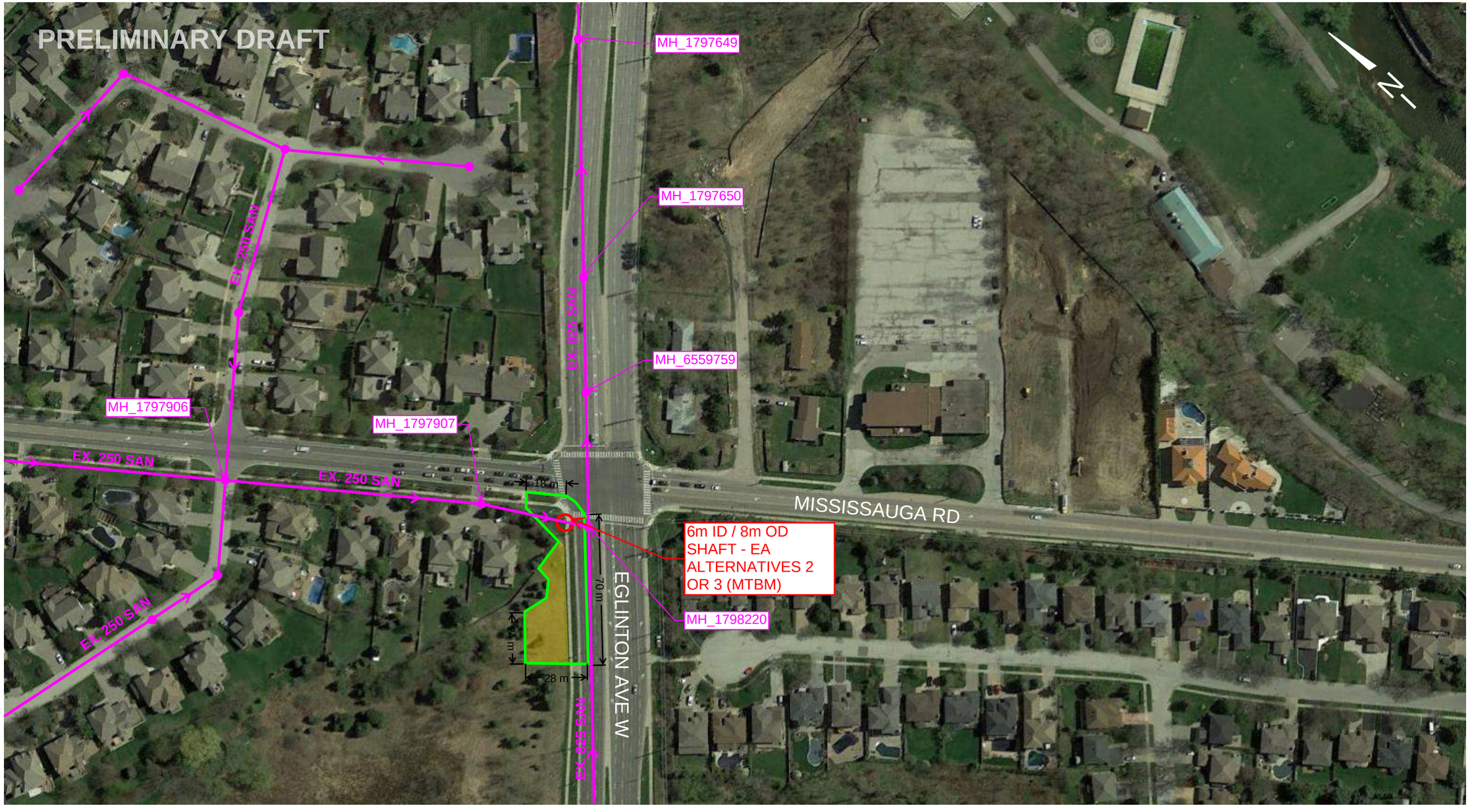
WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & ROTHESAY CT

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 25 of 34	Plan No.	SA11.2



LEGEND

- TOTAL EASEMENT (APPROX. 750m²)
- TOTAL STAGING AREA (APPROX. 1,750m²)
- EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

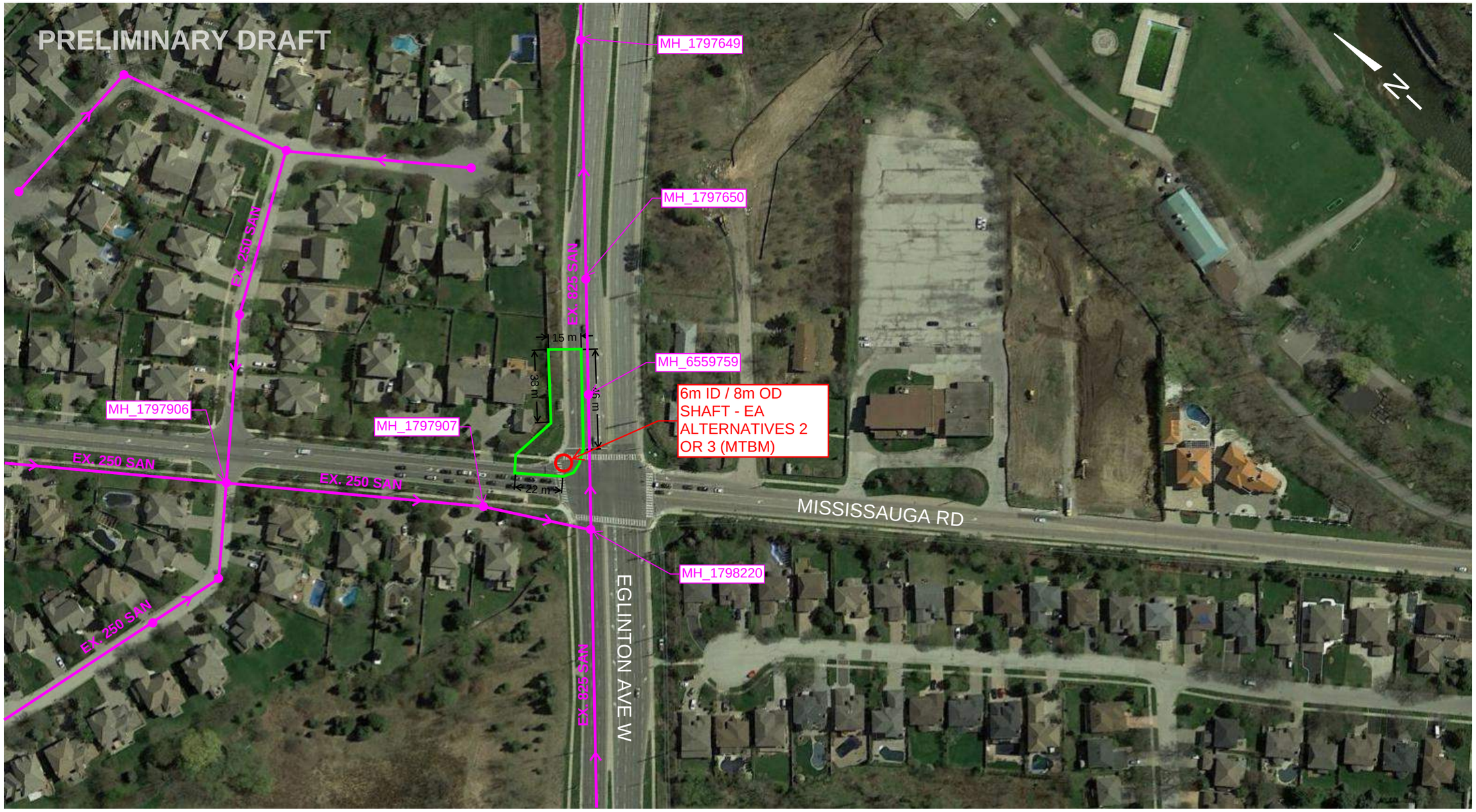
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & EGLINTON AVE W

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 26 of 34	Plan No.	SA13.1



LEGEND

TOTAL STAGING AREA (APPROX. 1,100m²)

EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

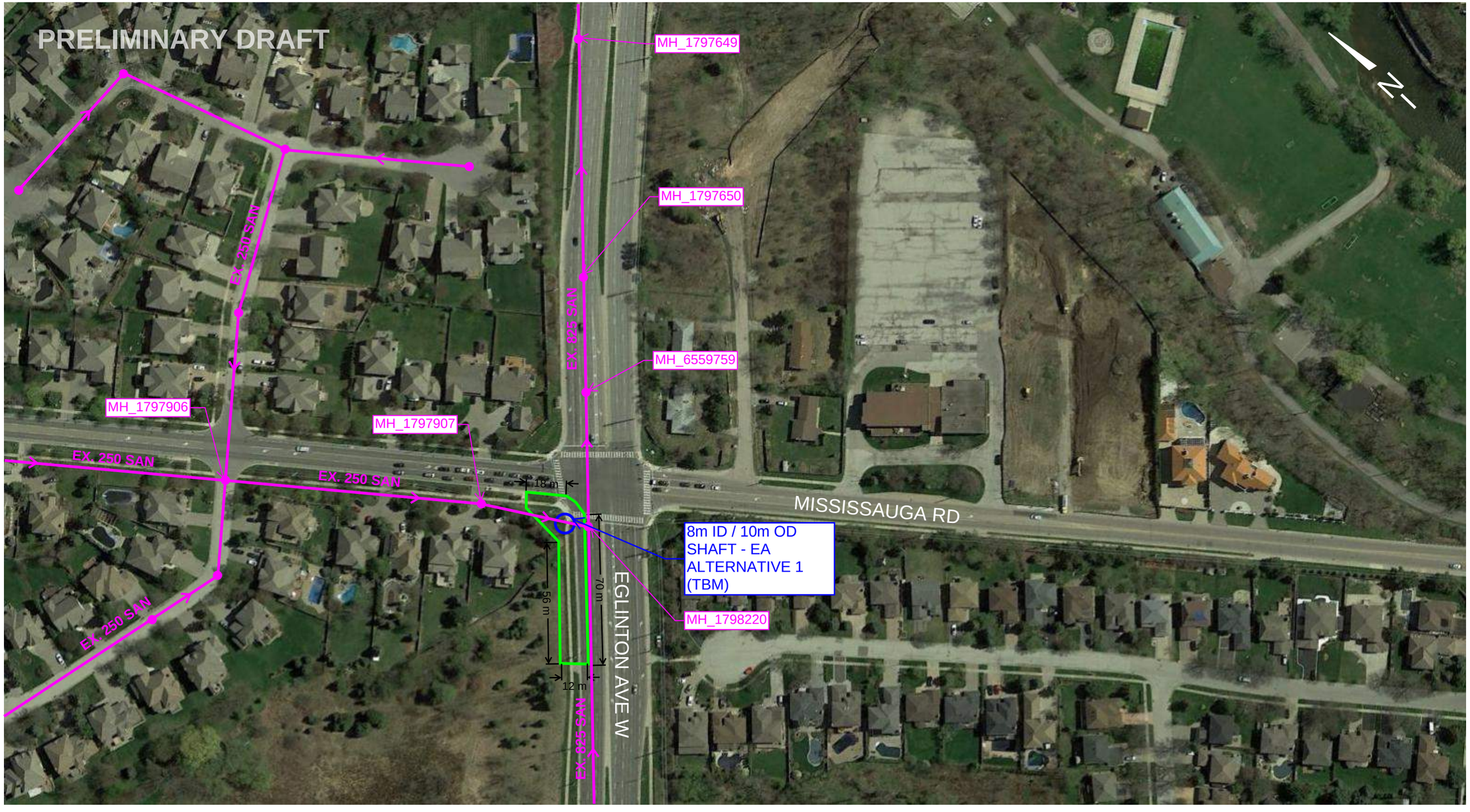
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & EGLINTON AVE W

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 27 of 34	Plan No.	SA13.2



LEGEND

TOTAL STAGING AREA (APPROX. 1,200m²)

EX. SANITARY SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

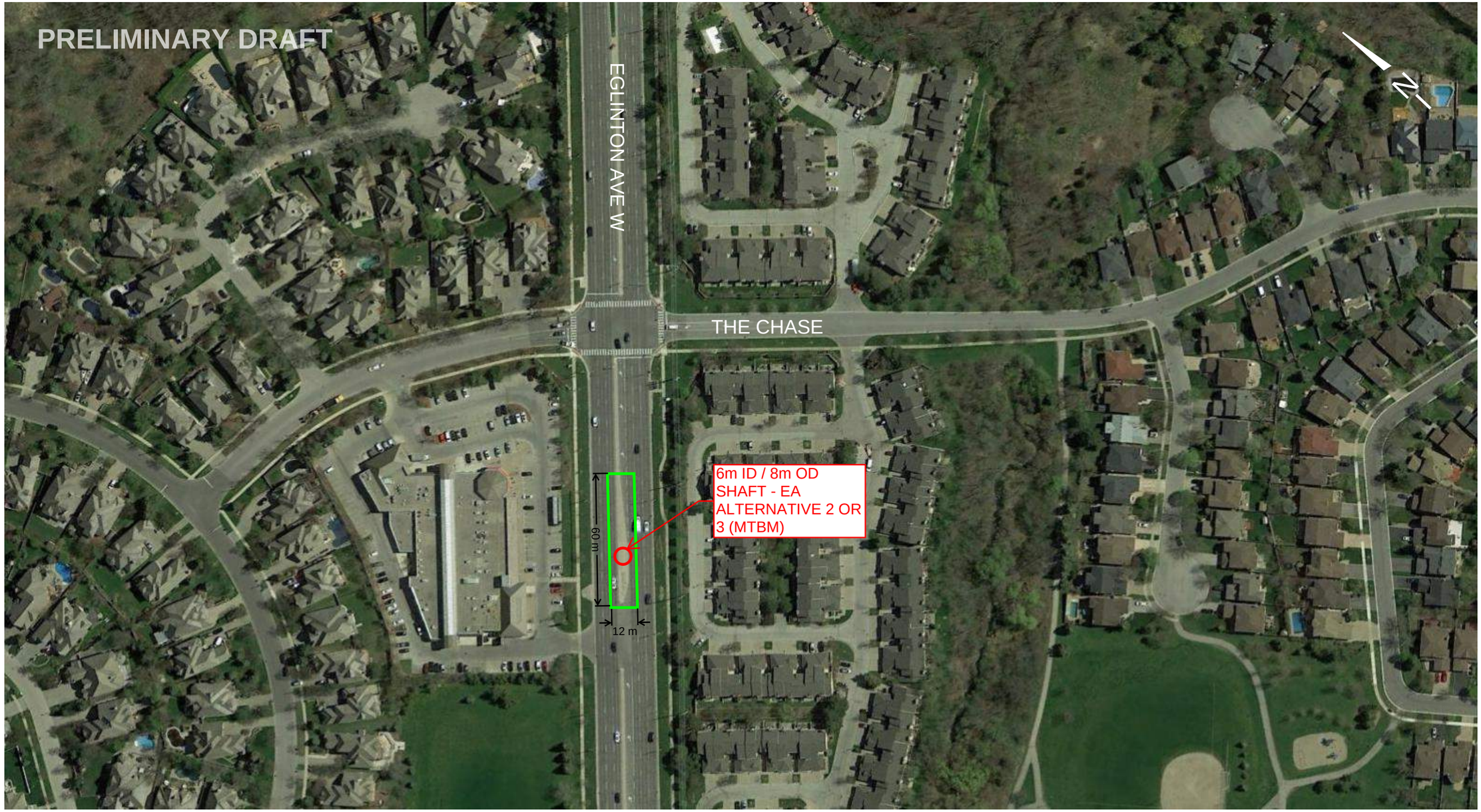
Region of Peel
working with you

WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

MISSISSAUGA RD & EGLINTON AVE W

Checked by G.H.	Drawn by D.K.	Project No.	08-2250
Date FEB 2021	Sheet 26 of 34	Plan No.	SA13.3



LEGEND

TOTAL STAGING AREA
(APPROX. 720m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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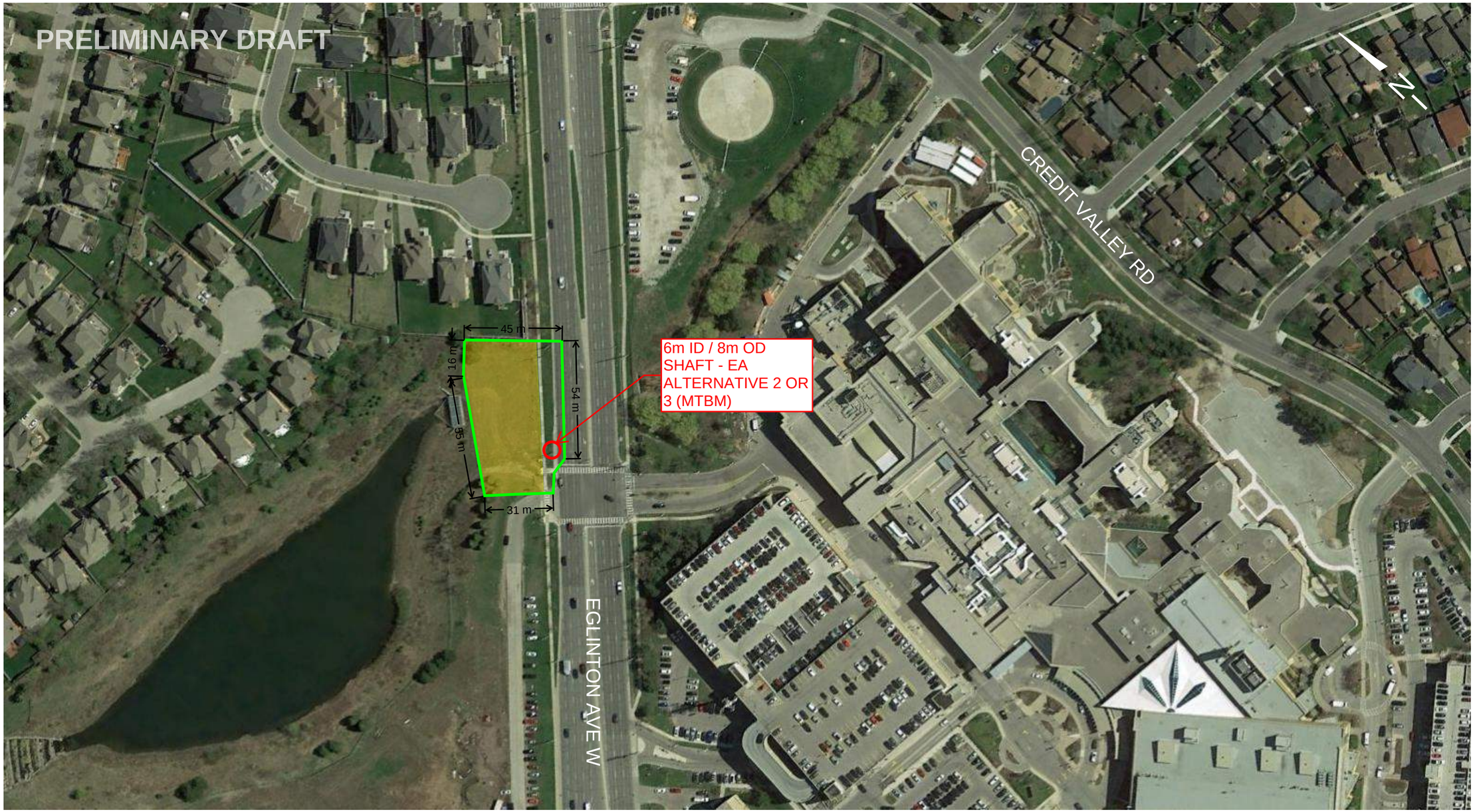
WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

EGLINTON AVE W & THE CHASE

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 28 of 34	Plan No.	SA15



LEGEND

TOTAL EASEMENT (APPROX. 2,200m²)

TOTAL STAGING AREA (APPROX. 2,900m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

EGLINTON AVE W

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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LEGEND

TOTAL EASEMENT (APPROX. 1,000m²)

TOTAL STAGING AREA (APPROX. 1,850m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

EGLINTON AVE W

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
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LEGEND

TOTAL EASEMENT (APPROX. 2,100m²)

TOTAL STAGING AREA (APPROX. 2,100m²)

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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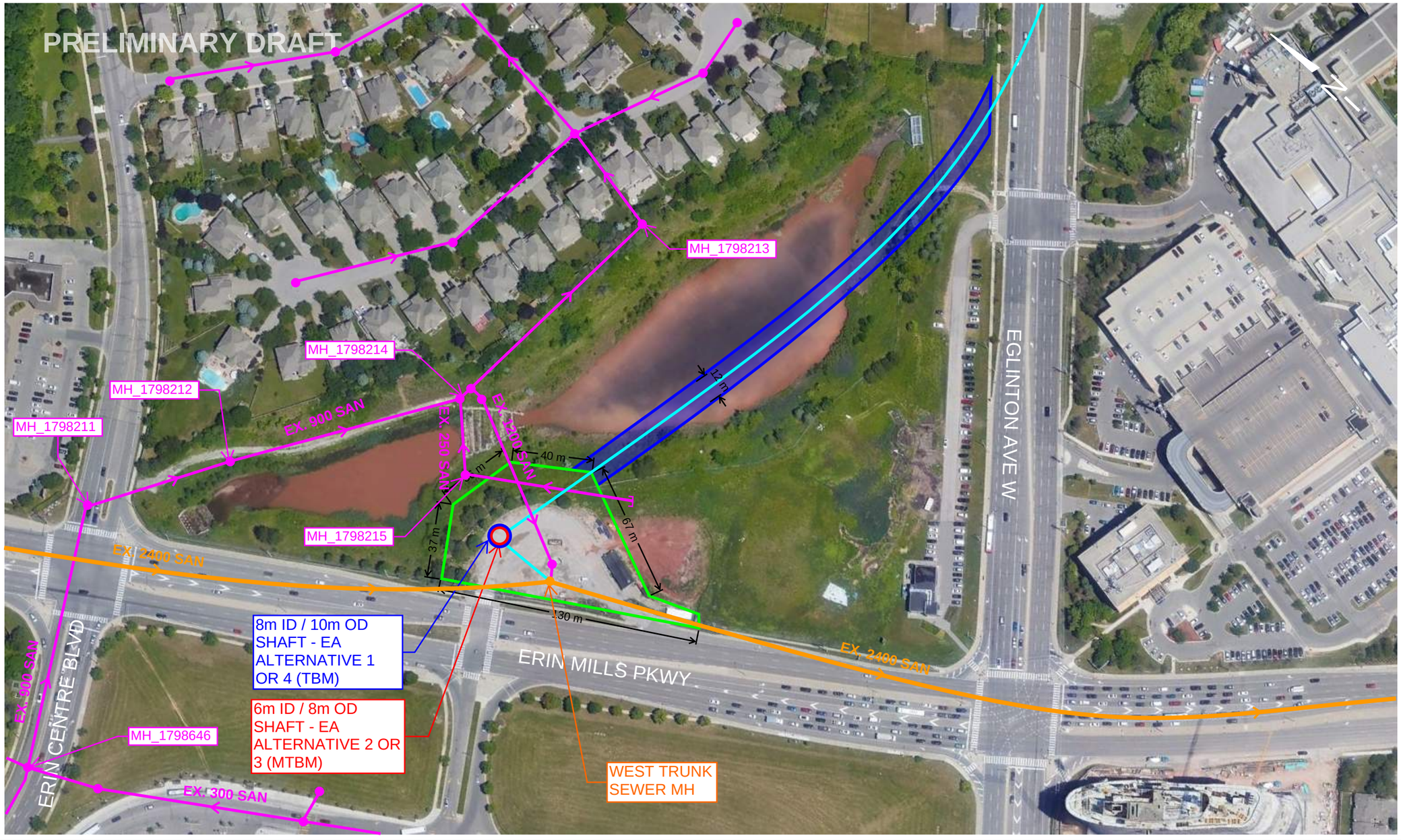
WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

EGLINTON AVE W

Checked by G.H.	Drawn by N.W.	Project No.	08-2250
Date JULY 2019	Sheet 31 of 34	Plan No.	SA16.3



LEGEND

- PERMANENT EASEMENT (APPROX. 3,250m²)
- TOTAL STAGING AREA (APPROX. 6,000m²)
- EX. SANITARY SEWER
- EX. WEST TRUNK SEWER
- PROP. WEST TRUNK DIVERSION SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

ERIN MILLS PKWY & EGLINTON AVE W

Checked by	G.H.	Drawn by	N.W.
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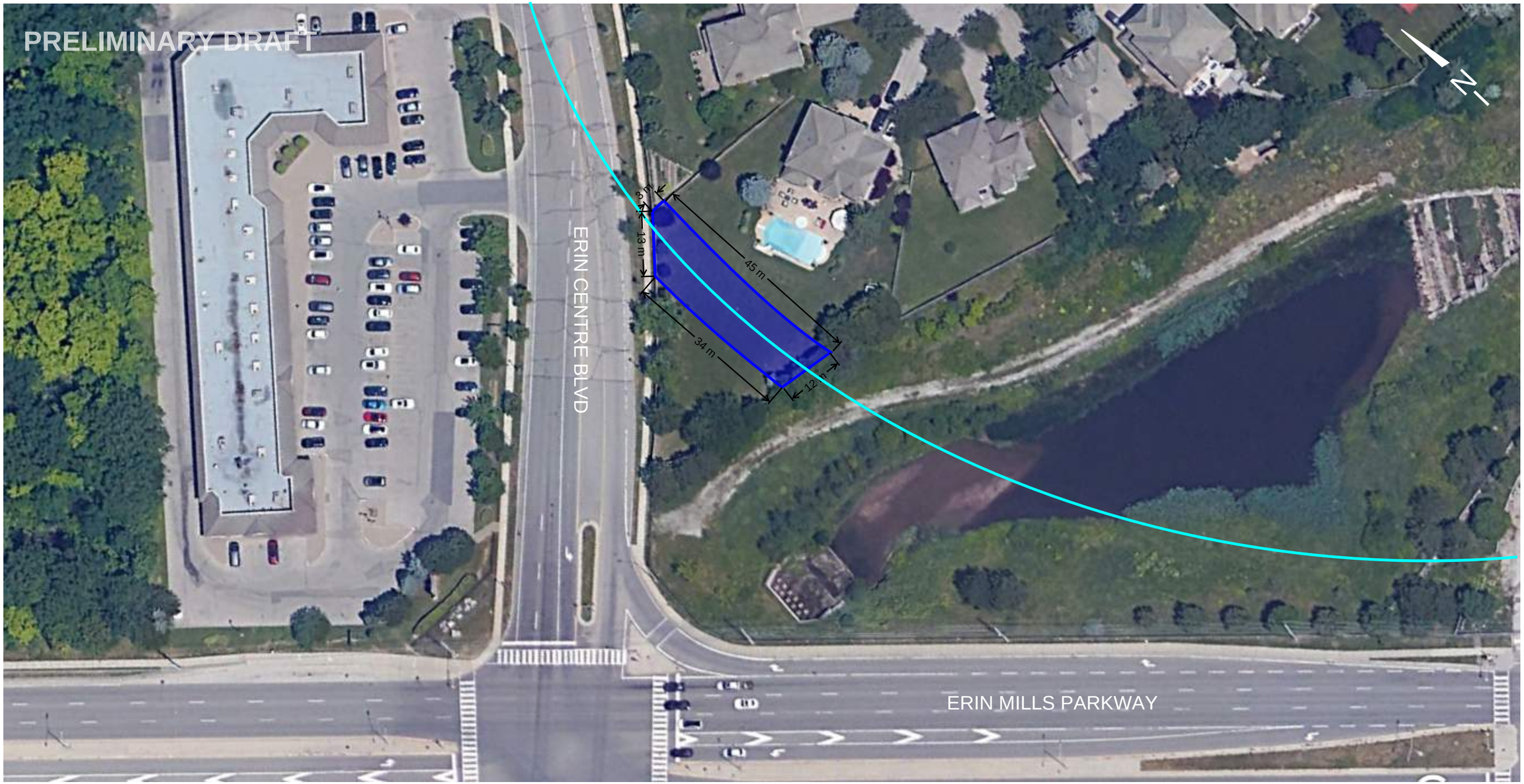
Project No. 08-2250

Plan No. **SA17**



LEGEND

PERMANENT EASEMENT (APPROX. 500m²)

PROP. WEST TRUNK DIVERSION SEWER

NOTES:

1. ALL INDICATED DIMENSIONS ARE APPROXIMATE AND FOR CONCEPTUAL PURPOSES.

Region of Peel
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WEST TRUNK DIVERSIONS

PROPERTY IMPACT PLAN

ERIN CENTRE BLVD & ERIN MILLS PKWY

Checked by G.H.	Drawn by D.K.	Project No.	08-2250
Date JAN 2021	Sheet 34 of 34	Plan No.	PE1

APPENDIX I

Comparison of EA Alternatives

Factor	Criteria	Alternative 1 (Queen Street)	Alternative 2 (Britannia through Woodlot)	Alternative 3 (Britannia Straight)	Alternative 4 (Erin Centre Boulevard)
Socio-Economic Environment	• Effects on existing land uses	• Of 7 shaft sites: ○ 44% are adjacent to land zoned as "residential" ○ 14% are adjacent to land zoned as "mixed use" ○ 14% are adjacent to land zoned as "business/industrial" ○ 14% are adjacent to land zoned as "greenlands" ○ 14% are within the ROW	• Of 15 shaft sites: ○ 27% are adjacent to land zoned as "residential" ○ 27% are adjacent to land zoned as "business/industrial" ○ 20% are within the ROW ○ 12% are adjacent to land zoned as "greenlands" ○ 7% are adjacent to land zoned as "mixed use" ○ 7% are adjacent to land zoned as "institutional" • Multiple additional shafts located within residential zoned areas	• Of 14 shaft sites: ○ 29% are adjacent to land zoned as "residential" ○ 29% are adjacent to land zoned as "business/industrial" ○ 21% are within the ROW ○ 7% are adjacent to land zoned as "greenlands" ○ 7% are adjacent to land zoned as "mixed use" ○ 7% are adjacent to land zoned as "institutional" • Multiple additional shafts located within residential zoned areas	• Of 6 shaft sites: ○ 32% are adjacent to land zoned as "residential" ○ 17% are adjacent to land zoned as "mixed use" ○ 17% are adjacent to land zoned as "business/industrial" ○ 17% are adjacent to land zoned as "greenlands" ○ 17% are within the ROW
	• Compliance with Planning / Environmental Policies	• 3 shafts within watercourse areas	• 4 shafts within watercourse areas	• 4 shafts within residential/watercourse areas	• 3 shafts within watercourse areas
	• Nuisance impacts (vibration, noise, dust)	• Lower number of shafts within residential areas; minimizing impacts to residents	• Greater number of shafts within residential areas	• Greater number of shafts within residential areas	• Least number of shafts within residential areas; minimizing impacts to residents • Tunnel alignment adjacent to higher concentration of residential areas
	• Vibration effect on existing buildings	• Lower number of shafts resulting in a proportional reduction to amount of buildings subject to vibration • Consider proximity to buildings during detailed design selection of shaft sites • Slightly higher risk of vibrational impact due to additional length of tunnel	• Consider proximity to buildings during detailed design selection of shaft sites	• Consider proximity to buildings during detailed design selection of shaft sites	• Least number of shafts resulting in a proportional reduction to amount of buildings subject to vibration • Consider proximity to buildings during detailed design selection of shaft sites • Slightly higher risk of vibrational impact due to additional length of tunnel
	• Traffic Management	• Fewer intersections impacted by proposed work • No lane restrictions in Streetsville • No truck traffic to be allowed along Queen Street through Streetsville Village Core • Fewer shafts within travelled ROW	• Greater number of intersections impacted • Traffic impacts on Britannia Road including lane restrictions	• Greater number of intersections impacted • Traffic impacts on Britannia Road including lane restrictions	• Fewer intersections impacted by proposed work • No lane restrictions in Streetsville • No truck traffic to be allowed along Queen Street through Streetsville Village Core • Fewest shafts within travelled ROW
	• Odour Management	• Less critical bends and drops thus a reduced potential for release of odourous air due to velocity changes within the sewer flow	• More critical bends and drops thus an increased potential for release of odourous air due to velocity changes and turbulence within the sewer flow	• More critical bends and drops thus an increased potential for release of odourous air due to velocity changes and turbulence within the sewer flow	• Less critical bends and drops thus a reduced potential for release of odourous air due to velocity changes within the sewer flow

Factor	Criteria	Alternative 1 (Queen Street)	Alternative 2 (Britannia through Woodlot)	Alternative 3 (Britannia Straight)	Alternative 4 (Erin Centre Boulevard)
	• Land Requirements (permanent/temporary)	• 7 major staging areas required • Lower number of shaft sites required and minimal alignment outside of ROW	• 15 major staging areas • Greatest number of shaft sites therefore greater land/property requirements	• 14 major staging areas • Greater number of shaft sites therefore greater land/property requirements	• 6 major staging areas required • Least number of shaft sites required, 1 permanent easement required for tunnel
	OVERALL	**PREFERRED** Less impact to residential properties, fewer intersection impacts, less transportation delays and less staging areas.	**LEAST PREFERRED** Greater impact to residential properties, greatest number of shaft sites, located within residential areas, as well as greater impact on transportation/delays during construction, as well as lane reductions.	**LEAST PREFERRED** Greater impact to residential properties, greater number of shaft sites, located within residential areas, as well as greater impact on transportation/delays during construction, as well as lane reductions.	**MOST PREFERRED** Least impact to residential properties, fewest intersection impacts, less transportation delays and less staging areas.
Natural Environment	• Impact on natural features (watercourses, Environmentally Sensitive Areas, SAR, Aquatic features, Significant land forms, Wildlife and Wildlife Habitat)	• Crossing of Credit River • Crossing of Mullet Creek at 1 location • Crossing of unnamed tributary of Mullet Creek • No additional impact to natural areas beyond those shared with all alternatives	• Crossing of Credit River • Crossing of Mullet Creek at 2 locations • Crossing of unnamed tributary of Mullet Creek • Potential to impact the significant woodland associated with Mullet Creek along Britannia Avenue • Potential to impact Turney Woods Park – significant woodland • Potential to impact wetland located within Turney Woods Park • Potential to impact bat SAR within woodlot	• Crossing of Credit River • Crossing of Mullet Creek at 2 locations • Crossing of unnamed tributary of Mullet Creek • Potential to impact the significant woodland associated with Mullet Creek along Britannia Avenue	• Crossing of Credit River • Crossing of Mullet Creek at 1 location • Crossing of unnamed tributary of Mullet Creek • Tunnel alignment adjacent to Erin Woods Park (Environmentally Sensitive Area) but no shaft is proposed in or adjacent to the park, therefore no anticipated impacts • No additional impact to natural areas beyond those shared with all alternatives
	• Street Trees	• Minimal impact to street trees along the alignment as sewer installation will be undertaken via trenchless methods	• Minimal impact to street trees along the alignment as sewer installation will be undertaken via trenchless methods	• Minimal impact to street trees along the alignment as sewer installation will be undertaken via trenchless methods	• Minimal impact to street trees along the alignment as sewer installation will be undertaken via trenchless methods
	• Geology/Hydrogeology Considerations	• Avoids crossing of deep water-bearing buried valley along Erin Mills Parkway • Potential to cross unknown buried valley along Eglinton Avenue West. If encountered, crossing would be shallower and with lower associated groundwater pressures.	• Confirmed crossing of deep water-bearing buried valley along Erin Mills Parkway • Potential to cross unknown buried valley along Eglinton Avenue West. If encountered, crossing would be shallower and with lower associated groundwater pressures.	• Confirmed crossing of deep water-bearing buried valley along Erin Mills Parkway • Potential to cross unknown buried valley along Eglinton Avenue West. If encountered, crossing would be shallower and with lower associated groundwater pressures.	• Avoids crossing of deep water-bearing buried valley along Erin Mills Parkway • Potential to cross unknown buried valley along Erin Centre Boulevard. If encountered, crossing would be shallower and with lower associated groundwater pressures.
	• Contamination	• Comparable potential to impact contaminated soils	• Comparable potential to impact contaminated soils	• Comparable potential to impact contaminated soils	• Comparable potential to impact contaminated soils
	OVERALL	**MOST PREFERRED** This alternative has no additional watercourse crossings beyond those common to all alternatives, avoids the known buried valley at Erin Mills Parkway, and does not impact any woodlots.	**LEAST PREFERRED** This alternative requires an additional crossing of Mullet Creek and will impact the known deep water-bearing buried valley at Erin Mills Parkway. Turney Woods Park, a significant woodland, will be impacted along with the bat SAR and wetland located	**PREFERRED** This alternative requires an additional crossing of Mullet Creek and will impact the known deep water-bearing buried valley at Erin Mills Parkway. There is also the potential to impact significant woodland associated with Mullet Creek.	**MOST PREFERRED** This alternative has no additional watercourse crossings beyond those common to all alternatives, avoids the known buried valley at Erin Mills Parkway, and does not impact any woodlots.

Factor	Criteria	Alternative 1 (Queen Street)	Alternative 2 (Britannia through Woodlot)	Alternative 3 (Britannia Straight)	Alternative 4 (Erin Centre Boulevard)
			within the park. There is also the potential to impact significant woodland associated with Mullet Creek.		
Cultural Environment	• Minimize impact to archaeological resources	• Majority of study area previously assessed; small areas require Stage 2 AA outside of existing alignment	• Majority of study area previously assessed; woodlot requires further assessment in addition to other small areas that require Stage 2 AA outside of existing alignment	• Majority of study area previously assessed; small areas require Stage 2 AA outside of existing alignment	• Majority of study area previously assessed; small areas require Stage 2 AA outside of existing alignment
	• Minimize impact to cultural heritage resources	• Streetsville located within the Mississauga Scenic Route and Streetsville Village Core Cultural Heritage Landscape - Streetscape • Alignment adjacent to Listed properties; (cemetery, a plaque and a significant tree) however the alignment is within the ROW and no impacts are anticipated • Shaft locations positioned outside of Streetsville Village Core and selected to reduce risk of impacts	• Proposed alignment adjacent to two (2) designated built heritage resource (on north side of Britannia Avenue and Barbertown Road and Queen Street) • Shaft locations selected to reduce risk of impacts	• Proposed alignment adjacent to two (2) designated built heritage resource (on north side of Britannia Avenue and Barbertown Road and Queen Street) • Shaft locations selected to reduce risk of impacts	• Streetsville located within the Mississauga Scenic Route and Streetsville Village Core Cultural Heritage Landscape - Streetscape • Alignment adjacent to Listed properties; (cemetery, a plaque and a significant tree) however the alignment is within the ROW and no impacts are anticipated • Shaft locations positioned outside of Streetsville Village Core and selected to reduce risk of impacts
OVERALL		**PREFERRED** This alternative will travel through the identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core Area. However, shaft locations are positioned outside of Streetsville Village Core and are selected to reduce risk of impacts.	**PREFERRED** This alternative has limited potential to impact cultural heritage resources, as shaft sites will avoid resource locations.	**PREFERRED** This alternative has limited potential to impact cultural heritage resources, as shaft sites will avoid resource locations.	**PREFERRED** This alternative will travel through the identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core Area. However, shaft locations are positioned outside of Streetsville Village Core and are selected to reduce risk of impacts.

Factor	Criteria	Alternative 1 (Queen Street)	Alternative 2 (Britannia through Woodlot)	Alternative 3 (Britannia Straight)	Alternative 4 (Erin Centre Boulevard)
Technical	• Shaft locations	• 7 shaft sites	• 15 shaft sites	• 14 shaft sites	• 6 shaft sites
	• Site requirements	• Approximately 45,000m^2 of total compound space required for this alternative	• Approximately 57,300m^2 of total compound space required for this alternative	• Approximately 55,800m^2 of total compound space required for this alternative	• Approximately 43,700m^2 of total compound space required for this alternative
	• Existing utilities	• Approximately 43 utilities with one existing hydro transformer within the proposed conceptual shaft compounds • Significantly less utility presence within preferred shaft locations	• Approximately 84 utilities with one existing high pressure gasmain and two hydro transformers within the proposed conceptual shaft compounds • Greatest utility presence within preferred compound locations	• Approximately 80 utilities with one existing high pressure gasmain and two hydro transformers within the proposed conceptual shaft compounds • Greater utility presence within preferred compound locations	• Approximately 37 utilities with one existing hydro transformer within the proposed conceptual shaft compounds • Significantly less utility presence within preferred shaft locations
	• Impact on existing and future wastewater systems	• Single connection point to WTS	• Two connection points to WTS	• Two connection points to WTS	• Single connection point to WTS
	• Constructability	• Construction is within the capabilities of the local Contracting market • Anticipated to be undertaken using a closed or closeable face, self-propelled TBM in a single pass or double pass installation	• Construction is within the capabilities of the local Contracting market, however, mining through the known buried valley feature at Britannia Road and Erin Mills Parkway is a significant constructability challenge due to high groundwater pressures • Anticipated to be undertaken using a closed or closeable face, pipe jacking TBM in a single pass installation	• Construction is within the capabilities of the local Contracting market, however, mining through the known buried valley feature at Britannia Road and Erin Mills Parkway is a significant constructability challenge due to high groundwater pressures • Anticipated to be undertaken using a closed or closeable face, pipe jacking TBM in a single pass installation	• Construction is within the capabilities of the local Contracting market • Anticipated to be undertaken using a closed or closeable face, self-propelled TBM in a single pass or double pass installation
	• Shaft Compound at Major Intersection	• 2 shaft compounds required at major intersections (Britannia Rd W/Queen St N & Eglinton Ave W/Mississauga Rd)	• 3 shaft compounds required at major intersections (Britannia Rd W/Queen St N, Eglinton Ave W/Mississauga Rd & Erin Mills Pkwy/Britannia Rd W)	• 3 shaft compounds required at major intersections (Britannia Rd W/Queen St N, Eglinton Ave W/Mississauga Rd & Erin Mills Pkwy/Britannia Rd W)	• 1 shaft compound required at major intersections (Britannia Rd W/Queen St N)
	• Overall project delivery risk	• Maximizes alignment within ROW • Reduced number of shaft locations, however a 18% longer route	• Increased number of shaft locations, and 4% longer route • Mining through buried valley feature is a significant risk	• Increased number of shaft locations, and shortest route • Mining through buried valley feature is a significant risk	• Maximizes alignment within ROW • Reduced number of shaft locations, and 8% longer route
	• Pipe capacity	• Single diversion approach allows for the use of a larger diameter sewer which facilitates additional capacity (2.4m/3.0m ID)	• Double diversion approach limits feasible pipe sizes and therefore proportionally reduces pipe capacity (i.e., 2.4/3.0m ID sewer is not feasible)	• Double diversion approach limits feasible pipe sizes and therefore proportionally reduces pipe capacity (i.e., 2.4/3.0m ID sewer is not feasible)	• Single diversion approach allows for the use of a larger diameter sewer which facilitates additional capacity (2.4m/3.0m ID)
OVERALL		**PREFERRED** Although a longer route is required than Alternatives 2 and 3, there are less shaft sites, and the alternative only requires a single connection point to the West Trunk Sewer along Erin Mills Parkway. The alignment will primarily be located within the existing right-of-way. This alternative also	**LEAST PREFERRED** This alternative alignment is a shorter route, compared to Alternative 1, however results in 15 shaft sites. This alternative requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. This alternative does not provide for	**LEAST PREFERRED** This alternative alignment is a shorter route, compared to Alternative 1, however results in 14 shaft sites. This alternative requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. This alternative does not provide for	**MOST PREFERRED** Although a longer route is required versus Alternatives 2 and 3, there are less shaft sites, and the alternative only requires a single connection point to the West Trunk Sewer along Erin Mills Parkway. The alignment will primarily be located within the existing right-of-

		offers the ability for increased storage, providing redundancy in the situation that additional capacity is needed during a storm event.	increased storage capacity during storm events.	increased storage capacity during storm events.	way. This alternative also offers the ability for increased storage, providing redundancy in the situation that additional capacity is needed during a storm event. This alignment also offers greater hydraulic flexibility and a better optimized connection to the existing WTS.
Factor	**Criteria**	**Alternative 1 (Queen Street)**	**Alternative 2 (Britannia through Woodlot)**	**Alternative 3 (Britannia Straight)**	**Alternative 4 (Erin Centre Boulevard)**
Costs	• Construction costs • Operational costs • Land acquisition/easement cost	• Similar construction costs • Lower anticipated operational cost (less structures to maintain) • Less shaft sites required and minimal alignment outside of ROW	• Similar construction costs • Highest anticipated operational cost (most structures to maintain) • Greatest number of shaft sites and highest shaft site area, therefore highest anticipated cost associated with property acquisition and easements	• Similar construction costs • Higher anticipated operational cost (more structures to maintain) • Greater number of shaft sites and higher shaft site area, therefore higher anticipated cost associated with property acquisition and easements	• Similar construction costs • Lowest anticipated operational cost (less structures to maintain) • Least shaft sites required, 1 permanent easement required for tunnel
OVERALL		**PREFERRED** Fewer shafts required resulting in lower operational costs and reduced property requirements.	**LEAST PREFERRED** Greatest number of shafts resulting in greatest operational costs and more property requirements.	**LEAST PREFERRED** Greater number of shafts resulting in greater operational costs and more property requirements.	**PREFERRED** Fewest shafts required resulting in lower operational costs and reduced property requirements.

SUMMARY	**PREFERRED** Less impact to residential properties, fewer intersection impacts, less transportation delays and less staging areas. This alternative has 1 watercourse crossing of Mullet Creek, avoids the known buried valley at Erin Mills Parkway, and does not impact any woodlots. This alternative will travel through the identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core area, however areas of impact will be limited to shaft site locations. Although a longer route is required, there are less shaft sites, and the alternative only requires a single connection point to the West Trunk Sewer along Erin Mills Parkway. The alignment will be located within the existing right-of-way, with one shaft location at a major intersection requiring partial lane closures. This alternative provides increased storage, as well as redundancy for additional capacity if needed during a storm event. Fewer shafts required resulting in lower operational costs and reduced property requirements.	**LEAST PREFERRED** Greater impact to residential properties, greater number of shaft sites, located within residential areas, as well as greater impact on transportation/delays during construction, as well as lane reductions. This alternative requires 2 crossings of Mullet Creek and has the potential to impact the known deeply buried valley at Erin Mills Parkway. The alternative also impacts Turney Woods Park, a significant woodland, as well as the significant woodland associated with Mullet Creek. The alternative has the potential to impact the wetland located within the Park. There is also the potential to impact bat SAR located within the woodland. This alternative has limited potential to impact cultural heritage resources, as shaft sites will avoid resource locations. This alternative alignment is a shorter route, compared to Alternative 1, however results in 15 shaft sites. This alternative requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. This alternative does not provide for increased storage capacity during storm events. Greatest number of shafts resulting in greatest operational costs and more property requirements.	**LEAST PREFERRED** Greater impact to residential properties, greater number of shaft sites, located within residential areas, as well as greater impact on transportation/delays during construction, as well as lane reductions. This alternative requires 2 crossings of Mullet Creek and has the potential to impact the known deeply buried valley at Erin Mills Parkway. This alternative has the potential to impact the significant woodland associated with Mullet Creek. There is limited potential to impact cultural heritage resources, as shaft sites will avoid resource locations. This alternative alignment is a shorter route, compared to Alternative 1, however results in 14 shaft sites. This alternative requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. This alternative does not provide for increased storage capacity during storm events. Greater number of shafts resulting in greater operational costs and more property requirements.	**MOST PREFERRED** Less impact to residential properties, fewer intersection impacts, less transportation delays and less staging areas. This alternative has 1 watercourse crossings of Mullet Creek, avoids the known buried valley at Erin Mills Parkway, and does not impact any woodlots. This alternative will travel through the identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core area, however areas of impact will be limited to shaft site locations. Although a longer route is required, this alignment has the least number of shaft sites, and the alternative only requires a single connection point to the West Trunk Sewer along Erin Mills Parkway. The alignment will be located mainly within the existing right-of-way, with a small portion of the tunnel requiring a permanent easement. This alternative provides increased storage, as well as redundancy for additional capacity if needed during a storm event. Fewest shafts required resulting in lower operational costs and reduced property requirements.

APPENDIX J

Consultation

APPENDIX J1

Notice of Study Commencement

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Public Notice

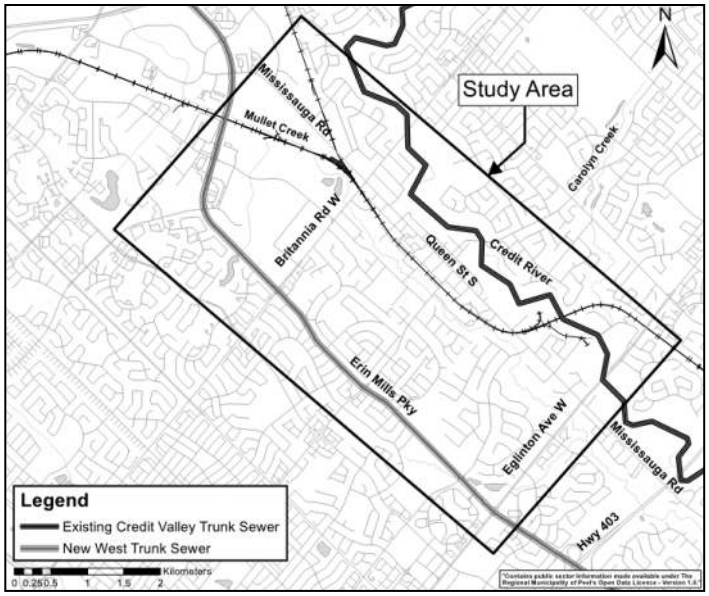
Region of Peel
working with you

Environmental Assessment Study

Notice of Study Commencement - West Trunk Sanitary Sewer Diversion

The Study

The Region of Peel has started an Environmental Assessment (Class EA) for the West Trunk Sanitary Sewer Diversion. The approximate limits of the project study area extend from Erin Mills Parkway to the Credit River, and from Eglinton Ave. West to the intersection of Erin Mills Parkway and Mississauga Rd., as shown in the map.



The purpose of the study is to review alternative flow diversions from the existing Credit Valley trunk sewer to the newly constructed West Trunk sewer at Erin Mills Parkway to allow for future rehabilitation of the existing trunk sewer.

The Process

The study is being conducted in accordance with the approved requirements for a Schedule 'B' project as described in the Municipal Engineers Association's Municipal Class EA document (October 2000, as amended in 2007, 2011 and 2015).

We Want to Hear from You

Public consultation is an important part of the EA process. We welcome your comments throughout the study. The Region plans to hold two Public Information Centres (PICs) over the course of the study. The PICs will provide background information on the study, compare the alternative solutions and select the technically preferred solution. Regional staff will be present to answer questions and address any concerns. Information on the PICs will be provided closer to the dates and will be in a similar format to this notice. A Project File Report will be filed with the Ministry of the Environment, Conservations and Parks at the end of the study and made available to agencies and the public for a 30-day public review period.

Comments and Information

Please visit our website at peelregion.ca/pw/water/environ-assess for updates on the project. To provide comments or request additional information about this project, please contact either of the following team members.

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Division, Collection & Communal Treatment Region of Peel Public Works
905-791-7800, ext. 5073
ajay.puri@peelregion.ca

Marc Gelinas, P.Eng., PE, PMP
Principal Engineer, Infrastructure
Hatch
905-486-0740, ext. 220228
marc.gelinas@hatch.com

This notice was first issued on April 8, 2019

With the exception of personal information, all comments will become part of the public record of the study.
The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's *Environmental Assessment Act*.

APPENDIX J2

Letters to Indigenous Communities

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Region of Peel
working with you

May 28, 2019

Fawn Sault
Consultation Manager
Mississaugas of New Credit First Nation

Public Works

10 Peel Centre Dr.
Suite B
Brampton, ON
L6T 4B9
tel: 905-791-7800

peelregion.ca

Dear Ms. Sault,

Subject: West Trunk Sanitary Sewer Diversion from the Credit River to Erin Mills Parkway
Class Environmental Assessment Study

The Regional Municipality of Peel has initiated a Schedule 'B' Municipal Class Environmental Assessment to review alternative flow diversions from the existing Credit Valley Trunk sewer to the newly constructed West Trunk sewer along Erin Mills Parkway to allow for the future rehabilitation of the existing trunk sewer in the City of Mississauga. The purpose of this letter is to inform you of the Study and to solicit your initial input and comments.

The Notice of Study Commencement was published in a local newspaper on April 18th, 2019.

Input from stakeholders (Indigenous Communities, the public and agencies) is important so that concerns can be identified early, documented and assessed. Two-way communication will be a top priority throughout this Project and will include, but not be limited to a Public Information Centre (PIC) to provide updates on the Project progress, and to receive feedback.

Details regarding the forthcoming PIC will be advertised two weeks prior to the meeting.

Please advise the Project Team of your interest in this Study by responding to this email/letter with the following information:

- The representative who will be the main contact for this Study; and
- Comments and feedback pertaining to the Study that should be considered.

We look forward to working with you on this Project,

Sincerely,

Ajay Puri, M.E. (Env.), P.Eng.,
Project Manager
The Regional Municipality of Peel
ajay.puri@peelregion.ca

Encl. : Notice of Study Commencement

cc.: Marc Gelinas, Graeme Henderson, Melissa Alexander – Hatch

Public Notice

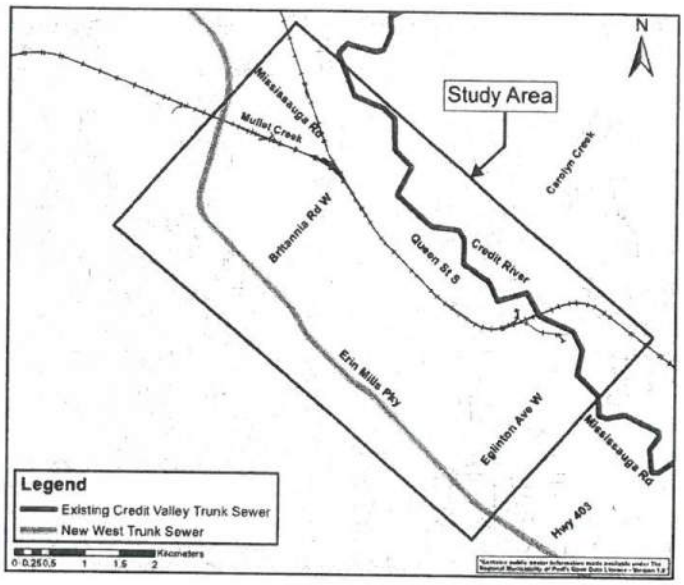
Region of Peel
working with you

Environmental Assessment Study

Notice of Study Commencement - West Trunk Sanitary Sewer Diversion

The Study

The Region of Peel has started an Environmental Assessment (Class EA) for the West Trunk Sanitary Sewer Diversion. The approximate limits of the project study area extend from Erin Mills Parkway to the Credit River, and from Eglinton Ave. West to the intersection of Erin Mills Parkway and Mississauga Rd., as shown in the map.



The purpose of the study is to review alternative flow diversions from the existing Credit Valley trunk sewer to the newly constructed West Trunk sewer at Erin Mills Parkway to allow for future rehabilitation of the existing trunk sewer.

The Process

The study is being conducted in accordance with the approved requirements for a Schedule 'B' project as described in the Municipal Engineers Association's Municipal Class EA document (October 2000, as amended in 2007, 2011 and 2015).

We Want to Hear from You

Public consultation is an important part of the EA process. We welcome your comments throughout the study. The Region plans to hold two Public Information Centres (PICs) over the course of the study. The PICs will provide background information on the study, compare the alternative solutions and select the technically preferred solution. Regional staff will be present to answer questions and address any concerns. Information on the PICs will be provided closer to the dates and will be in a similar format to this notice. A Project File Report will be filed with the Ministry of the Environment, Conservations and Parks at the end of the study and made available to agencies and the public for a 30-day public review period.

Comments and Information

Please visit our website at peelregion.ca/pw/water/environ-assess for updates on the project. To provide comments or request additional information about this project, please contact either of the following team members.

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Division, Collection & Communal Treatment Region of Peel Public Works
905-791-7800, ext. 5073
ajay.puri@peelregion.ca

Marc Gelinas, P.Eng., PE, PMP
Principal Engineer, Infrastructure
Hatch
905-486-0740, ext. 220228
marc.gelinas@hatch.com

This notice was first issued on April 8, 2019

With the exception of personal information, all comments will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's *Environmental Assessment Act*.

APPENDIX J3

Regulatory Contact List

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HATCH

Peel West Trunk Diversion
Peel Contract No. 08-2250
Agency Contact List

Region of Peel
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Agency/Organization	Title	First Name	Last Name	Position	Address			Email	Telephone
Federal									
Transport Canada, Ontario Region		N/A	N/A	Environmental Assessment Coordinator	4900 Yonge Street,	Suite 300	Toronto, ON M2N 6A5	EnviroOnt@tc.gc.ca	N/A
Provincal									
Ministry of Indigenous Affairs, Communications Branch	Mr.	David	Fraser	Manager, Coorespondence Unit	222 Jarvis Street	5th Floor	Toronto, ON M7A 0B6	david.fraser@ontario.ca	416-314-9379
Minstry of Agriculture, Food and Rural Affairs (Regional Office)	Ms.	Nancy	Rutherford	Rural Planner (A), Greater-Toronto Area and Centreal SW ON	6484 Wellington Road 7	Unit 10	Elora, ON N0B 1S0	omafra.eanotices@ontario.ca	226-962-2139
Ministry of Heritage, Sport, Tourism and Culture Industries - Heritage, Tourism and Culture Division	Ms.	Karla	Barboza	Team Lead	401 Bay Street	Suite 1700	Toronto, ON M7A 0A7	karla.barboza@ontario.ca	416-314-7120
Ministry of Heritage, Sport, Tourism and Culture Industries - Heritage, Tourism and Culture Division	Mr.	Dan	Minkin	Heritage Planner				Dan.Minkin@ontario.ca	
Ministry of Municipal Affairs and Housing - Ontario Growth Secretariat	Mr.	Jeffrey	Thompson	Manager	777 Bay Street, 23rd Floor	Suite 2304	Toronto, ON M5G 2E5	jeff.thompson@ontario.ca	416-325-6282 and 416-325-1578
Ministry of Municipal Affairs and Housing - Ontario Growth Secretariat	Mr.	Stewart	Chisholm	Manager	777 Bay Street, 23rd Floor		Toronto, ON M5G 2E5	stewart.thompson@ontario.ca	437-225-0331
Ministry of Municipal Affairs and Housing - Regional Office (Central Municipal Services Office)	Ms.	Heather	Watt	Manager	777 Bay Street, 13th Floor		Toronto, ON M5G 2E5	heather.watt@ontario.ca	437-232-9474
Ministry of Natural Resources and Forestry, Aurora District	Ms.	Maria	Jawaid	District Planner	50 Bloomington Road West		Aurora, ON L4G 0L8	maria.jawaid@ontario.ca	289-380-6817
Ministry of the Environment, Conservation and Parks	N/A	Trevor	Bell	(email notification)	N/A	N/A	N/A	eanotification.cregion@ontario.ca; Trevor.Bell@ontario.ca	N/A
Ministry of Municipal Affairs and Housing	Mr.	John	Iveson	Senior Policy Advisor	College Park	14th Floor,	Toronto, ON M5G 2E5	john.iveson@ontario.ca	416-585-6779
Ministry of the Solicitor General	Mr.	Robert	Green	Director	25 Grosvenor Street	13th Floor	Toronto, ON M7A 1Y6	robert.greene@ontario.ca	416-277-2370
Ministry of Transportation, Regional Office - Delivery Central	Mr.	Jason	White	Manager	159 Sir William Hearst Ave.	5th Floor, Building D	Toronto, ON M3M 0B7	jason.white@ontario.ca	
Rail									
GO Transit and Metrolinx	Ms.	Pam	Foster	Director Environmental Programs and Assessment	10 Bay Street		Toronto, ON M5J 2W3	pam.foster@metrolinx.com	647-272-9386
Conservation Authorities									
Credit Valley Conservation Authority	Mr.	Josh	Campbell	Director, Planning & Development Services	1225 Old Derry Road	N/A	Mississauga, ON, L5N 6R4	josh.campbell@cvc.ca;	905-670-1615 x 289
Credit Valley Conservation Authority	Mr.	Ahmad	Iftekhar					Iftekhar.Ahmad@cvc.ca	
Credit Valley Conservation Authority	Ms.	Rebecca	Stewart	Planning Ecology	1225 Old Derry Road	N/A	Mississauga, ON, L5N 6R4	rebecca.stewart@cvc.ca;	
Credit Valley Conservation Authority	Mr.	Jakub	Kilis	Planner/Regulations Officer	1225 Old Derry Road	N/A	Mississauga, ON, L5N 6R4	Jakub.Kilis@cvc.ca;	
School Boards									
Dufferin - Peel Catholic District School Board	Ms.	Stephanie	Cox	Manager of Planning	40 Matheson Boulevard West	N/A	Mississauga, ON, L5R 1C5	stephanie.cox@dpcdsb.org;	905-890-0708 ext. 24163
Dufferin - Peel Catholic District School Board	Ms.	Joanne	Rogers	Senior Planner, Planning Department				Joanne.Rogers@dpcdsb.org;	905-890-0708 ext. 24299
Peel District School Board				Intermediate Planning officer	5050 Hurontario Street	N/A	Mississauga, ON L5R 1C6		
Student Transportation of Peel Region	Mr.	Tom	Howe	Manager, Student Transportation of Peel Region	5685 Keaton Cres.	N/A	Mississauga, ON L5R 3H5	tom.howe@dpcdsb.org;	905-890-9680
EMS and Health									
Mississauga Fire Services	Ms.	Deryn	Rizzi	Fire Chief	15 Fairview Road West	N/A	Mississauga, ON L5B 1K7	deryn.rizzi@vaughan.ca;	905-615-3777
Peel Fire and Emergency Services	Mr.	Garry	Morden	Fire Chief	15 Fairview Road West	N/A	Mississauga, ON L5B 1K7	fire.prevention@mississauga.ca;	905-613-4777
Peel Regional Paramedic Services	Mr.	Patrick	McColm	Supervisor, Risk and Audit, Region of Peel	5299 Maingate Drive	N/A	Mississauga, ON L4W 1G6	patrick.mccolm@peelregion.ca;	905-791-7800 x 3931
Region of Peel Health Department	Ms.	Louise	Aubin	Director of Environmental Health	10 Peel Centre Drive	N/A	Brampton, ON L6T 4B9	louise.aubin@peelregion.ca;	905-791-7800 ext. 2802
Region of Peel Ambulance Services	Mr.	Peter	Dundas	Director	5299 Maingate Drive	N/A	Mississauga, ON L4W 1G6	peter.dundas@peelregion.ca;	N/A
Credit Valley Hospital					2200 Eglinton Avenue West	N/A	Mississauga, ON L5M 2N1		(905) 813 3850
Municipal Representatives									
City of Mississauga	Ms.	Crystal	Greer	City Clerk (Confirm) - non-existent on directory	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	crystal.greer@mississauga.ca;	N/A
City of Mississauga	Ms.	Helen	Noehammer	Director, Transportation & Works	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	helen.noehammer@mississauga.ca;	N/A
City of Mississauga	Ms.	Sangita	Manandhar	Team Leader - Park Assets (9056153200x3997) - she can confirm Bike Trail/Trail requirements for contact	3484 Semenyk Court	N/A	Mississauga, ON L5C 4R1	sangita.manandhar@mississauga.ca;	905-615-3200 ext. 3997
City of Mississauga	Mr.	Thomas	Nightingale	Stormwater Asset Management Plan	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	thomas.nightingale@mississauga.ca;	905-615-3200 ext. 5921
City of Mississauga	Ms.	Lin	Rogers	Manager of Transportation Projects	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	lin.rogers@mississauga.ca;	905-615-3200 ext. 4197
City of Mississauga	Ms.	Sharon	Chapman	Manager, Park Planning				sharon.chapman@mississauga.ca;	
City of Mississauga	Ms.	Sheryl	Badin	Manager, Real Estate	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	sheryl.badin@mississauga.ca;	
City of Mississauga	Mr.	Bryan	MacMillan	MiWay	3484 Semenyk Court	N/A	Mississauga, ON L5C 4P8	bryan.macmillan@mississauga.ca;	905-615-3200 ext. 3825
City of Mississauga	Mr.	John	Dunlop	City of Mississauga, Supervisor Heritage Planning	201 City Centre Drive (Suite 202)			john.dunlop@mississauga.ca;	
City of Mississauga		Auryn	Soares	Storm Drainage Coordinator, Environmental Services				auryn.soares@mississauga.ca;	905-615-3200 ext.3363
City of Mississauga		Evelyn	Krolicka	Storm Drainage Technologist				evelyn.krolicka@mississauga.ca;	
City of Mississauga	Mr.	Jevito	Marchese	Supervisor, Maintenance Standards and Permits				jevito.marchese@mississauga.ca	905-615-3200 ext. 4024
Region of Peel	Ms.	Kealy	Dedman	Commissioner of Public Works.				kealy.dedman@peelregion.ca>	
Region of Peel	Mr.	Anthony	Parente	General Manager, Water and Wastewater	10 Peel Centre Drive	N/A	Brampton, ON L6T 4B9	anthony.parente@peelregion.ca;	N/A
Region of Peel	Mr.	Elvis	Oliveira	Director, Water Wastewater Infrastructure Planning	10 Peel Centre Drive	N/A	Brampton, ON L6T 4B9	elvis.oliveira@peelregion.ca;	N/A

Peel West Trunk Diversion
Peel Contract No. 08-2250
Agency Contact List

Agency/Organization	Title	First Name	Last Name	Position	Address			Email	Telephone
Region of Peel	Ms.	Terry	Ricketts	Director of Transportation				terry.ricketts@peelregion.ca;	
Region of Peel	Ms.	Andrea	Pitura	Director, Water/Wastewater, Engineering Services Division				andrea.pitura@peelregion.ca	
Region of Peel	Ms.	Elaine	Gilliland	Director, Water & Wastewater Operations				elaine.gilliland@peelregion.ca	
Other Agencies									
The Streetsville BIA				General Mailbox	280 Queen Street				

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Peel West Trunk Diversion
Peel Contract No. 08-2250
Utilities Contact List

Region of Peel
working with you

Agency/Organization	Title	First Name	Last Name	Position	Address			Email	Telephone
Enbridge Pipelines Inc.	Ms.	Ann	Newman	Crossings Coordinator	801 Upper Canada Drive P O Box 128	Sarnia, ON N7T 7H8	Sarnia, ON N7T 7H8	ann.newman@enbridge.com	519-339-0080
Enbridge Pipelines Inc.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	est.reg.crossing@enbridge.com	1-800-668-2951
Enbridge Gas Distribution Inc.	Mr.	Daniel	Petrozziello	Transit Project Manager	101 Honda Blvd.	Markham	Markham, ON L6C 0M6	jim.arnott@enbridge.com	416-758-7901
Trans-Northern Pipelines Ltd	Mr.	Cliff	Lee	N/A	45 Vogell Road, Suite 310	Richmond Hill	Richmond Hill, ON L4B 3P6	clee@tnpi.ca	905-770-3353 ext 292
Trans Canada Pipelines	Ms.	Darlene	Quilty	Planning Co-ordinator	442 Brant Street	Suite 204	Burlington, ON L7R 2G4	dquilty@mhbcplan.com	T 905 639 8686 x 229
Union Gas Ltd.	Mr.	Dave	Gadbois	Manager	N/A	N/A	N/A	DGadbois@uniongas.com	N/A
Bell Canada	Mr.	Ajmal Maha	Sairally Zafar	N/A	N/A	N/A	N/A	ajmal.sairally@bell.ca maha.zafar@bell.ca	(416) 770-6731
Rogers Cable	Mr.	Bien	Bengco	N/A	N/A	N/A	N/A	Bien.Bengco@rci.rogers.com	647-426-5214
Hydro One Networks	Mr.	Greg	Gowan	N/A	N/A	N/A	N/A	greg.gowan@hydroone.com	905-946-6232
Hydro One Telecom	Mr.	Ian	Mitchell	OSP Manager	N/A	N/A	N/A	ian.mitchell@HydroOne.com	N/A
Peel Fibre (PSN)	Ms.	Neha	Canjar	PSN Advisor	N/A	N/A	N/A	neha.canjar@peelregion.ca	905-791-7800 ext. 1831
Bell 360	Mr.	Jody	Thompson	Specialist, Network Provisioning	N/A	N/A	N/A	jody.thompson2@bell.ca	416-407-3976
Aptum Technologies (formerly Cogeco Peer 1)	Mr.	Scott	Connor		N/A	N/A	N/A	Scott.Connor@cogecopeer1.com	N/A
Alectra		Tirath	Garcha	Supervisor, Distribution Design – Transit Projects	3240 Mavis Rd	Mississauga	Mississauga, ON L5C 3K1	Tirath.Garcha@alectrautilities.com	905-283-4022
Alectra	Mr.	Rob	Chopra	N/A	3240 Mavis Rd	Mississauga	Mississauga, ON L5C 3K1	Rob.Chopra@alectrautilities.com	
Alectra	Mr.	Philander	Khuu	N/A	3240 Mavis Rd	Mississauga	Mississauga, ON L5C 3K1	Philander.Khuu@alectrautilities.com	

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Peel West Trunk Diversion
Peel Contract No. 08-2250
First Nations Contact List

Region of Peel
working with you

Agency/Organization	Title	First Name	Last Name	Position	Address			Email	Telephone
Haudenosaunee Six Naitons Confederacy Council, c/o Haudenosaunee Development				Office Administrator	Suite 600, 16 Sunrise Court	PO Box 714	Ohsweken, ON N0A 1M0	hdi2@bellnet.ca	
Huron-Wendat Nation		Mario	Gros-Louis	Coordinator	255 Place Chef Michel Laveau		Wendake, QB G0A 4V0	mario.grouslouis@wendake.ca	418 843-3767
Mississaugas of New Credit First Nation	**Chief**	**Stacey**	**LaForme**	Chief				stacey.laforme@mncfn.ca	
Mississaugas of New Credit First Nation		Fawn	Sault	Consultation Manager				fawn.sault@mncfn.ca	
Peel Aboriginal Network	Ms.			Healthy Living Coordinator	5 Wellington Street East	N/A	Brampton, ON L6W 1Y1	pan.info@icloud.com	905-712-9803
Six Nations of the Grand River		Lonny	Bomberry	Director - Land and Resources	2498 Chiefswood Road	P.O. Box 5000	Oshweken, ON N0A 1M0	lonnybomberry@sixnations.ca	519-753-0665
Six Nations of the Grand River	**Chief**	**Mark B.**	**Hill**	Chief	Chief of Staff, of Mark Hill			tammymartin@sixnations.ca	

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Peel West Trunk Diversion
Peel Contract No. 08-2250
Councillor Contact List

Region of Peel
working with you

Agency/Organization	Title	First Name	Last Name	Position	Address			Email	Telephone
Region of Peel to Notify									
City of Mississauga	Mr.	George	Carlson	Ward 11 Councillor	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	george.carlson@mississauga.ca	
City of Mississauga	Ms.	Pat	Saito	Ward 9 Councillor	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	pat.saito@mississauga.ca	
City of Mississauga	Mr.	Matt	Mahoney	Ward 8 Councillor	300 City Centre Drive	N/A	Mississauga, ON L5B 3C1	matt.mahoney@mississauga.ca	

Appendix J4

Project Information Form (PIF)

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What to do:
Step 1: Look for the type of EA project in column B that applies to you.
Step 2: Complete columns C to J for that project.
Step 3: Send this form in Excel format to the MECP regional office email address where the project is located.
MECP regional office email addresses are listed at
www.ontario.ca/page/preparing-environmental-assessments

	Class EA/Streamlined EA	Proponent Name	Proponent Contact	Project Name	Project Schedule	Project Type	Project Location	MOECC Region	Project Initiation Date
1	CO - Remedial flood and erosion control projects								
2	GO Transit - Class EA								
3	Hydro One - Minor transmission facilities								
4	MEA - Class EA for municipal infrastructure projects	Region of Peel	Ajay Puri ajay.puri@peelregion.ca	West Trunk Sanitary Sewer Diversion	Schedule B	Municipal water and wastewater projects	Mississauga, City of	Central	4/8/2019
5	Ministry of Infrastructure - Public work								
6	MNDM - Activities of the Ministry of Northern Development and Mines under the Mining Act								
7	MNRF - Provincial parks and conservation reserves								
8	MNRF - Resource stewardship and facility development projects								
9	MTO - Provincial transportation facilities								
10	O. Reg. 101/07 - Waste management projects								
11	O. Reg. 116/01 - Electricity projects								
12	OWA - Waterpower projects								
		Enter the proponent's name.	Enter the name and email address of the person who the MECP should contact about your project. This should be the same contact person who is listed on the notice.	Enter the project name as it appears on the notice.	Select the project schedule from the drop-down menu.	Select the project type from the drop-down menu.	Select the name of the municipality or unorganized/unsurveyed area where your project is located from the drop-down menu.	Select the MECP region from the drop-down menu. Read the "MECP regions" worksheet to find the MECP region where your project is located.	Enter the date that the streamlined EA process was initiated (e.g. notice of commencement). This date may be when the project notice was first published.

APPENDIX J5

Consultation Activity and Tracking Table

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Contact Information	Points of Contact	Comment	Response/Follow-Up
Indigenous Communities			
Fannon Burch Chippewa of the Thames Consultation Coordinator	Notice of Study Commencement Notice of PIC	Letter (July 10, 2019) - We have identified no concerns with your project or the information that you have presented to us at this time.	Noted.
Fawn D. Sault Consultation Manager Mississaugas of the New Credit First Nation (MNCFN) MNCFN Department of Consultation and Accommodation cc – Mark LaForme; Director, Department of Consultation and Accommodation	Notice of Study Commencement Notice of PIC	At this time, MNCFN does not have a high level of concern regarding the proposed project and therefore, by way of this letter, approves the continuation of this project. However, MNCFN requests that you continue to notify us about the status of the project. In addition, we respectfully ask you to immediately notify us if there are any changes to the project as they may impact MNCFN's interests and that you please provide us with a copy of all associated environmental and archaeology reports. This includes, but is not limited to changes related to the scope of work and expected archaeological and environmental impacts. It is MNCFN policy that Field Liaison Representatives (FLRs) are on location whenever any fieldwork for environmental and/or archaeological assessments are undertaken.	Thank you for taking the time to provide us with your comments. Fieldwork for the Stage 2 Archaeological Assessment work for the Falconer Detailed Design is progressing and coordination with the MNCFN is ongoing, including the coordination of FLRs. We are planning on completing the Stage 2 AA work this year. We will provide notification for the field work and will provide compensation per ongoing discussions.
Maxime Picard Huron Wendat	Notice of Study Commencement Notice of PIC No. 1	Requested copy of Stage 1 Archaeological Assessment (Jan 14, 2021). Acknowledged receipt of Report and requested to be contacted if future archaeological studies anticipated.	Shared Stage 1 AA Report (January 2021).
Six Nations of the Grand River	Notice of PIC No. 1 Phone Call		Phone Call (Nov 24, 2021) - follow-up to confirm no further comments, as no response provided from any communication issued. Follow-up email provided (Nov 25, 2021) with attached PIC notice for their records.
Haudenosaunee Confederacy Chiefs Council	Notice of PIC No. 1 Follow-up Email		Follow-up email issued (November 25, 2021) including Notice of PIC, and inquired if there were any further comments on the Project.
Federal Agencies			
Cheyenne Loon Habitat Biologist, Aboriginal Species at Risk Fund Canadian Wildlife Service- Environment and Climate Change Canada- Government of Canada	Notice of Study Commencement	Email (May 17, 2019)- Request to be removed from mailing list.	Noted.
Environmental Assessment Program, Ontario Region Transport Canada- Government of Canada	Notice of Study Commencement	Email (June 13, 2019)- Transport Canada does not require receipt of all individual or Class EA related notifications. It is requested that project proponents determine if the project will interact with federal property and/or waterway by reviewing the Directory of Federal Real Property, and if the project requires approval and/or authorization under any Acts administered by Transport Canada. With projects that do occur on federal property, they will be subjected to a determination of the likelihood of significant adverse environmental effects, per Section 67 of the *Canadian Environmental Assessment Act, 2012*. If the aformentioned does not apply, any correspondence regarding the Environmental Assessment program will not be answered. If there is a role that Transport Canada will play, a brief description should be outlined for them specifically. Certain acts that can be triggered in environmental assessment projects like these include the Navigation Protection Act (NPA), Railway Safety Act (RSA), Transportation of Dangerous Goods Act (TDGA), and the Aeronautics Act.	Noted.
Fisheries and Oceans Canada, Fisheries Protection Program	Notice of Study Commencement	Email (May 17, 2019)- Fisheries and Oceans Canada, Fisheries Protection Program confirmed receipt of notification.	Noted.
Provincial Agencies			

Contact Information	Points of Contact	Comment	Response/Follow-Up
Trevor Bell Environmental Resource Planner and EA Coordinator Ministry of the Environment, Conservation and Parks (MECP)	Notice of Study Commencement Notice of PIC	Email with letter in PDF (June 12, 2019) - The MECP acknowledges that the Region of Peel is following the approved environmental planning process for a Schedule B project under the Municipal Engineers Association's Municipal Class EA. The MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter. Areas of interest need to be identified by the proponent so project delays are minimal, and the crown and proponent have a legal duty to consult with affected Aboriginal communities (ie. Mississaugas of the Credit First Nation, Six Nations on the Grand River, Haudenosaunee Confederacy Chiefs Council, and the Huron-Wendat Nation) where the duty must be fulfilled for the project to proceed. The following areas are to be incorporated into the documentation (further detail in Appendix A): • Source Water Protection Areas mentioned in the Clean Water Act • Climate Change • Planning and Policy • AIr Quality, Dust and Noise • Ecosystem Protection and Restoration • Surface Water • Groundwater • Contaminated Soils • Excess Materials Management • Serving and Facilities • Mitigation and Monitoring • Consultation • Class EA Process • Duty to Consult with affected Indigenous communities	Response (December 3, 2021): Thank you for your comments related to the Areas of Interest, which we have addressed in this Schedule B Class EA, and documented in the Project File Report. In recognizing that the MECP's delegated the procedural aspects of rights-based consultation to the proponent through the letter, the Region of Peel has included the four Indigenous communities included in the letter on the Project contact list, and shared the Notices of Study Commencement, Public Information Centre and Study Completion to those Indigenous communities. As noted in the Consultation Tracking table, two Indigenous communities requested to be involved either to review the Stage 1 Archaeological Assessment, or to be involved in future field work for Stage 2 Archaeological Assessment. We have already engaged with the Mississaugas of the New Credit First Nation, as part of a segment of the Project, and outside of the EA to have Field Liaison Representatives to join our team on site. A copy of the PFR will be shared with the MECP as part of the Public Review period. The additional Areas of Interest are summarized as noted below: - Source Water Protection - we have included details related to the Clean Water Act, and Credit Valley - Toronto and Region - Central Lake Ontario Source Protection Region, as it relates to this study area in Section 2.2.6 of the PFR. - Climate Change - Section 2.2.5 of the PFR outlines the Made-in-Ontario Environment Plan (2018), as well as the consideration of climate change in the EA Process (Section 2.2.5.1). - Planning and Policy - Section 2.2 includes a summary of all the Provincial Policies (up to date), which influence the study area of this Project. - Air Quality, Dust and Noise - Although the Project does not intend to have an impact on air quality, dust and noise during the operation, the potential to impact air quality, dust and noise are summarized in the Section 6.1.2, related to nuisance effects during construction, as well as the need for construction and post-construction monitoring plans to mitigate any potential impacts as a result of air quality, dust and noise. - Ecosystem Protection and Restoration - Section 3.3 includes a summary of existing natural environment conditions, and Section 6.3 summarizes the potential environental effects, mitigation measures and commitments as a result of the Project. - Surface Water - as noted above, Section 3.3 discusses the three watercourses within the study area, and Section 6.3 summarizes potential effects. - Groundwater - Section 3.2.2 includes details on hydrogeological conditions, as well as groundwater levels. - Contaminated Soils - Section 3.2.1 summarizes the findings of a Phase 1 Environmental Site Assessment completed for the study area to document potential sources of contamination. - Excess Materials Management - Section 6.2.1 provides recommendations related to how to manage and dispose of contaminated soils. - Servicing and Facilities - Details about the existing wastewater servicing in the study area is detailed in Section 3.2.3, and Section 3.2.4 discusses the land use compatibility of the proposed project. - Mitigation and Monitoring - Mitigation and monitoring activities are summarized in Section 6, and are further detailed in Section 6.7, related to Construction and Post-Construction Monitoring Plans. - Consultation - The Project included two points of contact, including the Notice of Study Commencement, and an online Public Information Centre. The details are included in Section 5 of the PFR. - Class EA Process - The Project File Report summarizes the planning and decision-making process and will be made available for a 45-calendar day review period, to allow interested members of the public, stakeholders, agencies, and Indigenous communities to comment on the Project. We hope that the details provided are satisfactory with regards to the requirements outlined in your letter in 2019.
Dan Minkin - Cultural Heritage MHSTCI	Notice of Commencement Submitted CHRA (May 28, 2020) for review/approval Submitted CHRA and Cultural Heritage Report (November 11, 2021) for review/approval Notice of PIC	Response (July 10, 2020) - There is no description of potential or identified built heritage resources or cultural heritage landscapes beyont those with previous recognition by the municipality. It is not clear whether the field review noted any potential previously unrecognized resources, and if so, how they were evaluated and found not to have cultural heritage value or interest. This should be clarified. Please continue to consult MHSTCI throughout EA process.	Action: ASI updated Report to include a few additional sentences clarifying the field work to reflect the comments received.

Contact Information	Points of Contact	Comment	Response/Follow-Up
MHSTCI Archaeology - Pastport	Submitted Stage 1 AA to MHSTCI	The Ministry has screen the project report package, and it is now complete - the report is now considered filed with the ministry. It will either be added to the queue to be reviewed or entered into the register without technical review. This is deemed a revised report, and does not require an expedited review - we will try to review report within 15 business days of the report filing date.	
		Revised Version of the Stage 1 was submitterd (Nov 2021) with an expedited Review Request. Response submitted (Jan. 19, 2022) in relation to the concerns related to trenchless technology and clarification regarding surface level construction in proximity to Streetsville Memorial Cemetery. ASI and Hatch provided additional information (Jan. 27, 2022) related to shaft construction and tunnelling methods. Hatch noted that they fully intend to take all reasonable precaustions and employ engineering best practices to ensure the tunnel does not collapse (to be designed during Detailed Design phase). The revised report inclusive of the above noted clarifications was resubmitted (March 1, 2022).	Comments received (Dec 13, 2021) noting MHSTCI's concern with trenchless technology as the preferred construction method as well as the project proximity to Streetsville Memorial Cemertery. A reponse was then provided (Jan 27, 2022) requesting additional clarification. MHSTCI responded (Feb 18, 2022) noting that based on clarifications that there is a low potential to impact burials associated with Streetsville Memorial Cemetery and additional caveats if the tunnel design could not be done to "guarantee against collapse." An automated reponse was provided at the time of submission stating that the report would be in screening for 10 days. The revised report was accepted by MHSTCI and entered into the register on April 20, 2022.
Municipal Agencies			
Kimberly Duarte Admin Asst. to George Carlson, Councillor Ward 11 City of Mississauga	Notice of Study Commencement Notice of PIC	Email (May 29, 2019)- Kimberly mentioned that Councillor George Carlson for Ward 11 will promote the Open House in the Fall once the date is firm. Email (Sept 19, 2019) - Have you confirmed the date of the PIC yet?	Response (Region, Sept 19, 2019) - We are still in the investigation phase, and anticipate hosting the PIC in the next 2-3 months. We will start a geophysical investigation in October. All required permits will be obtained from the City for the required night time work.
Emily Pelleja Transportation Project Engineer City of Mississsauga	Notice of Study Commencement Meeting May 17, 2019 with City of Mississauga Notice of PIC	Email (May 17, 2019) - Emily will be the representative from City of Mississauga on the TAC, and advised she has no comments.	Noted.
Evelyn Krolicka City of Mississauga Auryn Soares Storm Drainage Coordinator, Environmental Services City of Mississauga	Notice of Study Commencement Notice of PIC	Email (May 23, 2019)- Auryn requested to be on the TAC. Email (July 31, 2019)- **Transportation & Works from Jacqueline Elias- MiWay.** • The City requests to be kept informed about Stormwater Pond #3901 (on the northeast corner of Erin Mills Parkway and Eglinton Ave W), and Stormwater Pond #4604 (on the northeast corner of Britannia Rd W and Queen) as the project progresses. • For proposed relocations, adjustments or alterations to the City's storm sewer network, the Region of Peel shall: -> Demonstrate there will be no negative hydraulic impacts -> Provide detailed designs to City Staff for review -> Complete a pre- and post- construction CCTV inspection of the affected storm sewers to the satisfaction of City staff which shall conform with NASSCO (PACP) standards -> Provide as-constructed drawings and CAD files to the City detailing revisions/alterations to the storm sewer network • With proposed utilities that are adjacent to the City's storm sewers, the Region of Peel shall: -> Ensure a minimum 0.5 m vertical clearance (above and below) for all storm sewer crossings -> Ensure a minimum 2.5 m horizontal clearance • Please refer to attached memo detailing MiWay's Infrastructure Requirements and	Meeting held with City of Mississauga to discuss comments (February 21, 2020). See Meeting Minutes (Appendix J).

Contact Information	Points of Contact	Comment	Response/Follow-Up
	City of Mississauga Feedback on Project Briefing- Community Services comments	Email (July 31, 2019)- **Community Services from Katie Henley-Landscape Architecht Assistant, Parks Assets- Park Planning Section, Community Services Department- City of Mississauga.** The intial comments from the Community Services include the following: • Advise what work or access routes for the proposed project will be within City of Mississauga lands/easements. • A Consent to Enter agreement application and/or Park Access Permit application is required for any City of Mississauga lands that are required for work or access. • Advise if new easements will be required. • Circulate to the Credit Valley Conservation of the proposed works for necessary permits/approvals needed for conducting work that may potentially impact natural features in the Conservation area. • A full construction/management drawing package with support for Natural Areas must be submitted for all areas of work. Please refer to the memo to see what types of documentation are needed. • Once a construction/management package is submitted, a site inspection will need to be completed by Park Planning, Forestry, CVC and the Region of Peel. • Inform Community Services of the project schedule and phases once information is available.	
	City of Mississauga Feedback on Project Briefing- Corporate Services comments	Email (July 31, 2019)- **Corporate Services frrom Auryn Soares or Katie Henley.** • If the rehabilitation of the existing trunk sewer requires an acquisition of new property rights involving easements, or fee acquisitions, the Region should allow a term of one and a half to two years to acquire the necessary property rights. This information should also form part of the schedule.	
Utilities			
Chris Pincombe Advisor Lands & ROW Enbridge Inc.	Notice of Study Commencement Notice of PIC	Email (May 21, 2019)- Contact needs to be updated. Suggested to contact the Right-of-way Group at 1-800-668-2951 or est.reg.crossing@enbridge.com.	Noted.

CHIPPEWAS OF THE THAMES FIRST NATION

January 25, 2021

VIA EMAIL

Ajay Puri
Project Manager, Capital works
Wastewater Division

Subject: **West Trunk Sanitary Sewer Diversion, Peel Region**

Dear Ajay,

We are in receipt of correspondence of the aforementioned project, dated January 14, 2021.

In our screening of your correspondence, we have identified no concerns with your project or the information that you have presented to us at this time.

We ask that you contact a First Nation within in closer proximity to your project. However, if there are any changes to your project that are of a substantive nature that you keep us informed.

Sincerely,

Fallon Burch
Chippewa of the Thames
Consultation Coordinator
consultation@cottfn.com

Department of
Consultation & Accommodation

April 25, 2022

Ajay Puri, M.E. (ENV), P. Eng.
Project Manager
The Regional Municipality of Peel
Ajay.puri@peelregion.ca

Dear Ajay,

We are the Mississaugas of the New Credit First Nation (MNCFN), the descendants of the Mississaugas of the River Credit. Our traditional territory extends from the Rouge River Valley in the east, across to the headwaters of the Thames River, down to Long Point on Lake Erie, and back along the shores of Lake Erie, the Niagara River, and Lake Ontario to the Rouge River Valley. It encompasses present-day London, Hamilton, and Toronto, as well as our communal lands. Our traditional territory has defined and sustained us as a First Nation for countless generations, and must continue to do so for all our generations to come.

Thank you for your notification on *the West Trunk Sanitary Sewer Diversion form the Credit River to Erin Mills Parkway* dated *May 3, 2019*. The Mississaugas of the New Credit First Nation (MNCFN) has various treaty rights across its traditional territory, including the area contemplated by your project. For further information, please see our website, http://www.newcreditfirstnation.com/. MNCFN continues to exercise treaty rights which include, but are not limited to, rights to harvest, fish, trap and gather species of plants, animals and insects for any purpose including food, social, ceremonial, trade and exchange purposes. The MNCFN also has the right to use the water and resources from the rivers, creeks and lands across the MCNFN traditional territory.

At this time, MNCFN *does not* have a high level of concern regarding the proposed project and therefore, by way of this letter, approves the continuation of this project. However, MNCFN

requests that you continue to notify us about the status of the project. **In addition, we respectfully ask you to immediately notify us if there are any changes to the project as they may impact MNCFN's interests and that you please provide us with a copy of all associated environmental and archaeology reports.** This includes, but is not limited to changes related to the scope of work and expected archaeological and environmental impacts.

Additionally, MNCFN employs Field Liaison Representatives ("FLRs") to act as official representatives of the community and who are answerable to MNCFN Chief and Council through the Department of Consultation and Accommodation. The FLRs' mandate is to ensure that MNCFN's perspectives and priorities are considered in the field and to enable MNCFN to provide timely, relevant, and meaningful comment on the Project. Therefore, **it is MNCFN policy that FLRs are on location whenever any fieldwork for environmental and/or archaeological assessments are undertaken.** It is expected that the proponent will cover the costs of this FLR participation in the fieldwork. Please also provide the contact information of the person, or consultant, in charge of organizing this work so they may facilitate the participation of the MNCFN FLRs.

Nothing in this letter shall be construed as to affect the Aboriginal or Treaty rights and hence shall not limit any consultation and accommodation owed to MNCFN by the Crown or any proponent, as recognized by section 35 of the Constitution Act, 1982.

MNCFN reserves the right in relation to any development project or decision, to decide whether it supports a project and to: comment to regulators, participate in regulatory processes and hearings, seek intervener funding or status, or to challenge and seek remedies through the courts.

MNCFN expects all proponents to act according to the following best practices:

- Engage early in the planning process, before decisions are made
- Provide information in meaningful and understandable formats.
- Convey willingness to transparently describe the project and consider any MNCFN concerns.
- Recognize the significance of cultural activities and traditional practices of the MNCFN
- Demonstrate a respect for MNCFN knowledge and uses of land and resources.
- Understand the importance of youth and elders in First Nation communities.
- Act with honour, openness, transparency and respect.
- Be prepared to listen and allow time for meaningful discussion.

Sincerely,

Fawn D. Sault
Consultation Manager
MNCFN Department of Consultation and Accommodation
cc – Mark LaForme; Director, Department of Consultation and Accommodation

Alexander, Melissa

From: Maxime Picard <maxime.picard@cnhw.qc.ca>
Sent: Thursday, January 14, 2021 1:32 PM
To: Alexander, Melissa
Cc: Puri, Ajay; Gelinas, Marc; Henderson, Graeme
Subject: RE: Region of Peel - West Trunk Diversion - Notice of PIC

Follow Up Flag: Follow up
Flag Status: Flagged

We have well received the Stage 2 report Melissa.

Please note that the Huron-Wendat Nation would appreciate receiving the invitation to participate in the Stage 2 fieldwork.

Thanks and best regards,

Maxime Picard

NATION HURONNE-WENDAT
Bureau du Nionwentsïo

Maxime Picard, B. Sc. A.
Coordonnateur de projets - Ontario
255, Place Chef Michel-Laveau
Wendake (Qc) G0A 4V0
Téléphone : 418-843-3767 # 2105
Courriel : maxime.picard@cnhw.qc.ca

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De : Alexander, Melissa [mailto:melissa.alexander@hatch.com]
Envoyé : 14 janvier 2021 09:41
À : Maxime Picard <maxime.picard@cnhw.qc.ca>

Cc : Puri, Ajay <ajay.puri@peelregion.ca>; Gelinas, Marc <marc.gelinas@hatch.com>; Henderson, Graeme <graeme.henderson@hatch.com>
Objet : RE: Region of Peel - West Trunk Diversion - Notice of PIC

Hi Maxime,

There was a Stage 1 Archaeological Assessment completed as part of this Project. There will be some Stage 2 AA work to be completed as part of the detailed design.

Please let us know if you would like us to share the Stage 1 AA with you?

Thank you,

Melissa Alexander, B.Sc., MCIP, RPP
Environmental Planner / Environmental Services Group

Tel: +1 905 486 0744
Mississauga

From: Maxime Picard <maxime.picard@cnhw.qc.ca>
Sent: Thursday, January 14, 2021 8:19 AM
To: Alexander, Melissa <melissa.alexander@hatch.com>
Subject: TR: Region of Peel - West Trunk Diversion - Notice of PIC

Good morning Melissa,

This is to acknowledge reception of your email and notice on the West Trunk Diversion Project.

Can you please let us know if any archaeological studies are anticipated as part of this process ?

Thanks and best regards,

Maxime Picard

NATION HURONNE-WENDAT
Bureau du Nionwentsïo

Maxime Picard, B. Sc. A.
Coordonnateur de projets - Ontario

255, Place Chef Michel-Laveau
Wendake (Qc) G0A 4V0
Téléphone : 418-843-3767 # 2105
Courriel : maxime.picard@cnhw.qc.ca

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Avis sur la protection et la confidentialité des informations

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De : Alexander, Melissa [mailto:melissa.alexander@hatch.com]
Envoyé : 13 janvier 2021 17:28
À : Alexander, Melissa
Cc : Puri, Ajay; Gelinas, Marc; Henderson, Graeme
Objet : Region of Peel - West Trunk Diversion - Notice of PIC

Good afternoon,

Please find attached the Notice of Public Information Centre (PIC) for the West Trunk Diversion Class Environmental Assessment Study. The website link with the PIC boards will be activated, as identified in the Notice commencing January 25th, 2021.

We look forward to receiving your input on the Project.

Thank you,

Melissa Alexander, B.Sc., MCIP, RPP
Environmental Planner / Environmental Services Group

Tel: +1 905 486 0744
2800 Speakman Drive
Mississauga, Ontario L5K 2R7

Ministry of the Environment, Conservation and Parks
Central Region
5775 Yonge Street, 8th Floor
North York ON M2M 4J1
Phone: 416.326.6700
Fax: 416.325.6345

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Région du Centre
8e étage, 5775, rue Yonge
North York ON M2M 4J1
Tél : 416 326-6700
Téléc : 416 325-6345

Ontario

June 12, 2019 File No.: EA 01-06-03

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Division, Collection & Communal Treatment
Region of Peel Public Works
ajay.puri@peelregion.ca

BY EMAIL ONLY

Re: **West Trunk Sanitary Sewer Diversion**
Region of Peel
Schedule B Municipal Class EA
Response to Notice of Commencement

Dear Ajay Puri,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Region of Peel has indicated that the study is following the approved environmental planning process for a Schedule B project under the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA).

The attached "Areas of Interest" document provides guidance regarding the Ministry's interests with respect to the Class EA process. Please identify the areas of interest which are applicable to the project and ensure they are addressed. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MOECC is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed

project:

- Mississaugas of the Credit First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council
- Huron-Wendat Nation (if there is potential to impact archaeological resources)

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process" which can be found at the following link: https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process
Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information.

The proponent must contact the Director of Environmental Assessment and Permissions Branch under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to the proponent by the communities
- The proponent has reason to believe that the proposed project may adversely affect an Aboriginal or treaty right
- Consultation has reached an impasse
- A Part II Order request or elevation request is expected

The Director of the Environmental Assessment and Permissions Branch can be notified either by email with the subject line "Potential Duty to Consult" to enviropermissions@ontario.ca or by mail or fax at the address provided below:

Email:	enviropermissions@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Assessment and Permissions Branch 135 St. Clair Avenue West, 1st Floor Toronto, ON, M4V 1P5

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role the proponent will be asked to play in them.

A draft copy of the Project File Report (PFR) should be sent to this office prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments. Please also forward the Notice of Completion and final PFR to me when completed.

Should you or any members of your project team have any questions regarding the material above, please contact me at trevor.bell@ontario.ca or 416-326-3577.

Sincerely,

Trevor Bell, B.Sc., M.Env.
Regional Environmental Assessment Coordinator
Air, Pesticides and Environmental Planning

cc: Paul Martin, Supervisor, Technical Support Section, MECP
Tina Dufresne, Manager, Halton Peel District Office, MECP
Marc Gelinas, Principal Engineer, Infrastructure, Hatch
Central Region EA File
A & P File

Attach: Areas of Interest
A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities

AREAS OF INTEREST

It is suggested that you check off each applicable area after you have considered / addressed it.

☐ **Source Water Protection (all projects)**

The Clean Water Act, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or near other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- As you may be aware, in October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the PFR on source water protection.**
    - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the PFR how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: http://www.applications.ene.gov.on.ca/swp/en/index.php.The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be

applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. The contact for this project is Jennifer Stephens at 416-661-6600 ext. 5568 or jstephens@trca.on.ca. Please document the results of that consultation within the Report and include all communication documents/correspondence.**

More Information
For more information on the Clean Water Act, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the Clean Water Act. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

Climate Change

Ontario is leading the fight against climate change through the Climate Change Action Plan. Recently released, the plan lays out the specific actions Ontario will take in the next five years to meet its 2020 greenhouse gas reduction targets and establishes the framework necessary to meet its long-term targets. As a commitment of the action plan, **the province has now finalized a guide, "Considering Climate Change in the Environmental Assessment Process" (Guide), which is found online at: www.ontario.ca/page/considering-climate-change-environmental-assessment-process**

The Guide is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. **Proponents should review this Guide in detail.**

- The MECP expects proponents to:

  1. Consider during the assessment of alternative solutions and alternative designs, the following:
     a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
     b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
  2. Include a discrete section in the PFR detailing how climate change was considered in the EA.

  How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered. Please ensure climate change is considered in the report.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

Planning and Policy

- Parts of the study area may be subject to the Oak Ridges Moraine Conservation Plan, Niagara Escarpment Plan, Greenbelt Plan, Lake Simcoe Protection Plan, or Growth Plan for the Greater Golden Horseshoe. Applicable policies should be referenced in the PFR, and the proponent should describe how the proposed study adheres to the relevant policies in these plans. **The new 2017 provincial plans are now in effect.**

- The Provincial Policy Statement (2014) contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the PFR, and the proponent should describe how this proposed project is consistent with these policies.

Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of this project, an air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- **If a full Air Quality Impact Assessment is not required for the project, the PFR should still contain:**
  - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
  - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
  - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
  - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities.* Report prepared for Environment Canada. March 2005.http://www.bv.transports.gouv.qc.ca/mono/1173259.pdf

- The PFR should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The PFR should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- All natural heritage features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be

located within or adjacent to the study area:

- Areas of Natural and Scientific Interest (ANSIs)
- Rare Species of flora or fauna
- Watercourses
- Wetlands
- Woodlots

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, you may consider the provisions of the Rouge Park Management Plan if applicable.

Surface Water

- The PFR must include a sufficient level of information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the PFR and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

    - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
    - Watershed information, drainage conditions, and other relevant background information
    - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
    - Information on maintenance and monitoring commitments.

- Ontario Regulation 60/08 under the Ontario Water Resources Act (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the PFR should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

- Any potential approval requirements for surface water taking or discharge should be identified in the PFR. In particular, a Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

Groundwater

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the PFR.

- If the potential construction or decommissioning of water wells is identified as an issue, the PFR should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the PFR. In particular, a Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

Contaminated Soils

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the ministry's District Offices for further consultation if contaminated sites are present.

- Any current or historical waste disposal sites should be identified in the PFR. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites.

- The location of any underground storage tanks should be investigated in the PFR. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- The PFR should identify any underground transmission lines in the study area. The owners should be consulted to avoid impacts to this infrastructure, including potential spills.

Excess Materials Management

- Activities involving the management of excess soil should be completed in accordance with the MECP's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014) available online (http://www.ontario.ca/document/management-excess-soil-guide-best-management-practices).

- All waste generated during construction must be disposed of in accordance with ministry requirements.

Servicing and Facilities

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with the Environmental Approvals Access and Service Integration Branch (EAASIB) to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's "D-Series" guidelines – Land Use Compatibility to ensure

that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

Mitigation and Monitoring

Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the PFR and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the PFR, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

Consultation

- The PFR must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the PFR that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The Class EA also directs proponents to include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments.

Class EA Process

- The PFR should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. The Master Plan should clearly indicate the selected approach for conducting the plan, in particular by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the *Environmental Assessment Act* (EAA), although the plan itself would not be.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment. The PFR should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments) such that all potential impacts can be identified and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the PFR.

- Please include in the PFR a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, and approvals under the *Canadian Environmental Assessment Act* (CEAA).

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the PFR.

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing

a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the

Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Region of Peel West Trunk Diversion – Class EA – PFR - Ministry of Environment, Conservation, and Parks (MECP) Comments – 2022-02-01

Item No.	Drawing No./Section/ Page No.	Date of Comment	Comment (MECP)	Response (Region of Peel/Hatch)
0	Cover Letter (N/A)	January 13, 2022	The Ministry of the Environment, Conservation and Parks (the ministry) has reviewed the draft Project File Report (the report) prepared by Hatch Ltd., dated December 3, 2021, for the Schedule B Municipal Class Environmental Assessment for the Peel West Trunk Diversion in the City of Mississauga. We understand that the preferred alternative solution is Alternative 4: Single Diversion Concept Along Erin Centre Boulevard. This alternative focuses primarily on Queen Street/Mississauga Road, with a branch along Britannia Road West. The preferred alternative involves six tunnel shaft staging locations and one connection point to the Credit Valley Trunk Sewer. Tunneling will be used as the construction method for the sewer construction. The ministry is generally satisfied with the report. The level of detail is appropriate for a project of this scale and at this stage in the planning process. We appreciate the attention that went into addressing our areas of concern.	Noted.
1	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	A Phase 2 Environmental site Assessment should be completed for all shaft sites.	Phase 2 ESAs shall be undertaken at all proposed tunnel shaft locations. Text added to Section 6.2.1 to reflect requirement for Phase 2 ESAs.
2	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	The proponent should consider submitting an FOI request to the MECP for addresses identified in the Phase 1 ESAs as possible sites of concern. This data will help inform the management of excess soils and water removed from excavations.	Further to Hatch's response to comment 1, Phase 2 ESAs will be completed during the detailed design. In addition, a full suite of dedicated geotechnical and hydrogeological investigations shall be undertaken to assess subsurface conditions. This will include an assessment of past uses which incorporates research and FOI requests for additional information.
3	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	Table 0-4: Permits and Approvals Anticipated for the Proposed Project of Hatch (2021) should include a Permit to Take Water or an EASR for construction dewatering from the MECP and a discharge agreement/permit from the municipality or the Conservation Authority.	Table 0-4 updated to reflect text in Section 6.6. In addition, both Table 0-4 and Section 6.6 updated to reflect discharge agreement/permit.
4	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	The West Trunk Diversion (WTD) Geotechnical and Hydrogeological Background Review Study (TM-02) (Hatch, 2021) does not meet the requirements of a Category 3 Hydrogeological Assessment for either a PTTW or EASR for construction dewatering.	Noted. The referenced memorandum was only intended to provide a summary of other geotechnical investigations undertaken in proximity to the study area. A full suite of dedicated geotechnical and hydrogeological investigations shall be undertaken to assess subsurface conditions and to facilitate the acquisition of a PTTW/EASR during the detailed design phase.

5	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	The ministry recommends that during future investigations, site specific hydrogeological data should be collected to satisfy the requirements for PTTWs or construction dewatering EASRs. The hydrogeological reporting requirements for these instruments can be found at Technical guidance document for hydrogeological studies in support of category 3 applications and Technical guidance document for surface water studies in support of category 3 applications. Confirmation drilling along the geophysical survey transects should be used to draw cross sections, and boreholes can be instrumented as monitoring wells and tested to determine hydraulic conductivities.	Acknowledged. Further to the response to Comment 4, a full suite of dedicated geotechnical and hydrogeological investigations shall be undertaken to assess subsurface conditions and facilitate the acquisition of a PTTW/EASR during the detailed design phase.
6	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	Previous dewatering activities in the area can be used to inform the project dewatering requirements.	Noted. As noted within the response to Comment 4, a full suite of dedicated geotechnical and hydrogeological investigations shall be undertaken to assess the existing subsurface (i.e., hydrogeological) conditions as well.
7	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	The ministry recommends that the proponent contact the Oak Ridges Moraine Groundwater Program. This organization has completed groundwater studies delineating artesian areas within the Oak Ridges Moraine.	Aerial maps were received from the Oak Ridges Moraine Groundwater Program and taken into consideration. Further consultation shall be taken into consideration during the detailed design phase. Text added to Section 6.2.2 regarding additional consultation.
8	Contaminated Sites and Permit to Take Water (PTTW)	January 13, 2022	For PTTWs and EASRs, the proponent should address the possibility of settlement in the dewatering radius of influence.	Noted, this will be taken into consideration during the detailed design phase.
9	Species at Risk	January 13, 2022	Please contact the ministry's Species at Risk Branch at SAROntario@ontario.ca to confirm potential requirements under the Endangered Species Act (2007).	SARO was contacted on April 1, 2019 to confirm requirements (documented in Appendix A, of Appendix C of the PFR). Text updated in PFR.
10	Consultation with Indigenous Communities	January 13, 2022	The report notes in Section 5.1.1 that some of the interested Indigenous communities requested an opportunity to review the Stage 1 Archaeological Assessment (S1AA). Section 6.4.1 indicates that the S1AA was submitted to the MHSTCI on November 2, 2021. It is unclear if the S1AA was also provided to the interested Indigenous communities. This should be clarified in the report.	Section 5.1.1 updated to reflect that the Stage 1 AA was shared with (the Huron-Wendat and Mississaugas of the New Credit First Nation) and that no comments were received. These details are summarized in Appendix J.
11	Consultation with Indigenous Communities	January 13, 2022	Section 6.4.1 indicates that the consultant archaeologist, approval authority and Cultural Programs Unit of the MHSTCI should be immediately notified if archaeological remains are found during construction activities. A commitment should also be made to immediately contact the identified Indigenous communities if archaeological resources are uncovered during construction. The ministry recommends developing a plan for work stoppage and a communication plan for contacting the Indigenous communities should any archaeological resources be uncovered.	The following text has been added to Section 6.4.1: During detailed design, a communication plan should be developed to outline the steps to be undertaken in the event of a stop-work order following the uncovering of human remains and/or any archaeological resources during construction. The communication plan should outline the Indigenous communities to be contacted.

Ministry of Heritage, Sport, Tourism, and Culture Industries

Programs and Services Branch
401 Bay Street, Suite 1700
Toronto, ON M7A 0A7
Tel: 416.314.7147

Ministère des Industries du Patrimoine, du Sport, du Tourisme et de la Culture

Direction des programmes et des services
401, rue Bay, Bureau 1700
Toronto, ON M7A 0A7
Tél: 416.314.7147

Ontario

July 10, 2020 EMAIL ONLY

Melissa Alexander, B.Sc., MCIP, RPP
Hatch
2800 Speakman Drive
Mississauga, ON L5K 2R7
Melissa.alexander@hatch.com

MHSTCI File	**:**	**0010609**
Proponent	**:**	**Region of Peel**
Subject	**:**	**Cultural Heritage Resource Assessment**
Project	**:**	**West Trunk Sewer Diversions**
Location	**:**	**City of Mississauga, Ontario**

Dear Ms. Alexander:

Thank you for providing the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) with the *Cultural Heritage Resource Assessment: Built Heritage Resources and Cultural Heritage Landscapes* (CHRA) prepared for the above-referenced project by ASI. We have reviewed the CHRA and offer the following comments.

There is no description of potential or identified built heritage resources or cultural heritage landscapes beyond those with previous recognition by the municipality. It is not clear whether the field review noted any potential previously unrecognized resources, and if so, how they were evaluated and found not to have cultural heritage value or interest. This should be clarified.

Thank you for consulting MHSTCI on this project and please continue to do so throughout the EA process. If you have any questions or require clarification, do not hesitate to contact me.

Sincerely,

Dan Minkin
Heritage Planner
Dan.Minkin@Ontario.ca

Alexander, Melissa

From: Minkin, Dan (MHSTCI) <Dan.Minkin@ontario.ca>
Sent: Friday, January 7, 2022 5:14 PM
To: Alexander, Melissa
Subject: RE: Peel Region - West Trunk Sewer Diversion - CHRA and Cultural Heritage Report

** CAUTION: This email originated outside Hatch. Do not click links or open attachments unless you can authenticate the sender and the content

Hi Melissa,

Apologies again for the delay. We have completed our review of the July 2020 revision of the CHRA for the original alternatives and the new CHRA for Alternative 4. We have no concerns with either report. Thank you for the opportunity to review and comment and all the best with the project.

Dan Minkin | Heritage Planner
Ministry of Heritage, Sport, Tourism and Culture Industries
Heritage, Tourism and Culture Division | Programs and Services Branch | Heritage Planning Unit
T. 416. 786.7553 | Email: dan.minkin@ontario.ca

From: Minkin, Dan (MHSTCI)
Sent: December 21, 2021 8:36 PM
To: melissa.alexander@hatch.com
Cc: Barboza, Karla (MHSTCI) <Karla.Barboza@ontario.ca>
Subject: RE: Peel Region - West Trunk Sewer Diversion - CHRA and Cultural Heritage Report

Hi Melissa, sorry for the delays. I will send you our comments by January 7 if that's okay. Thanks.

Dan Minkin | Heritage Planner
Ministry of Heritage, Sport, Tourism and Culture Industries
Heritage, Tourism and Culture Division | Programs and Services Branch | Heritage Planning Unit
T. 416. 786.7553 | Email: dan.minkin@ontario.ca

T. 416. 786.7553 | Email: dan.minkin@ontario.ca

From: Accellion@hatch.com <Accellion@hatch.com>
Sent: November 11, 2021 12:53 PM
To: Barboza, Karla (MHSTCI) <Karla.Barboza@ontario.ca>; Minkin, Dan (MHSTCI) <Dan.Minkin@ontario.ca>
Cc: graeme.henderson@hatch.com
Subject: Peel Region - West Trunk Sewer Diversion - CHRA and Cultural Heritage Report

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

melissa.alexander@hatch.com sent you a secure message

Access message

Good afternoon,

As a follow-up to our previous submission for the above noted Project in May 2020, we have updated the Cultural Heritage Resource Assessment for the three alternative alignments evaluated. The updated CHRA includes additional detail related to the site visit, per comments received from the MHSTCI. Also included in this submission is the Cultural Heritage Report for Alternative Alignment 4. Alternative Alignment 4 has been identified to be the preferred alignment, therefore the Report includes impacts and mitigation measures.

We would also like to note that the Stage 1 Archaeological Assessment was submitted to the Register at the end of October.

Please let us know if you have any further comments. We are aiming to issue the Project File Report for public review in the coming weeks.

Thank you,

Melissa Alexander
HATCH

Attachments expire on Dec 11, 2021

Ministry of Heritage, Sport, Tourism, and Culture Industries

Archaeology Program Unit
Programs and Services Branch
Heritage, Tourism and Culture Division
5th Floor, 400 University Ave.
Toronto ON M7A 2R9
Tel.: (519) 671-7742
Email: Shari.Prowse@ontario.ca

Ministère des Industries du patrimoine, du sport, du tourisme et de la culture

Unité des programme d'archéologie
Direction des programmes et des services
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Apr 20, 2022

Lisa Merritt (P094)
ASI Archaeological and Cultural Heritage Services
528 Bathurst Street Toronto ON M5S 2P9

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment Peel West Trunk Sewer (Lot 32, Concession 2 North of Dundas, Lots 1-3, Range 5 North of Dundas, Lot 1, Concession 6 West of Centre, Lots 5-6, Concession 6 West of Centre, Lots 1-7, Concession V West of Centre, Former Toronto Township, County of Peel), City of Mississauga, Regional Municipality of Peel", Dated Mar 1, 2022, Filed with MHSTCI Toronto Office on Mar 2, 2022, MHSTCI Project Information Form Number P094-0291-2019, MHSTCI File Number 0010609

Dear Ms. Merritt:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18.[1] This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 *Standards and Guidelines for Consultant Archaeologists* set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the Stage 1 assessment of the study area as depicted in Figure 16-21 of the above titled report and recommends the following:

1 Parts of the Study Area exhibit archaeological potential. These lands require Stage 2 archaeological assessment by test pit survey at five metre intervals (Figures 16-21: Areas highlighted in green):

a. Areas of potential within the proposed shaft locations and staging areas will be required to have Stage 2 survey completed as part of the project in advance of any construction activities.

b. If it is determined that the tunnel design elsewhere in the project area can not guarantee against collapse, a Stage 2 archaeological assessment would be required for areas with archaeological potential that could be impacted by this construction.

c. Any future projects using construction methods other than those proposed by this project will require

further archaeological assessment in areas of potential.

2 The Study Area includes the Streetsville Memorial Cemetery at 299 Queen Street South. Because the proposed method of project construction will use trenchless installation 10 to 20 metres below the surface to bedrock in this area, all cemetery lands will be avoided by the current proposed project designs.

a. Despite the cemetery boundaries being well demonstrated, there is high potential for burials to extend into the sidewalk on Queen Street South based on the results of previous ground penetrating radar within the cemetery boundaries. Any future construction impacts (by methods other than those proposed by the current project) within the cemetery's legal boundaries or within the Queen Street South right-of-way will require a Stage 3 Cemetery Investigation to be conducted to confirm the presence of burial shafts outside the known limits of this cemeteries.

b. Once specific project impacts are understood, Stage 3 cemetery investigation specifically tailored to the project impacts should be developed by a licensed archaeologist and may include archaeological construction monitoring or mechanical trenching observed by a licensed archaeologist.

c. Prior to any Stage 3 cemetery investigation or archaeological monitoring, consultation with the M.H.S.T.C.I., the Bereavement Authority of Ontario, and a Cemetery Investigation Authorization issued by the Bereavement Authority of Ontario will be required prior to any "invasive" (Stages 2-4) fieldwork.

d. If any burials are documented during the course of construction monitoring, the police or coroner and the Register of Burial Sites at the Ministry of Government and Consumer Services must be contacted as per the Cemeteries Act, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Services Act, 2002.

3 If the riverbed of the Credit River or the tributary within the Study Area will be impacted, the M.H.S.T.C.I.'s Criteria for Evaluating Marine Archaeological Potential checklist should be consulted to determine whether the proposed impacts are within an area considered to have marine archaeological potential.

4 The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, slopes in excess of 20 degrees, or being previously assessed. These lands do not require further archaeological assessment; and,

5 Should the proposed work extend beyond the current Study Area, further archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands.

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Shari Prowse
Archaeology Review Officer

cc. Archaeology Licensing Officer
Graeme Henderson,Hatch Corporation
Ajay Puri,Region of Peel

[1] *In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.*

APPENDIX J6

Meeting Minutes

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Minutes of Meeting

Project Title:	West Trunk Diversion	**Hatch Project No:**	H-358800
Subject:	Credit Valley Conservation Authority Consultation Meeting	**Project File No:**	08-2250 (Peel)
Location:	Region of Peel HQ MR 4-830 10 Peel Center Drive Brampton, ON	**Date of Meeting:**	2019-06-11 10:00am to 11:00am
Present:	Ajay Puri (AP) – Peel Samantha Paquette (SP) – Peel Jakub Kilis (JK) – CVC Rebecca Stewart (RS) – CVC Marc Gelinas (MG) – Hatch Graeme Henderson (GH) – Hatch	ajay.puri@peelregion.ca samantha.paquette@peelregion.ca jkilis@creditvalleyca.ca rstewart@creditvalleyca.ca marc.gelinas@hatch.com graeme.henderson@hatch.com	
Recorded by:	Graeme Henderson – Hatch	**Revision:**	00 (2019-06-20)
Distribution:	All Attendees Melissa Alexander (MA) – Hatch Claudia Chan (CC) – Hatch	 melissa.alexander@hatch.com claudia.chan@hatch.com	

New Business:

Item:	Description:	Action By:
ea01.1	**Introductions**	
ea01.1.1	**Introduction:** All present meeting members introduced themselves and gave their affiliation.	Info
ea01.2	**Projects-at-a-Glance**	
ea01.2.1	**General:** Hatch (GH) provided a presentation on the West Trunk Diversions project and all anticipated Diversion area construction contracts to the CVC and all parties present. Hatch (GH) indicated that there will be one (1) to two (2) construction contracts depending on which EA alignment alternative is selected as the preferred alternative. *Refer to attached .pdf version of the presentation for further details.*	Info
ea01.3	**Schedule 'B' Class EA Phase Alignment Alternatives**	
ea01.3.1	**EA Alignment Alternative 1 – Streetsville:** Hatch (GH) provided an overview of EA Alignment Alternative 1 (EA1) which entails a single connection to the West Trunk Sewer (WTS) on Erin Mills Parkway and the predominant use of an Earth Pressure Balance Tunnel Boring Machine (EPB TBM) with some smaller drives undertaken via Micro Tunnel Boring Machine (MTBM) methods for sewer construction.	Info
ea01.3.2	**EA Alignment Alternative 2 – Britannia Leg 1:** Hatch (GH) provided an overview of EA Alignment Alternative 2 (EA2) which entails two (2) connections to the WTS and the predominant use of MTBM methods for sewer construction.	Info

Item:	Description:	Action By:
	Hatch (GH) clarified that this connection would be handled via an MTBM drive through a woodlot directly into the existing WTS rescue shaft.	
ea01.3.3	**EA Alignment Alternative 3 – Britannia Leg 2:** Hatch (GH) provided an overview of EA Alignment Alternative 3 (EA3) which entails two (2) connections to the WTS (connections at Britannia Rd W and Erin Mills Pkwy and Eglinton Ave W and Erin Mills Pkwy) and the predominant use of MTBM methods for sewer construction. Hatch (GH) noted that this alignment alternative is the same as EA2 with the exception of how the connection to the WTS is handled in proximity to the intersection of Britannia Rd W and Erin Mills Pkwy. Hatch (GH) noted that the connection to the WTS at Britannia Rd W would be connected on the north side of the intersection of Britannia Rd W and Erin Mills Pkwy.	Info
ea01.4	**Identified Potential Impact Areas**	
ea01.4.1	**Hatch Identified Areas of Potential Impact:** Hatch (GH) noted the following potential CVC areas of interest to be considered when evaluating EA alternatives: • Crossings of Mullet Creek • Crossings of the Credit River • Crossing of an in-line stormwater management pond in proximity to Erin Mills Parkway and Eglinton Ave W • Trenchless construction beneath a woodlot	Info
ea01.5	**CVC Input**	
ea0.1.5.1	**Additional Regulated Area:** CVC (JK) noted that there appears to be an unnamed creek that is CVC regulated within the woodlot in proximity to the Southeast corner of the Erin Mills Pkwy and Britannia Rd W intersection. CVC (JK) indicated that he would confirm whether or not this area is still actively regulated by the CVC.	CVC
ea01.5.2	**Impact versus Depth:** CVC (JK) noted that the proposed crossings are likely not an issue in accordance with the stated depths of construction (i.e., beyond 20m).	Info

Meeting adjourned at 11:00am. These minutes were prepared by Graeme Henderson, P.Eng., PMP and reviewed by Marc Gelinas, P.Eng., PE, PMP of Hatch.

Any question of interpretation, errors or omissions must be reported to the author within three (3) business days of the distribution date, otherwise these minutes will be considered an accurate record of the proceedings.

Action Items

Item	Action By	Description	Date Closed	Comments
ea01.5.1	CVC	Confirm whether or not this area is still actively regulated by the CVC.		

Minutes of Meeting

Project Title:	West Trunk Diversion	**Hatch Project No:**	H-358800
Subject:	Credit Valley Conservation Authority Update Meeting	**Project File No:**	08-2250 (Peel)
Location:	Region of Peel HQ MR 4-830 10 Peel Center Drive Brampton, ON	**Date of Meeting:**	2020-02-11 11:00am to 12:00pm
Present:	Jakub Kilis (JK) – CVC Ajay Puri (AP) – Peel Marc Gelinas (MG) – Hatch Graeme Henderson (GH) – Hatch	jakub.kilis@cvc.ca ajay.puri@peelregion.ca marc.gelinas@hatch.com graeme.henderson@hatch.com	
Recorded by:	Graeme Henderson – Hatch	**Revision:**	00 (2020-02-24)
Distribution:	All Attendees Melissa Alexander (MA) – Hatch	melissa.alexander@hatch.com	

New Business:

Item:	Description:	Action By:
ea02.1	**Presentation**	
ea02.1.1	**CVC Update Presentation:** Hatch (MG) provided a presentation on the current status of the West Trunk Diversion Project Class EA study currently in progress. *Refer to attached .pdf version of the presentation for further details.*	Info
ea02.2	**Potential Impact Areas**	
ea02.2.1	**Staging Area SA0:** CVC (JK) noted no issues with Staging Area SA0, which is located on the west side of Britannia Road between Earl Street and Joseph Street.	Info
ea02.2.2	**Staging Area SA1:** Hatch (MG) described Staging Area SA1 to CVC (JK) noting that this compound will feature two sewers (the Falconer diversion sewer and the primary West Trunk Diversion sewer) which both connect to the Credit Valley Trunk Sewer (CVTS). Hatch (MG) indicated that there are existing maintenance holes at this location, and Hatch is investigating the conceptual design as part of the EA process which features two new below-grade structures, one of which being a real-time controlled diversion structure. Peel (AP) noted that the actuators for the gates within this diversion structure cannot be within the floodplain, and as such, methods of achieving this are being investigated (i.e., use of fill, permanent structure, etc.). Peel (AP) indicated that permanent access to the actuators is required and will be taken into consideration when acquiring easements at Staging Area SA1. Peel (AP) noted that the gate control panels will be installed outside of the floodplain and at a location potentially outside of Staging Area SA1 for ease of access. CVC (JK) noted that the means of ensuring the actuators/critical diversion structure components being outside of the floodplain and the resultant permanent surface expression are a concern to the CVC, and any flooding impacts need to be addressed as part of the EA phase with proof of concept being demonstrated. CVC (JK) indicated that proof of concept will need to be demonstrated for the means of achieving Hatch (MG) noted that there appears to	Hatch

Item:	Description:	Action By:
	be some recent replanting (presence of saplings) within Staging Area SA1 which may be impacted by the proposed construction works. CVC (JK) requested that we forward the property impact drawing for Staging Area SA1 for CVC ecologists to review. CVC (JK) requested that the Contract Documents be tailored to ensure excessive soil stockpiling and fuel storage does not occur within the boundaries of Staging Area SA1.	Hatch
ea02.2.3	**Staging Area SA2:** CVC (JK) noted that the channel just west of Staging Area SA2 is regulated, but the location of Staging Area SA2 is not anticipated to require any action from the CVC as the shaft is located predominantly within the right-of-way (ROW). CVC (JK) indicated that these channelized flows with box culverts are not a concern from a scouring perspective for the CVC. Hatch (MG) noted that Staging Area SA2 is common to all alignment alternatives and construction is required at this location to connect to the existing maintenance hole.	Info
ea02.2.4	**Staging Area SA4 and SA17:** As part of the presentation, Hatch (MG) displayed the location of Staging Area SA4 and SA17 which present no issues from a CVC perspective.	Info
ea02.2.5	**Staging Area SA10:** CVC (JK) noted no issues with Staging Area SA10, which is located on the east side of Queen Street within the large currently vacant lot between the rail tracks and Erin Centre Blvd.	Info
ea02.2.6	**Crossing of the Credit River:** Further to item ea02.2.1, two separate diversion sewers are proposed for installation via tunnelling into Staging Area SA1 which requires two separate crossings of the Credit River. Hatch (MG) noted that the primary West Trunk Diversion sewer will be of a depth significant enough to likely not raise issues from a scour perspective (~4.5m according to conceptual RFP drawings) however the Falconer Drive crossing will be in relatively close proximity to the base of the Credit River. Hatch (MG) indicated that the Falconer Drive diversion sewer needs to be installed above the existing CVTS, while remaining as far below the Credit River as possible, and preliminary investigations are indicating that the obvert of the tunnelled casing may be as close as 1-1.5m below the Credit River. CVC (JK) noted that desktop geomorphology is needed to be undertaken at the desktop level during the EA phase for this type of anticipated crossing, as this is more than likely within the scour zone of the Credit River. CVC (JK) requested that a technical memorandum be developed to supplement the Phase 2 interim report. CVC (JK) requested that the technical memorandum include the following information at a minimum:	Hatch

Item:	Description:	Action By:
	• Commentary on erosion hazards related to conceptual maintenance hole/diversion structure installation locations. • Vertical and lateral scour analysis. Recommended that infrastructure be installed just outside of the 100-year scour zone. • Anticipated "worst-case" surface expression for proposed maintenance holes within Staging Area SA1 (inclusive of consideration related to maintaining diversion actuators outside of the floodplain – *ref. item ea02.2.1*).	
ea02.2.7	**Crossing of Mullet Creek – Eglinton Avenue West:** Hatch (GH) noted that the crossing of Mullet Creek to be undertaken along Eglinton Avenue West, west of the intersection results in a conceptual crossing depth of approximately 6m. CVC (JK) noted that the regulations have changed regarding geomorphological investigation requirements, but generally anything greater than 2.5m is acceptable to be installed without geomorphological investigations. CVC (JK) requested that Hatch review specific CVC guidelines related to these requirements to ensure compliance with CVC requirements for all crossings.	Hatch

Meeting adjourned at 11:00am. These minutes were prepared by Graeme Henderson, P.Eng., PMP and reviewed by Marc Gelinas, P.Eng., PE, PMP of Hatch.

Any question of interpretation, errors or omissions must be reported to the author within three (3) business days of the distribution date, otherwise these minutes will be considered an accurate record of the proceedings.

Action Items

Item	Action By	Description	Date Closed	Comments
ea01.5.1	CVC	Confirm whether or not this area is still actively regulated by the CVC.		
ea02.2.2a	Hatch	Forward the property impact drawing for Staging Area SA1 to CVC.		
ea02.2.2b	Hatch	Develop Contract Documents to ensure excessive soil stockpiling and fuel storage does not occur within Staging Area SA1.		
ea02.2.6	Hatch	Develop a geomorphological technical memorandum regarding the crossing of the Credit River and the flooding impacts of any construction at Staging Area SA1.		
ea02.2.7	Hatch	Review specific CVC guidelines regarding geomorphological investigation requirements based on depth of installation below creek/river crossings.		

Minutes of Meeting

Project Title:	West Trunk Diversion	**Hatch Project No:**	H-358800
Subject:	City of Mississauga Consultation Meeting	**Project File No:**	08-2250 (Peel)
Location:	201 City Centre Drive – Brenda Sakauye Room Mississauga, ON	**Date of Meeting:**	2019-06-17 2:00pm to 3:00pm
Present:	Ajay Puri (AP) – Peel Emily Pelleja (EP) – COM Auryn Soares (AS) – COM Marc Gelinas (MG) – Hatch Melissa Alexander (MA) – Hatch Graeme Henderson (GH) – Hatch	ajay.puri@peelregion.ca emily.pelleja@mississauga.ca auryn.soares@mississauga.ca marc.gelinas@hatch.com melissa.alexander@hatch.com graeme.henderson@hatch.com	
Recorded by:	Graeme Henderson – Hatch	**Revision:**	00 (2019-06-20)
Distribution:	All Attendees Claudia Chan (CC) – Hatch	 claudia.chan@hatch.com	

New Business:

Item:	Description:	Action By:
ea02.1	**Introductions and Safety Share**	
ea02.1.1	**Introduction:** All present meeting members introduced themselves and gave their affiliation.	Info
ea02.1.2	**Safety Share:** Hatch (MG) provided a brief safety share regarding ladder safety.	Info
ea02.2	**Projects-at-a-Glance**	
ea02.2.1	**General:** Hatch (GH) provided a presentation on the West Trunk Diversions project and all anticipated Diversion area construction contracts to the City of Mississauga (COM) and all parties present. Hatch (GH) indicated that there will be one (1) to two (2) construction contracts depending on which EA alignment alternative is selected as the preferred alternative. *Refer to attached .pdf version of the presentation for further details.*	Info
ea02.3	**Schedule 'B' Class EA Phase Alignment Alternatives**	
ea02.3.1	**EA Alignment Alternative 1 – Streetsville:** Hatch (GH) provided an overview of EA Alignment Alternative 1 (EA1) which entails a single connection to the West Trunk Sewer (WTS) on Erin Mills Parkway and the predominant use of an Earth Pressure Balance Tunnel Boring Machine (EPB TBM) with some smaller drives undertaken via Micro Tunnel Boring Machine (MTBM) methods for sewer construction.	Info
ea02.3.2	**EA Alignment Alternative 2 – Britannia Leg 1:** Hatch (GH) provided an overview of EA Alignment Alternative 2 (EA2) which entails two (2) connections	Info

Item:	Description:	Action By:
	to the WTS and the predominant use of MTBM methods for sewer construction. Hatch (GH) clarified that this connection would be handled via an MTBM drive through a woodlot directly into the existing WTS rescue shaft.	
ea02.3.3	**EA Alignment Alternative 3 – Britannia Leg 2:** Hatch (GH) provided an overview of EA Alignment Alternative 3 (EA3) which entails two (2) connections to the WTS (connections at Britannia Rd W and Erin Mills Pkwy and Eglinton Ave W and Erin Mills Pkwy) and the predominant use of MTBM methods for sewer construction. Hatch (GH) noted that this alignment alternative is the same as EA2 with the exception of how the connection to the WTS is handled in proximity to the intersection of Britannia Rd W and Erin Mills Pkwy. Hatch (GH) noted that the connection to the WTS at Britannia Rd W would be connected on the north side of the intersection of Britannia Rd W and Erin Mills Pkwy.	Info
ea02.4	**Identified Potential Impact Areas**	
ea02.4.1	**Hatch Identified Areas of Potential Impact:** Hatch (GH) noted the following potential COM areas of interest to be considered when evaluating EA alternatives and their respective potential impacts: • Streetsville Trenchless Construction • Traffic Impacts • Parks and Open Spaces • Trees in the Urban Environment • Pedestrian/Cyclist commuting interference • MiWay Impacts • Utility Impacts • Emergency Services • Schools • Construction Fatigue	Info
ea02.5	**COM Input**	
ea02.5.1	**Solicitation of COM Input:** COM (AS) noted that he will serve as the primary contact for all COM related aspects of the project's Schedule 'B' Class EA. Hatch (GH) agreed to distribute the minutes of the discussion held and include the attached presentation for COM's reference purposes. COM (AS) agreed to distribute the minutes and presentation internally, and noted that formal comments from the COM would be targeted to be submitted in advance of August 2019.	GH COM

Meeting adjourned at approximately 3:00pm. These minutes were prepared by Graeme Henderson, P.Eng., PMP and reviewed by Marc Gelinas, P.Eng., PE, PMP of Hatch.

Any question of interpretation, errors or omissions must be reported to the author within three (3) business days of the distribution date, otherwise these minutes will be considered an accurate record of the proceedings.

Action Items

Item	Action By	Description	Date Closed	Comments
ea02.5.1a	Hatch	Distribute the meeting minutes and presentation to the COM		
ea02.5.1b	COM	Provide formal comments based on the submitted minutes in advance of August 2019		

Minutes of Meeting

Project Title:	West Trunk Diversion	**Hatch Project No:**	H-358800
Subject:	City of Mississauga (COM) Update Meeting	**Project File No:**	08-2250 (Peel)
Location:	Region of Peel HQ MR 4-830 10 Peel Center Drive Brampton, ON	**Date of Meeting:**	2020-02-21 10:00am to 11:30pm
Distribution:	Ajay Puri (AP) – Peel	ajay.puri@peelregion.ca	
	Melissa Turner (MT) – Peel	melissa.turner@peelregion.ca	
	Marc Gelinas (MG) – Hatch	marc.gelinas@hatch.com	
	Melissa Alexander (MA) – Hatch	melissa.alexander@hatch.com	
	Graeme Henderson (GH) – Hatch	graeme.henderson@hatch.com	
	Paula Wubbenhurst (PW) – COM	paula.wubbenhurst@mississauga.ca	
	John Dunlop (JD) – COM	john.dunlop@mississauga.ca	
	Scott Sorensen (SS) – COM	scott.sorensen@mississauga.ca	
	Jim Greenfield (JG) – COM	jim.greenfield@mississauga.ca	
	Alana Evers (AE) – COM	alana.evers@mississauga.ca	
	Sharon Chapman (SC) – COM	Sharon.chapman@mississauga.ca	
	Domenic Tunido (DT) – COM	domenic.tunido@mississauga.ca	
	Bill Moffatt (BM) – COM	bill.moffatt@mississauga.ca	
	Chris Rouse (CR) – COM	chris.rouse@mississauga.ca	
	Alice Ho (AH) – COM	alice.ho@mississauga.ca	
	Evelyn Krolicka (EK) – COM	evelyn.krolicka@mississauga.ca	
	Matthew Shilton (MS) – COM	matthew.shilton@mississauga.ca	
	Su-Won Yang (SY) – COM	su-won.yang@mississauga.ca	
Recorded by:	Graeme Henderson (GH) – Hatch	**Revision:**	00 (2020-03-16)

Note: City of Mississauga staff will be generalized as COM for the purposes of the records of these proceedings.

New Business:

Item:	Description:	Action By:
ea04.1	**Presentation**	
ea04.1.1	**COM Update Presentation:** Hatch (MG) provided a presentation on the current status of the West Trunk Diversion Project Class EA study currently in progress. *Refer to attached .pdf version of the presentation for further details.*	Info
ea04.2	**Discussion Items**	
ea04.2.1	**Geophysical Investigations:** Hatch (MG) explained that the motivation to undertake geophysical investigations was based on the presence of buried valleys encountered on other similar tunnelling projects in proximity to the study area which resulted in significant delays. Hatch (MG) noted that alignment alternatives needed to be reviewed in the context of subsurface conditions and a preliminary geophysical investigation would bridge the gap between now and the eventual detailed geotechnical investigations undertaken during future design phases.	Info

Item:	Description:	Action By:
ea04.2.2	**Rationalization of Staging Area Selection:** COM inquired as to where the rationalization for the selection of Staging Areas for the preliminary preferred alternative could be found. Hatch (GH) noted that the Phase 2 Interim Report (which will form a major component of the overall Project File) houses the "Property Impacts and Requirements" report (ref. Appendix H) which provides details on the advantages of preliminary preferred staging areas. COM noted that staging area SA1 obstructs a heavy-use pedestrian walking trail. Hatch (GH) noted that staging area SA1 is common to all alignment alternatives due to the need to divert flows from the Credit Valley Trunk Sewer (CVTS) within this location, however provisions will be made to ensure alternative routes are provided to foot traffic along with suitable restoration to match or exceed existing conditions post-construction. Hatch (MG) noted that the alternative connection area to avoid crossing the credit river would require the obstruction of another pedestrian trail, significantly greater tree removal requirements, worsened access and technical diversion process difficulties. COM noted that the COM Forestry group would be interested in reviewing this document.	Info
ea04.2.3	**Development Status and Ownership of Staging Areas SA10 and SA17:** COM noted that the property at Staging Area is owned by a developer, but the status of the development is unknown at this time. Regarding SA17, COM agreed to provide Hatch and Peel with the contact information of the property owner at this location (Daniels).	COM

Meeting adjourned at 11:00am. These minutes were prepared by Graeme Henderson, P.Eng., PMP and reviewed by Marc Gelinas, P.Eng., PE, PMP of Hatch.

Any question of interpretation, errors or omissions must be reported to the author within three (3) business days of the distribution date, otherwise these minutes will be considered an accurate record of the proceedings.

Action Items

Item	Action By	Description	Date Closed	Comments
ea04.2.3	COM	Forward the contact information for the Daniel's representative managing the property at Staging Area SA17		

APPENDIX J7

Notice of Public Information Center (PIC)

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Public Notice

Region of Peel
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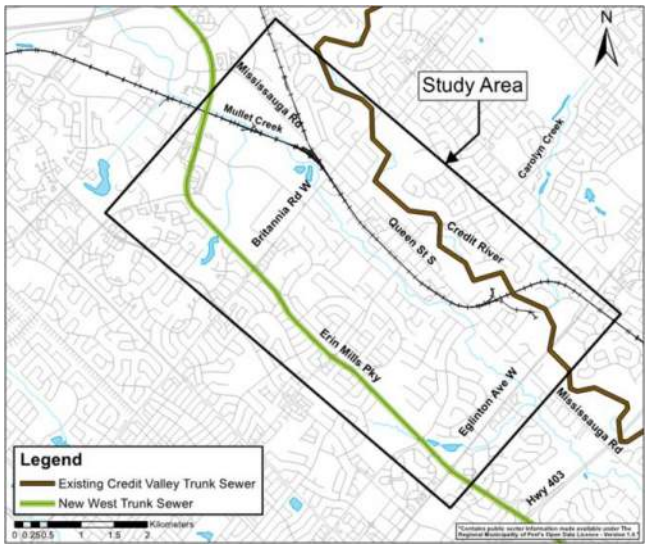
Environmental Assessment Study

NOTICE OF VIRTUAL PUBLIC INFORMATION EVENT

West Trunk Sanitary Sewer Diversion

The Study

The Region of Peel is currently undertaking a Schedule 'B' Class Environmental Assessment (Class EA) for the West Trunk Sanitary Sewer Diversion. The approximate limits of the study area extend from Erin Mills Parkway to the Credit River, and from Eglinton Ave. West up to the intersection of Erin Mills Parkway and Mississauga Rd., as shown in the map.



The purpose of the study is to identify a preferred solution to provide flow diversion from the existing Credit Valley trunk sewer to the newly constructed West Trunk Sewer at Erin Mills Parkway to allow for future rehabilitation of the existing sewer.

The Study Process Includes:

- Public and Stakeholder meetings
- An evaluation of alternative solutions
- The identification of a preferred solution
- Mitigation measures to reduce impacts on the surrounding community.

Virtual Public Information Centre

As part of this Project, one Public Information Centre (PIC) will be held to receive input from the public, interested stakeholders and Indigenous groups. Due to COVID-19 and current provincial guidance on public gatherings, the PIC material will be posted online at peelregion.ca/public-works/environmental-assessments/#current **and search under Mississauga, West Trunk Sanitary Sewer Diversion.** The material will include a summary of the background information and the evaluation and identification of the preliminary preferred solution. The PIC material will be made available from **Sept. 20, 2021 to Oct. 19, 2021**. Comments will be received until **Oct. 19, 2021.** A summary of questions and answers will be posted online following the PIC.

A Project File Report (PFR) will be filed with the Ministry of the Environment, Conservation and Parks at the end of the study and made available to agencies, the public and Indigenous groups for a 30-calendar day public review period. A separate Notice of Study Completion will be issued to announce the locations where the PFR can be viewed.

Comments

If you would like to provide comments or have questions, or if you would like to be added to the Project Contact List, please contact the Project Manager listed below.

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Capital Works
Wastewater Division
Tel.: (905) 791-7800 x 5073
ajay.puri@peelregion.ca

This notice was first issued on September 16, 2021.

With the exception of personal information, all comments will become part of the public record of the study.
The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's *Environmental Assessment Act*.

APPENDIX J8

Public Information Center (PIC) Material

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West Trunk Diversion Project

Class Environmental Assessment
Region of Peel
Public Information Centre (PIC)

Virtual PIC

Boards Posted Online from 2021-09-20 to 2021-10-19

HATCH

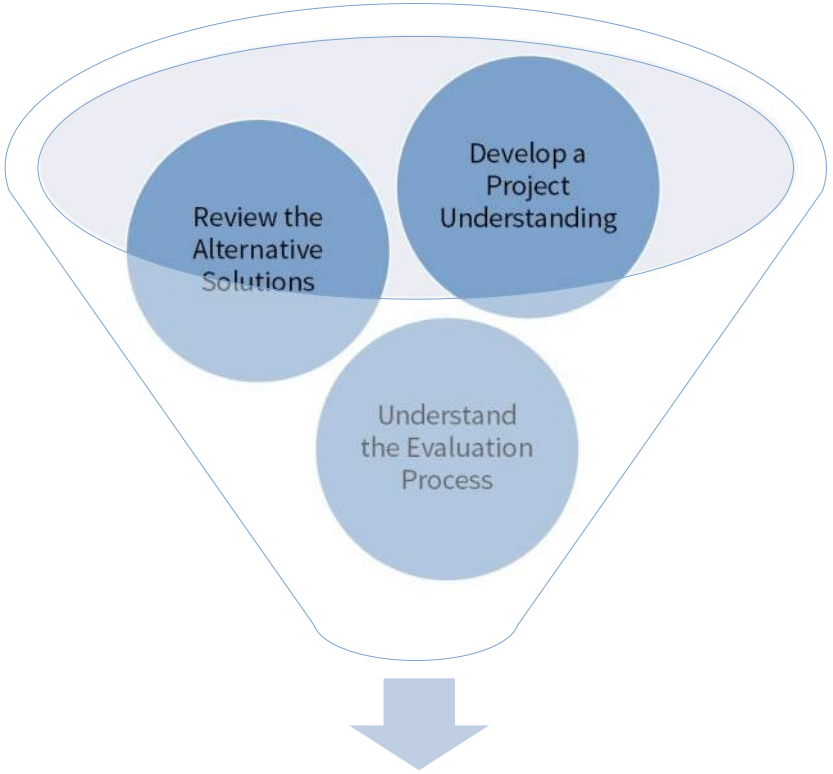
Region of Peel
working with you

Public Information Centre

West Trunk Diversion – Class Environmental Assessment Study

- **Purpose of the Public Information Center (PIC)**
  - To provide an update on the study's progress and to solicit feedback from the public.
- **Help us help you!**
  - This is your opportunity to comment on the study.
  - All comments received will be taken into consideration during the study phase. Once the study is complete however, the preferred solution alternative will continue to construction with no further changes made.
- **What should I be doing?**
  - Reviewing the PIC display boards.
  - To provide input or ask a question, please use the online question form and/or contact the Region of Peel Project Manager as follows:

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering
Wastewater Collection & Conveyance
Engineering Services Division
Public Works
Email: ajay.puri@peelregion.ca
905-791-7800 ext. 5073



Public Input for Study Phase Consideration

Study Area and Project History

West Trunk Diversion – Class Environmental Assessment Study

- **Project Background – Credit Valley Trunk Sewer meets West Trunk Sewer**
  - The Credit Valley Trunk Sewer was built in the late 1960s and has been responsible for servicing the western portion of the Region since that time.
  - The purpose of this Project is to support the future rehabilitation of the Credit Valley Trunk Sewer.
  - By linking the Credit Valley Trunk Sewer to the West Trunk Sewer, the Region will also benefit from improved system operations and redundancy which contributes to the overall long-term flood mitigation strategy.
  - Permanent linkages between the two sewers will be automated. Control gates within diversion structures will provide the Region with the ability to remotely divert flows between the two sewers as needed.
- **Study Area**
  - The study area extends from Erin Mills Parkway to the Credit River, and from Eglinton Avenue West to the intersection of Erin Mills Parkway and Mississauga Road.

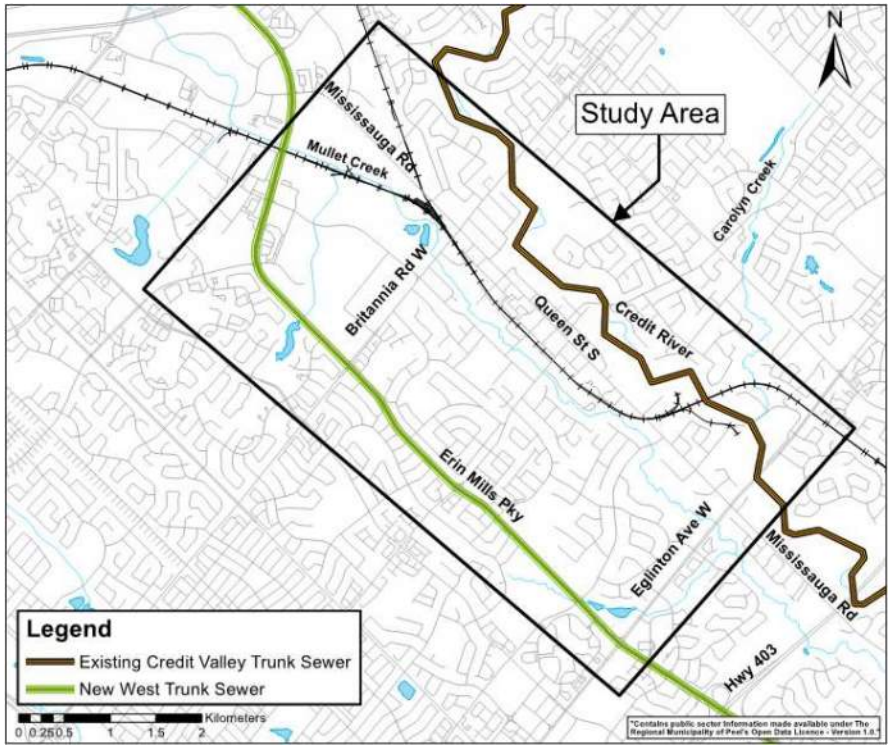


Figure 1 – Study Area for the West Trunk Diversion Class EA

Study Status

West Trunk Diversion – Class Environmental Assessment Study

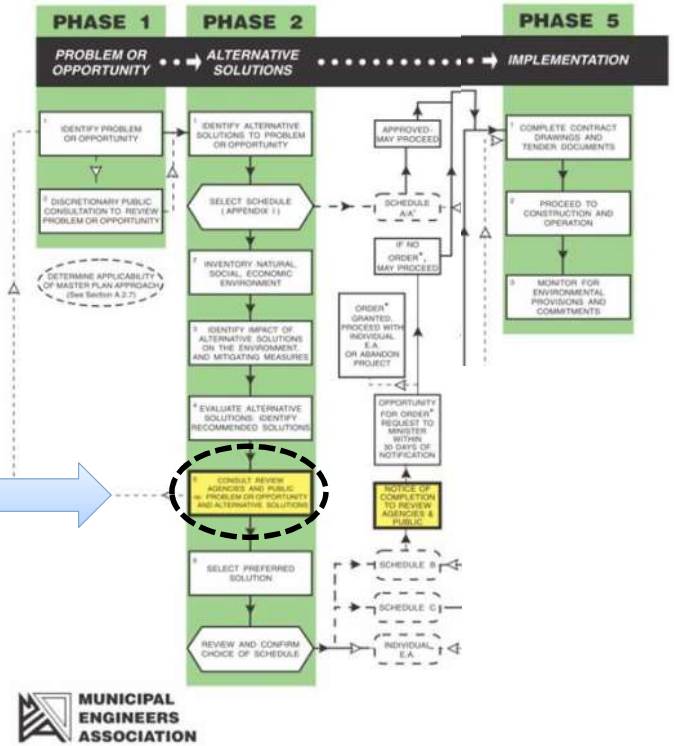
- **Where are We?**
  - We are approaching the completion of the Schedule B Class EA study
  - This PIC represents the "Consult Review Agencies and Public in Problem or Opportunity and Alternative Solutions"

Phase 1
- Identify Problems and Opportunities

Phase 2
- Identify and Evaluate Alternative Solutions
- Identify Preferred Solution

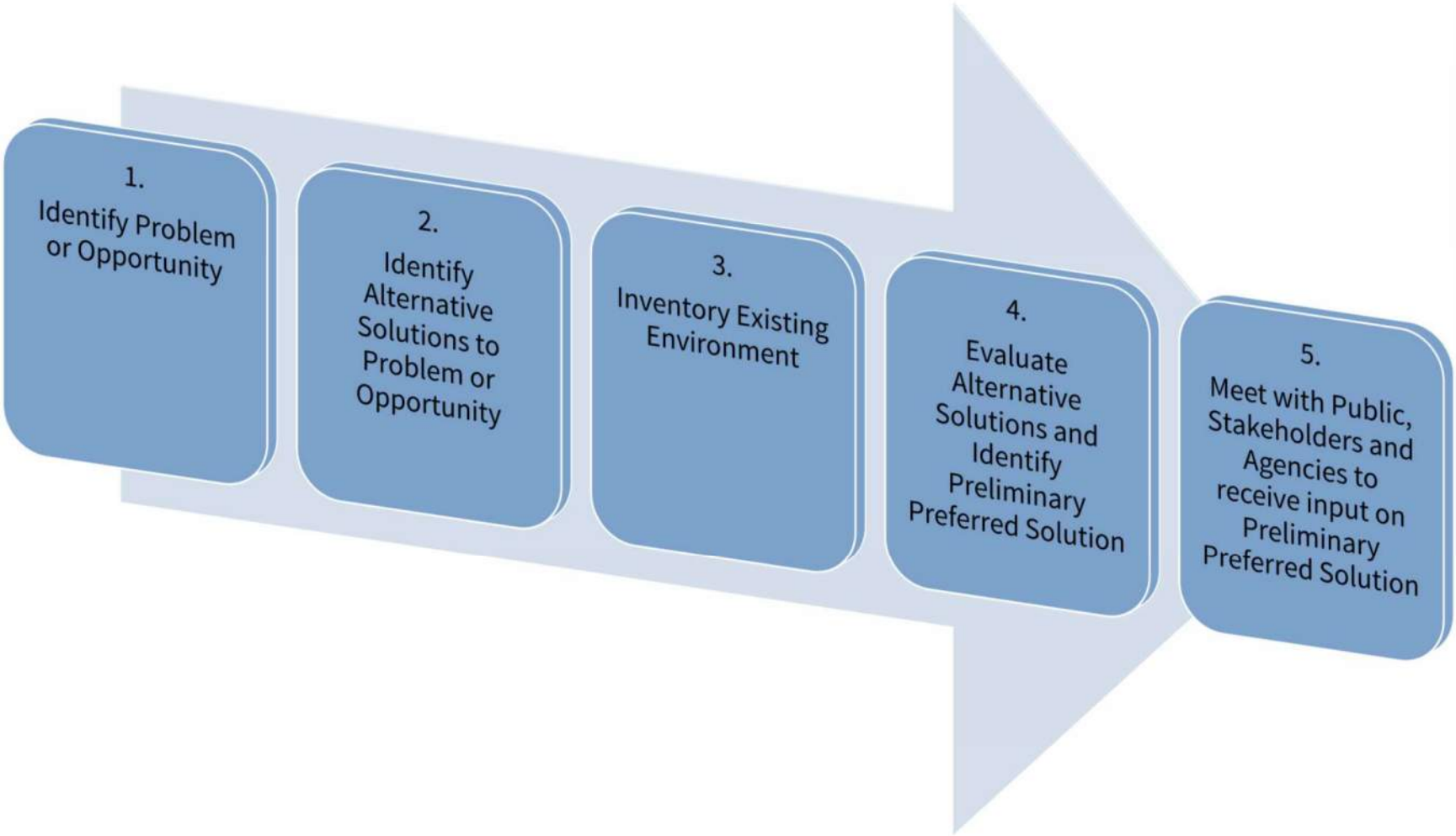
Phase 5
- Project Implementation – Detailed Design & Construction

Public Information Centre



Expanded Study Process

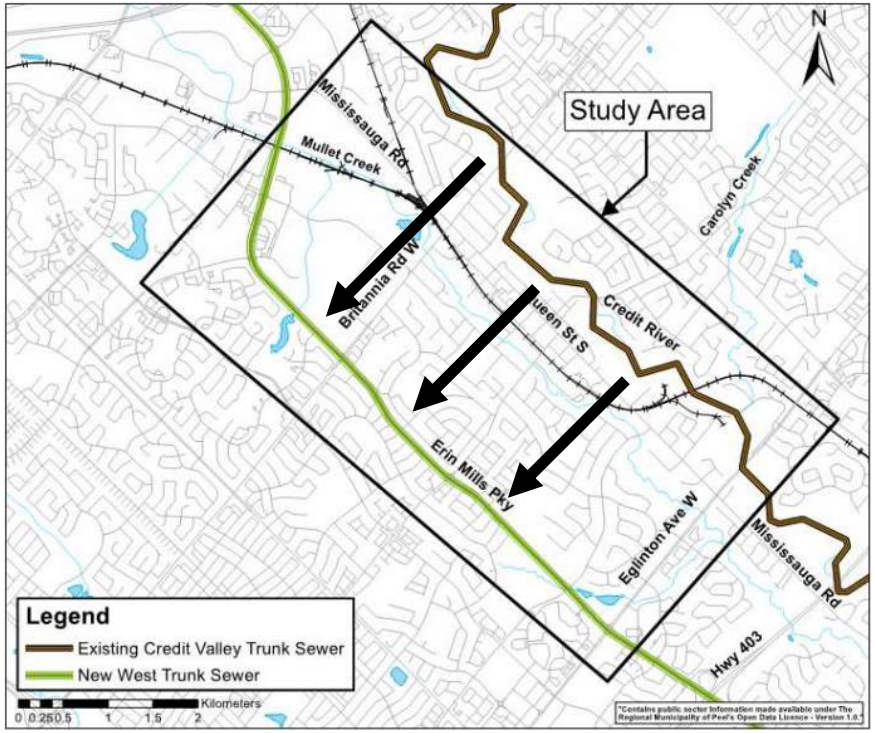
West Trunk Diversion – Class Environmental Assessment Study



1. Identify Problem or Opportunity

West Trunk Diversion – Class Environmental Assessment Study

1. 2. 3. 4. 5.



Problem Statement

"There is a need to undertake the rehabilitation of the existing Credit Valley Trunk Sewer (CVTS). To complete this work, it will be necessary to divert some or all of the flow to the recently constructed West Trunk Sewer (WTS) so that it can be undertaken in conditions of low to no flow. It is therefore necessary to undertake an interconnection between the CVTS and the WTS which has the benefit of providing operational flexibility, redundancy and additional capacity to better manage wet weather flows."

2. Identify Alternative Solutions

West Trunk Diversion – Class Environmental Assessment Study

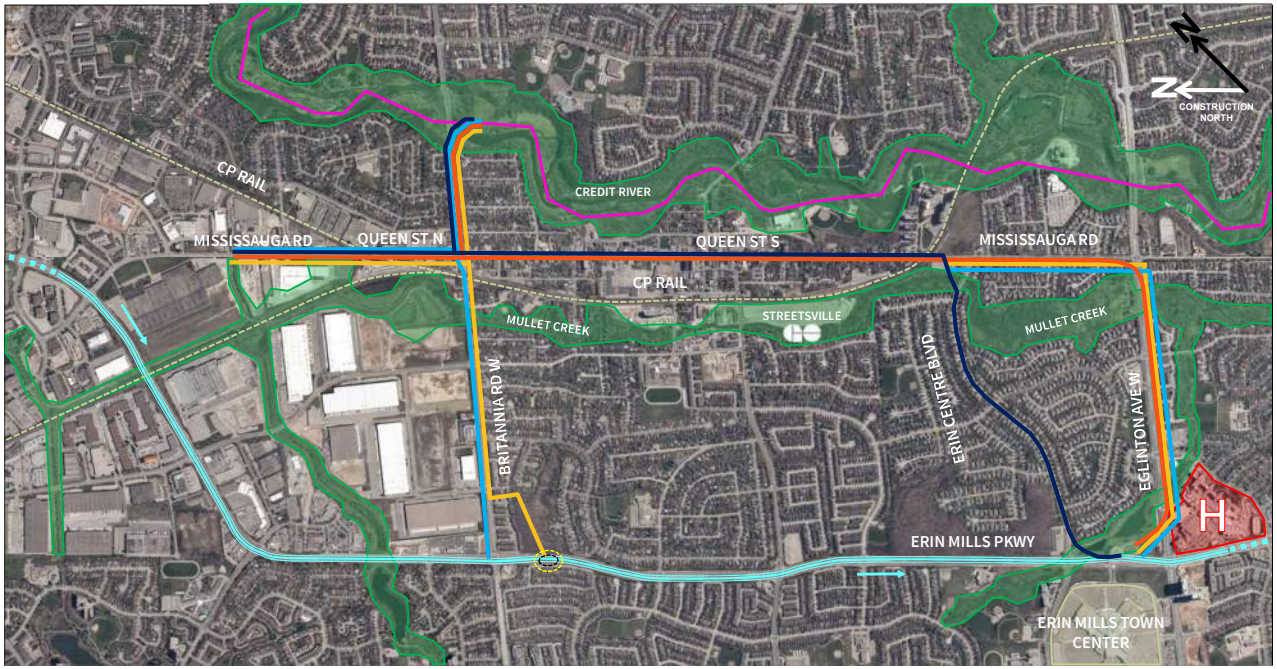
1. 2. 3. 4. 5.

Alternative Ideas

1. Do Nothing
2. Limit Growth
3. **Construction of Diversion Sewer(s)**

Alternative Sewer Diversion Concepts

Alignment Alternative 1 – "Streetsville"
Alignment Alternative 2 – "Britannia Woodlot"
Alignment Alternative 3 – "Britannia Straight"
Alignment Alternative 4 – "Erin Centre Blvd."



Evaluation Considerations and Technical Requirements

- Comparison focuses on sewer installation on Britannia Road (between Queen Street and Erin Mills Parkway) versus sewer installation on Queen Street (between Britannia Road and Erin Centre Boulevard). Common elements such as sewer installation along Queen Street north of Britannia Road West and along Britannia Road West east of Queen Street were not compared.
- The existing West Trunk sewer is very deep. In order to facilitate connections to the existing West Trunk sewer, the diversion sewer(s) will be constructed by trenchless tunneling methods (either tunnel boring machine or microtunneling).
- The only disturbance to the ground surface will be at shaft sites, to access the tunnel. Each alternative has a different number of shaft sites.
- Shaft sites will require a staging area where construction equipment can be stored, and excavated material managed. Staging areas will vary in size but will generally be on the order of 1000-2000m^2.
- Tunnels will be required to make tight radius curves or have shaft sites located within major intersections which are heavily congested.

LEGEND

- EA Alternative 1
- EA Alternative 2
- EA Alternative 3
- EA Alternative 4
- BRITANNIA LEG PROPOSED CONNECTION POINT
- CVC REGULATED AREA
- CREDIT VALLEY HOSPITAL
- EX. 2400mm Ø WEST TRUNK SEWER
- EX. 1200mm Ø CREDIT VALLEY TRUNK SEWER
- CP RAILWAY

3. Inventory Existing Environment

West Trunk Diversion – Class Environmental Assessment Study

Technical Studies Undertaken

1. Phase 1 Environmental Site Assessments
2. Geotechnical Background Review
3. Geophysical Investigation
4. Natural Environment Report
5. Stage 1 Archaeological Assessment
6. Cultural Heritage Resource Assessment
7. Traffic Movement Counts
8. Subsurface Utility Engineering Desktop Background Review
9. Property Impact Report

4.1 Alternative Evaluation Criteria

West Trunk Diversion – Class Environmental Assessment Study

Socio-Economic

- Effects on existing land uses
- Compliance with planning / environmental policies
- Nuisance impacts (vibration, noise, dust)
- Vibration effect on existing buildings
- Traffic management
- Odour management
- Land requirement (permanent/temporary)

Natural Environment

- Impact on natural features (watercourses, environmental site assessments, species at risk, aquatic features, landforms, wildlife and wildlife habitat)
- Impact on street trees
- Geology/hydrology considerations
- Soil contamination

Cultural Environment

- Impact to archaeological resources
- Impact to cultural heritage resources

Technical

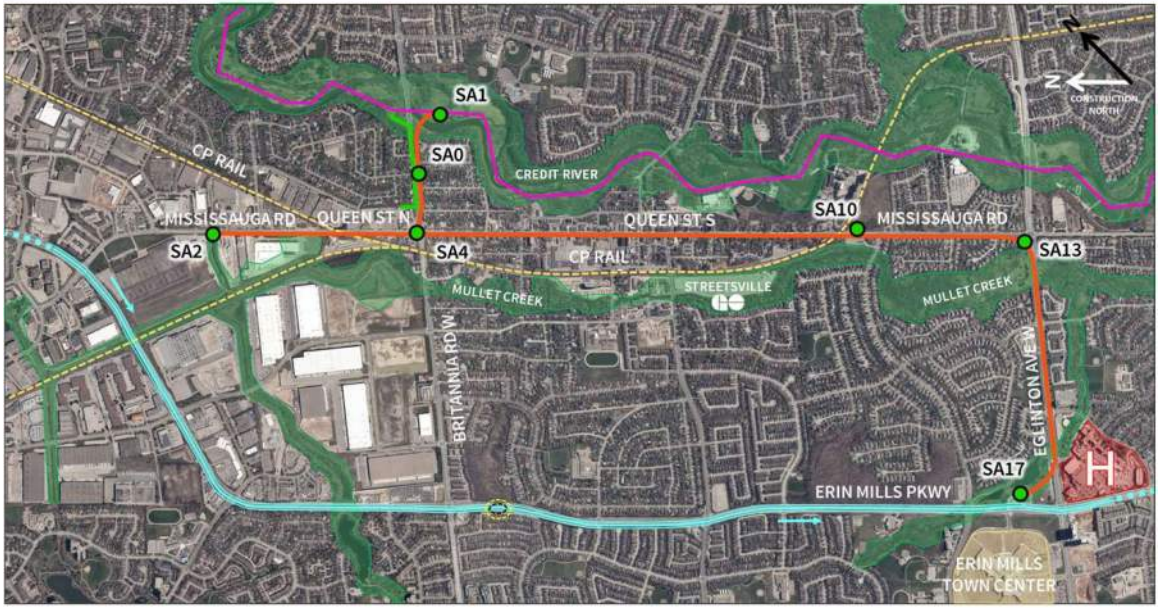
- Shaft locations
- Site requirements
- Existing utilities
- Connection with existing wastewater systems
- Constructability
- Shaft compound at major intersection
- Overall project delivery risk
- Capacity

Costs

- Construction costs
- Operational costs
- Land acquisition costs

4.2 Evaluate Alternative 1 – "Streetsville"

West Trunk Diversion – Class Environmental Assessment Study



LEGEND

- EA Alternative 1
- EA Alternative 2
- EA Alternative 3
- EA Alternative 4
- EX. 2400mm Ø WEST TRUNK SEWER
- EX. 1200mm Ø CREDIT VALLEY TRUNK SEWER
- CP RAILWAY
- BRITANNIA LEG PROPOSED CONNECTION POINT
- CVC REGULATED AREA
- CREDIT VALLEY HOSPITAL

Evaluation Criteria	Impact Narrative
Socio-Economic	Less shaft sites and therefore less impact to residential properties, fewer intersection impacts and less transportation delays.
Natural Environment	No additional watercourse crossings beyond baseline requirements, avoids the known buried valley at Erin Mills Parkway and Britannia Road West, and does not impact any woodlots.
Cultural Environment	Travels through identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core Area, however shaft locations are positioned outside of Streetsville Village Core and were selected to reduce risk of impacts.
Technical	Although a longer route is required, utilizes a larger diameter tunnel (increased storage potential), reducing the number of required shaft sites and offering the ability for increased capacity during storm events. Only a single connection point to the West Trunk Sewer along Erin Mills Parkway. Alignment will primarily be located within the existing right-of-way.
Costs	Fewer shaft sites and therefore less property required. Only a single connection to the West Trunk Sewer - therefore lower operational costs.

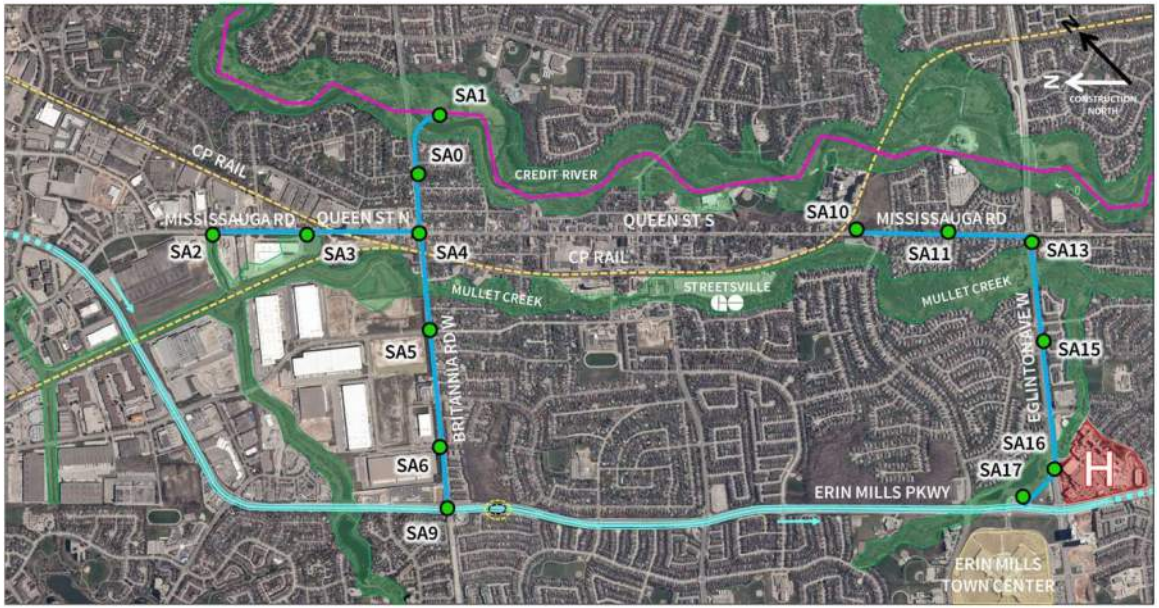
4.3 Evaluate Alternative 2 – "Britannia Woodlot"

West Trunk Diversion – Class Environmental Assessment Study

Evaluation Criteria	Impact Narrative
Socio-Economic	Requires greatest number of shaft sites with some shafts in residential areas and at/near major intersections. Greater impact to residential properties, greater impact on transportation including lane reductions and greater delays during construction.
Natural Environment	Requires an additional crossing of Mullet Creek and will impact the known deep, water-bearing buried valley at Erin Mills Parkway. Impacts Turney Woods Park, a significant woodland and therefore has the potential to impact the wetland and bat SAR within the park. Also has the potential to impact the significant woodland associated with Mullet Creek.
Cultural Environment	Limited potential to impact cultural heritage resources (CHR), as shaft sites will avoid known CHR locations.
Technical	Shorter route using smaller diameter tunnels as compared to Alternative 1, but requires additional shaft sites. Requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. Does not provide for increased capacity.
Costs	Greatest number of shafts, therefore more property required. Two connection points to the West Trunk Sewer, therefore greater operational costs.

4.4 Evaluate Alternative 3 – "Britannia Straight"

West Trunk Diversion – Class Environmental Assessment Study



LEGEND

- EA Alternative 1
- EA Alternative 2
- EA Alternative 3
- EA Alternative 4
- EX. 2400mm Ø WEST TRUNK SEWER
- EX. 1200mm Ø CREDIT VALLEY TRUNK SEWER
- CP RAILWAY
- BRITANNIA LEG PROPOSED CONNECTION POINT
- CVC REGULATED AREA
- CREDIT VALLEY HOSPITAL

Evaluation Criteria	Impact Narrative
Socio-Economic	Requires a greater number of shaft sites with some shafts in residential areas and at/near major intersections. Greater impact to residential properties, greater impact on transportation including lane reductions and greater delays during construction.
Natural Environment	Requires an additional crossing of Mullet Creek and will impact the known deep, water-bearing buried valley at Erin Mills Parkway. Also has the potential to impact the significant woodland associated with Mullet Creek.
Cultural Environment	Limited potential to impact cultural heritage resources, as shaft sites will avoid known resource locations.
Technical	Shorter route using smaller diameter tunnels as compared to Alternative 1, but requires additional shaft sites. Requires two connection points to the West Trunk Sewer along Erin Mills Parkway, and shaft sites will be located within the right-of-way, requiring lane closures. Does not provide for increased capacity.
Costs	Greater number of shafts, therefore more property required. Two connection points to the West Trunk Sewer, therefore greater operational costs.

4.5 Evaluate Alternative 4 – "Erin Centre Blvd."

West Trunk Diversion – Class Environmental Assessment Study

Evaluation Criteria	Impact Narrative
Socio-Economic	Less impact to residential properties, fewest intersection impacts, less transportation delays and least staging areas.
Natural Environment	This alternative has no additional watercourse crossings beyond those common to all alternatives, avoids the known buried valley at Erin Mills Parkway, and does not impact any woodlots.
Cultural Environment	This alternative will travel through the identified Cultural Heritage Landscape of the Mississauga Scenic Route and Streetsville Village Core Area. However, shaft locations are positioned outside of Streetsville Village Core and are selected to reduce risk of impacts.
Technical	Although a longer route is required versus Alternatives 2 and 3, there are less shaft sites, and the alternative only requires a single connection point to the West Trunk Sewer along Erin Mills Parkway. The alignment will primarily be located within the existing right-of-way. This alternative also offers the ability for additional capacity during a storm event and offers greater hydraulic flexibility and a more optimized connection to the existing WTS.
Costs	Fewest shafts required resulting in lower operational costs and reduced property requirements.

Summary of Alternatives Evaluation

West Trunk Diversion – Class Environmental Assessment Study

Alt. 1 – "Streetsville"	Alt. 2 – "Britannia Woodlot"	Alt. 3 – "Britannia Straight"	Alt. 4 – "Erin Centre Blvd."
• Less impact to residential properties and traffic • Avoids the known water-bearing, deep buried valley at Erin Mills Parkway/Britannia Road • Fewer number of shaft sites and staging areas, therefore less property requirements • Allows for additional sewer capacity • Comparable capital cost amongst all alternatives	• Greater impact to residential properties and traffic • Requires additional crossing of Mullet Creek • Potential to impact the known water-bearing, deep buried valley at Erin Mills Parkway/Britannia Road • Potential to impact Turney Woods Park, a significant woodland with species-at-risk present • Greatest number of shafts, therefore more property required	• Greater impact to residential properties and traffic • Requires additional crossing of Mullet Creek • Greatest potential to impact the known water-bearing, deep buried valley at Erin Mills Parkway/Britannia Road • Greater number of shafts, therefore more property required	**PRELIMINARY PREFERRED ALTERNATIVE** • Less impact to residential properties and traffic • Avoids the known water-bearing, deep buried valley at Erin Mills Parkway/Britannia Road • Fewest number of shaft sites and staging areas, therefore least amount of property requirements • Allows for additional sewer capacity and improved connection hydraulics • Comparable capital cost amongst all alternatives

Evaluation Criteria	Alt. 1 - Streetsville	Alt. 2 – Britannia Woodlot	Alt. 3 – Britannia Straight	Alt. 4 – Erin Centre Blvd.
Socio-Economic	+	-	-	+
Natural Environment	+ +	-	+	+ +
Cultural Environment	+	+	+	+
Technical	+	-	-	+ +
Costs	+	-	-	+

LEGEND

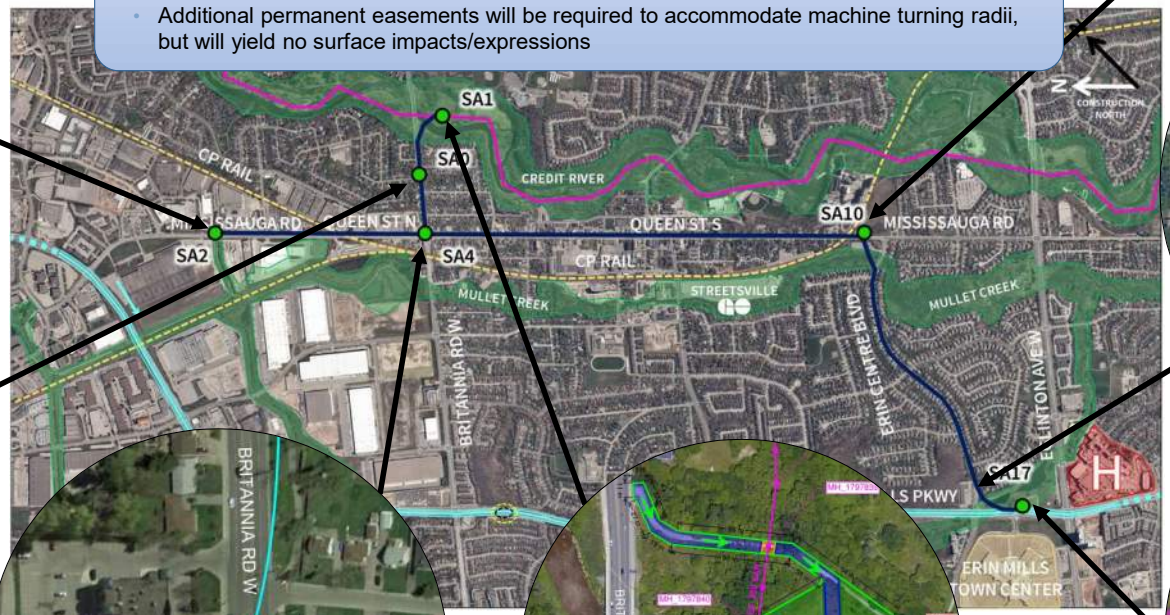
+ + Most Preferred
+ Preferred
- Least Preferred

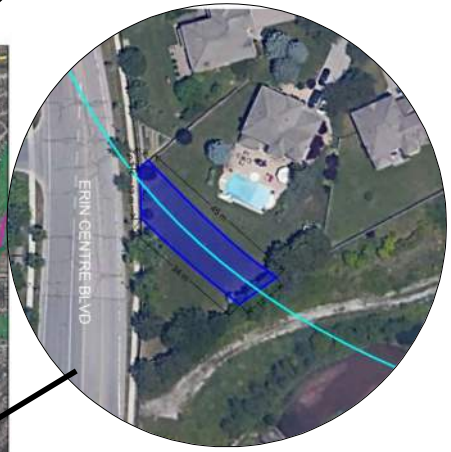
“Erin Centre Blvd” Staging Area Property Plans

West Trunk Diversion – Class Environmental Assessment Study

Shaft Selection Rationale

- Extended TBM drive lengths to minimize number of shafts
- Accommodates existing constraints (existing sewer depths, connection points, etc.)
- Minimize impacts to traffic by avoiding lane closures on roadways, cycling/multi-use trails and pedestrian pathways
- Minimize impacts to natural environment, existing and future land uses (e.g., residential and commercial areas), archaeological/cultural heritage features and existing infrastructure
- Additional permanent easements will be required to accommodate machine turning radii, but will yield no surface impacts/expressions





HATCH

Region of Peel
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“Erin Centre Blvd.” Construction Methodology and Considerations

West Trunk Diversion – Class Environmental Assessment Study

Existing sewer connection depths require the West Trunk Diversion Sewer to be constructed by tunnelling as opposed to open cut (i.e., cut and cover) construction methods.

Surface impacts limited to shaft and working compound construction. Shafts provide launch and reception locations for the specialized tunnel boring machines.

Only the “Erin Centre Blvd.” and “Streetsville” alternative allows for the use of larger tunnel boring machines which can complete longer drives allowing for a significant reduction of the number of required shafts.

The selected tunnel boring machine(s) will be equipped to handle known deep, water-bearing buried valley geohazards which have slowed similar projects in the area.

Proposed Construction Mitigation Measures

West Trunk Diversion – Class Environmental Assessment Study

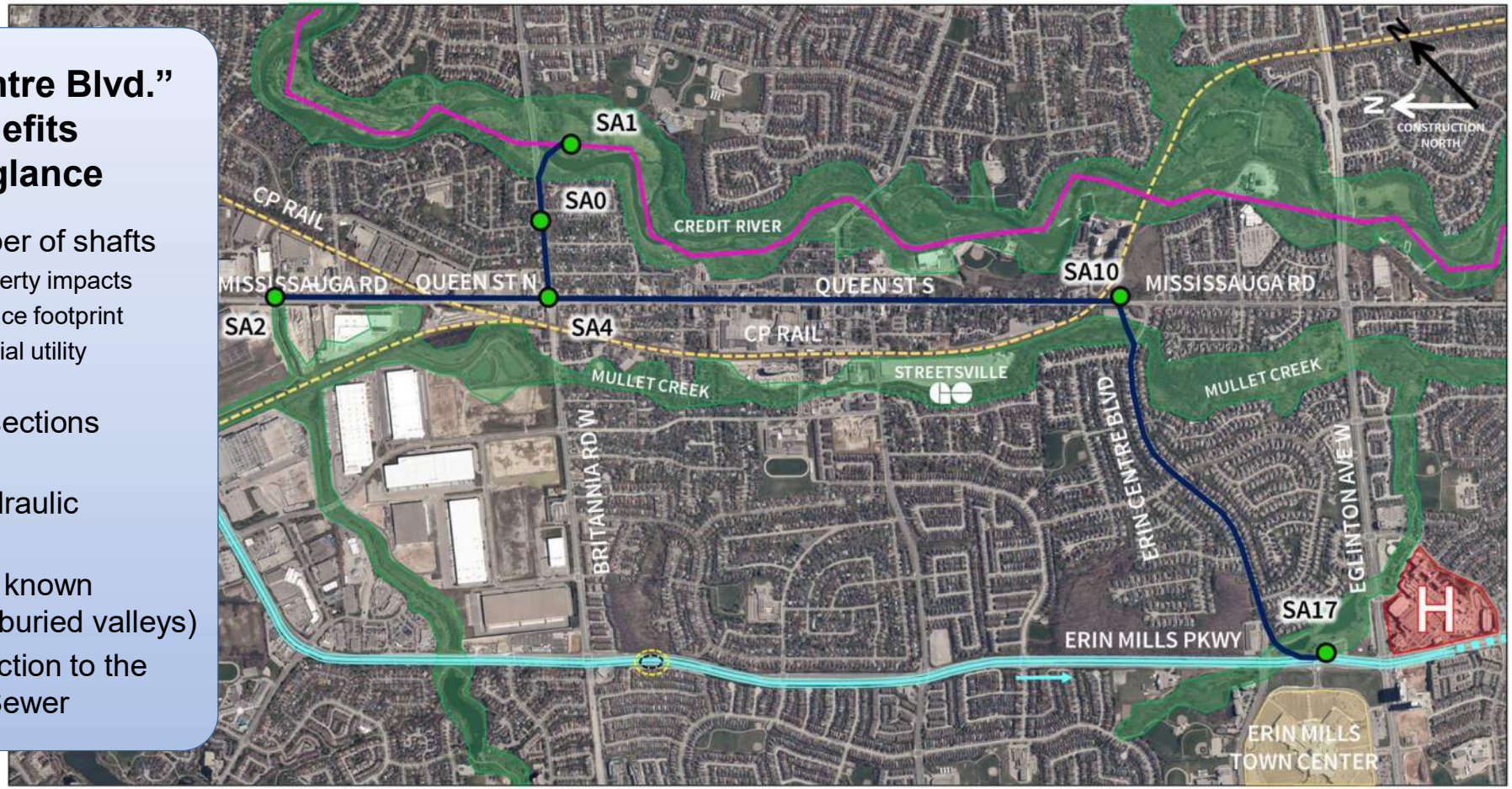
- **Nuisance Impacts (Dust, Noise and Vibration)**
  - Adherence to all applicable noise regulations, guidelines and bylaws.
  - Fugitive dust mitigation measures shall include mud mats, water spraying/non-chloride dust suppressants, street sweeping, etc.
  - Establishment of a reactive complaints protocol.
- **Erosion and Discharge of Sediment**
  - Certified Inspectors of Sediment and Erosion Controls will ensure that all required erosion and sediment control measures are in place during construction to avoid construction generated sediment entering adjacent habitats.
- **Traffic (Pedestrian, Cyclist, Transit, Vehicular) Impacts**
  - Surface impacts are only related to shaft construction as the sewer will be constructed via trenchless technology.
  - Shafts were selected from a host of alternatives to ensure lane reductions were minimized or altogether avoided where possible.
- **Tree Protection**
  - Shafts will be optimized during the detailed design phase to avoid/minimize tree and vegetation removal.
  - Snow fencing and all standard tree protection measures will be implemented as necessary.
  - All disturbed locations will be restored to meet or exceed existing conditions.
- **Watercourse Crossings**
  - Fish and fish habitats will not be impacted as all trenchless crossings of watercourses (i.e., Mullet Creek, Credit Valley River) will be undertaken below watercourse levels.

Summary of "Erin Centre Blvd." Benefits

West Trunk Diversion – Class Environmental Assessment Study

"Erin Centre Blvd." Benefits at-a-glance

- Fewest number of shafts
  - Reduced property impacts
  - Smallest surface footprint
  - Fewest potential utility relocations
- Fewest intersections impacted
- Improved hydraulic flexibility
- Avoidance of known geohazards (buried valleys)
- Single connection to the West Trunk Sewer



Expanded Study Process

West Trunk Diversion – Class Environmental Assessment Study

- **Next Steps**
  - Following the receipt of comments and input, the preferred solution will be updated as appropriate.
  - The decision-making and process followed will be documented in a Project File Report and made available for the 30-day public review period.
  - Pending there is not a Part 2 Order, the project will move forward to detailed design.

Project Schedule	
Study Commencement	April, 2019
Public Information Centre	September, 2021
Submit Project File for Public Review	October, 2021
Class EA Study Completion	November, 2021
Detailed Design	November, 2021
Field Investigations	Spring, 2022
Proposed Start of Construction (Main Contract)	2025

We are here

- **Your Review and Comments are Greatly Appreciated!**
  - If you have any questions or input, please use the online question form or reach out to the Region of Peel Project Manager →
  - The construction timing window is subject to potential delays due to COVID-19 and is dependent upon approval of the construction budget by Region Council

Ajay Puri, M.E. (Env.), P.Eng.
Project Manager, Engineering
Wastewater Collection & Conveyance
Engineering Services Division
Public Works
Email: ajay.puri@peelregion.ca
905-791-7800 ext. 5073

APPENDIX K

EATM-03 Construction in Proximity to the Credit River

West Trunk Diversion (WTD)

Environmental Assessment Technical Memorandum for the Peel West Trunk Diversion (EATM-03)

Construction in Proximity to the Credit River:

West Trunk Diversion Sewer
CVTS Connection Approach

2021-09-28

Report Prepared For:

Regional Municipality of Peel

Report Prepared By:

Hatch Ltd.
2265 Upper Middle Road, 5th Floor
Oakville, Ontario
L6H 0G5

Hatch Project: H-358800

Issue and Revision Record					
Rev	Date	Originator	Checker	Approver	Description
0	2020-05-14	Graeme Henderson	Melissa Alexander	Marc Gelinas	Issued for Review
1	2021-09-28	Graeme Henderson		Marc Gelinas	Final Version for inclusion within the EA PFR

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Peel West Trunk Diversion Project (WTD) serves as the groundwork to facilitate the future rehabilitation of the existing Credit Valley Trunk Sewer (CVTS). The CVTS was originally built in the late 1960s and has been responsible for servicing the west portion of the Regional Municipality of Peel (Region) for almost half a century. Furthermore, the Region has identified the benefits of linking the recently constructed West Trunk Sewer (WTS) to the CVTS with permanent trunk sanitary sewers for redundancy and dynamicity of operations via the inclusion of automated SCADA controlled gates within diversion structures to optimize the flow regime between the CVTS and WTS.

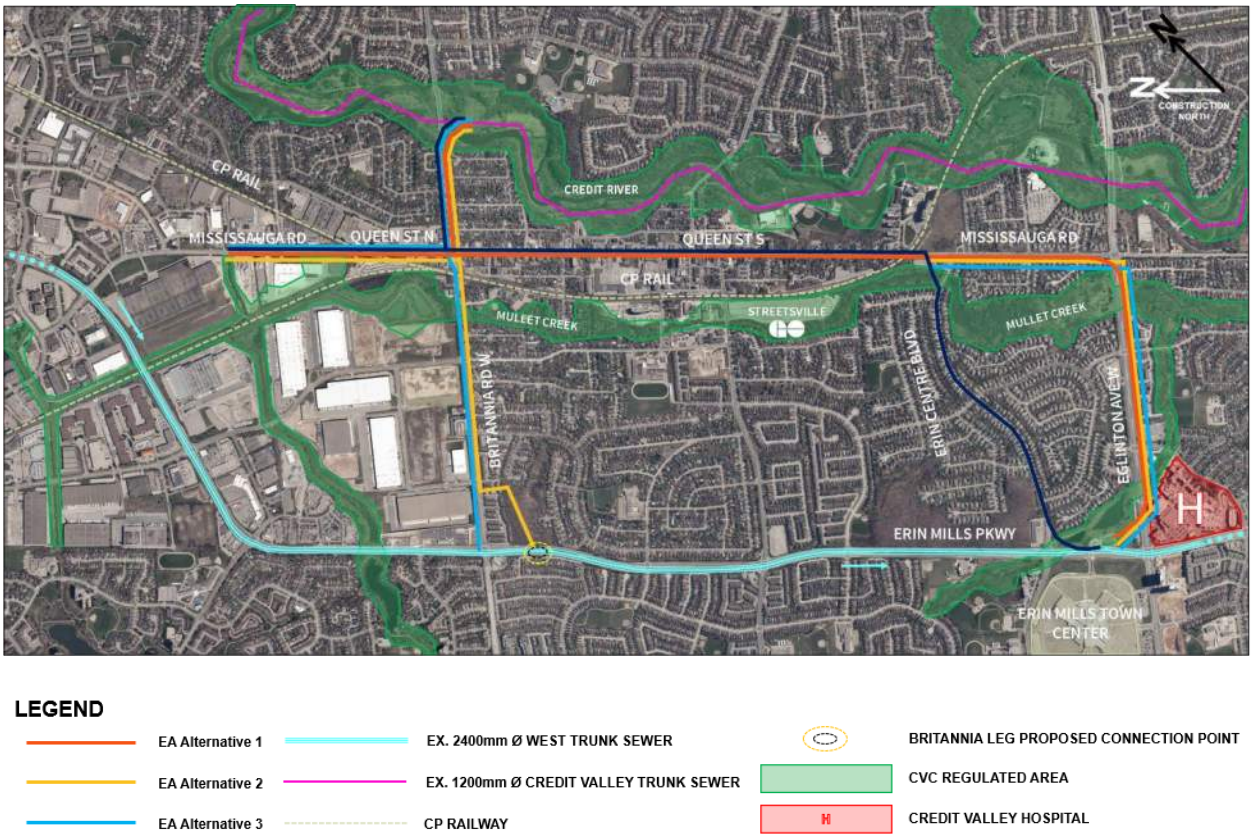

Figure 1-1 - WTD EA Alignment Alternatives

1.2 PURPOSE OF DOCUMENT

This TM was requested to be generated by the CVC during a pre-consultation meeting on 2020-02-11. The purpose of this technical memorandum (TM) is to provide additional details with respect to infrastructure proposed for construction in close proximity to the Credit River. Specifically, this TM pertains to the sections of sewer at the east end of the Britannia Road West

(trenchless crossing of the Credit River) which are proposed to connect to the CVTS within the Credit River Valley near Britannia Road.

2. WTD CREDIT RIVER CROSSING AND SCOUR POTENTIAL

As part of the project, a single trenchless crossing of the Credit River is mandatory for the primary WTD sewer. This connection will result in the diversion of flows from the CVTS into the proposed West Trunk Diversion sewer.

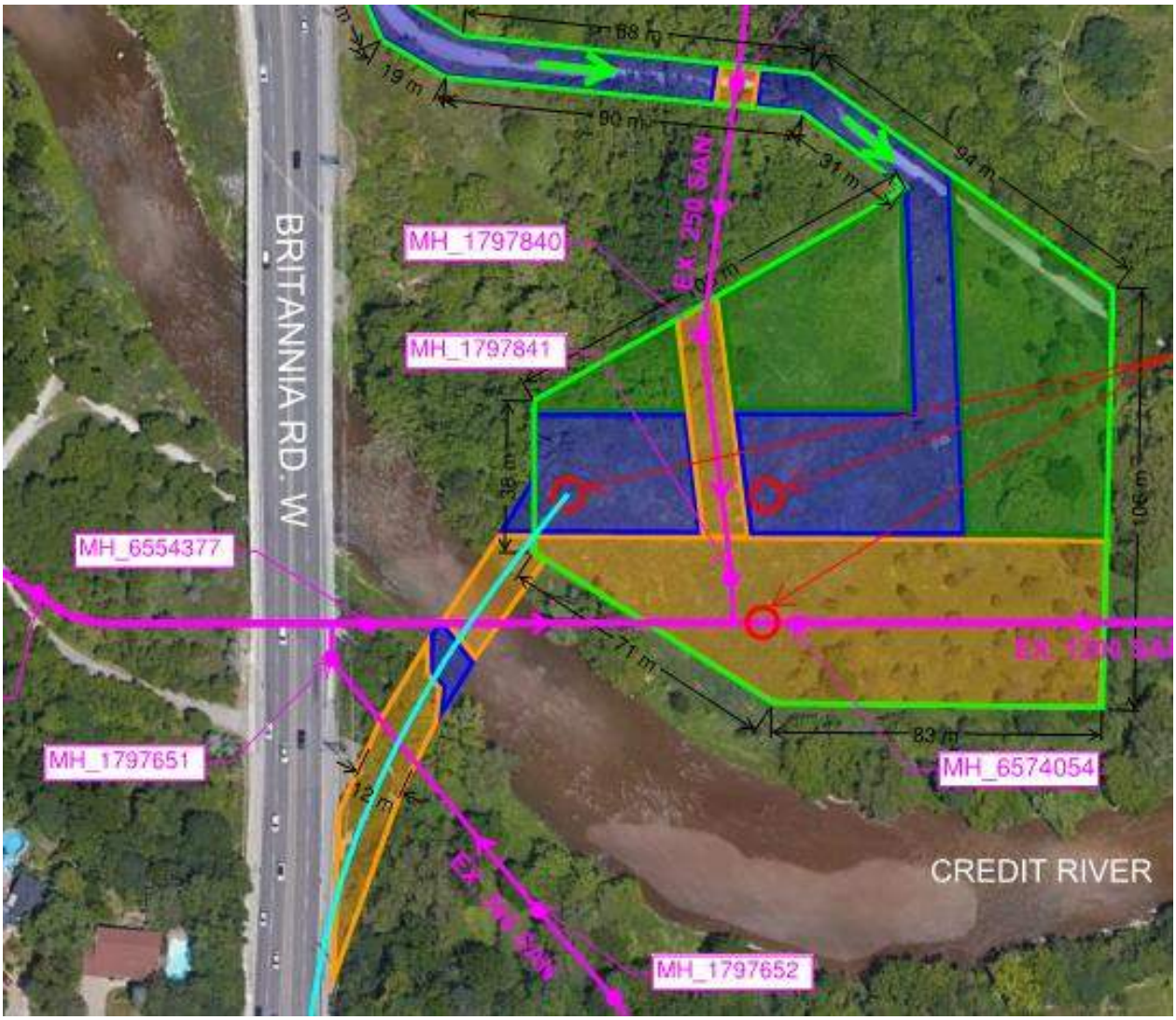

Figure 2-1 – WTD Crossing of the Credit River

2.1 EXISTING CONSTRAINTS

The following sections detail the critical constraints that must be taken into account while reviewing the proposed CVTS connection point alternatives for the West Trunk Diversion sewer.

2.1.1 CREDIT RIVER THALWEG

The elevation of the Credit River thalweg (the deepest portion of the creek bed) at the location of the proposed sewer crossings is approximately 150.5 m as per as-built drawing 67675-D provided by the Region of Peel.

2.1.2 CREDIT VALLEY TRUNK SEWER

The section of the CVTS crossing the Credit River on the south side of Britannia Road West was abandoned, with maintenance holes replaced in place and a 1200mm sewer installed in parallel (~10m east) as per as-built drawing 67675-D provided by the Region of Peel. This 1200mm sewer was constructed by open-cut trenching across the Credit River and is concrete encased at the crossing location. Because of this shallow construction, the West Trunk Diversion sewer will need to cross underneath the CVTS.

2.2 EXTERNAL INVESTIGATIONS AND RECOMMENDATIONS

The Region and Hatch retained Matrix Solutions Inc. (Matrix) to perform a preliminary fluvial geomorphological assessment of the Credit River at the proposed crossing location. The investigation recommends that proposed sewer pipe be buried 1.8m below the lowest point of the existing channel bed at a minimum. The complete report of their assessment can be found within Appendix A.

This crossing is of minor concern from a Credit River scouring perspective given that preliminary alignment investigations indicate that the obvert of the primary diversion sewer will be greater than 5m below the inferred Credit River bottom, which exceeds the scour depth installation recommendations identified by Matrix.

3. CONSTRUCTION WITHIN CVC REGULATED AREAS

Staging Area SA1 serves as a mandatory construction location where flows are diverted from the existing CVTS and sent westward towards the West Trunk Sewer. For this reason, compound establishment and surface construction presence within Timothy Street Memorial Park (i.e., Staging Area SA1) is required.

3.1 PROPOSED INFRASTRUCTURE AND FINAL SURFACE EXPRESSIONS

3.1.1 WEST TRUNK DIVERSION SEWER

The proposed West Trunk Diversion sewer involves a microtunneled 1200mm sewer from the CVTS, crossing under the Credit River towards Britannia Road West and Queen Street North. This sewer crosses below the Credit River at a preliminary depth of approximately 5.5m below the creek thalweg. This portion of work was not subject to additional evaluations as this is the mandatory connection point required to divert flows from the CVTS to facilitate the future rehabilitation of the CVTS in accordance with the project objective as noted within the EA problem statement.

The majority of sewer installations within SA1 will be installed via open cut methods. Following installation the site will be restored to match or exceed existing conditions. The WTD will require three chambers within SA1 to facilitate the diversion connection to the CVTS. All chambers will have a maintenance hole access frame and cover at ground surface with the potential for at least one vent pipe to be located above regional flood lines and a minimum 1.5m above grade. If the vent pipe cannot be installed outside the floodplain it can be accompanied with a sewer vent check valve. Two sluice gate operating stem valve boxes will also be required for the main diversion chamber to be installed flush with grade.

The sluice gates are intended to be real time controlled SCADA actuated gates, and as such, actuators will be required to operate the gates automatically. The Region requires all actuators and electrical equipment to be installed outside of the floodplain, however, SA1 and the required infrastructure within are in close proximity to the Credit River, and therefore lie within the floodplain. Significant modifications to the topography of the area are not acceptable from a CVC perspective, and the actuators cannot be removed from the proposed chambers. As such, Hatch and the Region will investigate the use of watertight chambers, actuators with suitable ingress protection (IP) ratings, housing the actuators within watertight enclosures, or a combination of these to best suit the application. If these measures prove to be not feasible from a technical; perspective, a surface enclosure/building above/adjacent to the maintenance hole access frame and cover may be considered. Control panel infrastructure will be installed outside of SA1 within Regional right-of-way (ROW) for ease of access and operation.

4. CREDIT VALLEY CONSERVATION AUTHORITY REQUIREMENTS

To assist in fulfilling the technical requirements associated with construction within CVC regulated areas, several CVC guidelines and requirements were reviewed as described within the following sections and will be considered during future detailed design phases.

4.1 FLUVIAL GEOMORPHIC GUIDELINES

The Fluvial Geomorphic Guidelines provide guidance on when and what fluvial geomorphic analyses are required within CVC regulated areas by providing study requirements for planning and project applications as they pertain to geomorphology. The application of fluvial geomorphology allows the dynamics of watercourses to be quantified and provides guidance on when and where impact mitigation measures and plans may be required. The general requirements are divided into five (5) fact sheets which provide an overview of requirements for specific activities.

- **Fact sheet I** pertains to hazard delineation of watercourses in confined and unconfined systems to identify existing hazards and limit of hazard for future development. Two key considerations are channel migration and erosion which can create substantial risk to inappropriately located development and result in the need to armour or train channels impacting channel form and function and potentially degrade aquatic habitat. A geomorphological assessment allows for the evaluation of channel stability and quantification of potential channel adjustment. Assessment of potential future erosion based on a 100 year timing window should be performed.
- **Fact sheet II** relates to the application of geomorphology in the development of appropriate stormwater management plans to limit potential negative impacts from land use change. As land use change is not anticipated for this project, this section is of less relevance. Any disturbed land will be restored to original condition or better and erosion and sediment control methods with be put in place during construction.
- **Fact sheet III** addresses geomorphological concerns in stream crossing location, sizing and design. This section relates to above ground structures such as bridges or culverts which may impact sediment transport processes, channel migration, and aquatic and terrestrial habitat. This project does not include any proposed above ground channel crossings. However a geomorphological assessment can help quantify vertical degrading channel adjustment which may impact the proposed crossing under the Credit River.
- **Fact sheet IV** provides an overview of the geomorphological requirements associated with the planning process and development applications, which involves baseline data collection, identification of geomorphically sensitive reaches, delineation of hazards and support of stormwater management through the provision of erosion thresholds and target flows.
- **Fact sheet V** outlines the application of geomorphology in the development of natural channel designs. This project does not include natural channel design.

4.2 TECHNICAL GUIDELINES FOR WATERCOURSE CROSSINGS

The Technical Guidelines for Watercourse Crossings provides guidance for applicants on the design and submission requirements of watercourse crossings within the Credit River Watershed. However, this document is geared towards minimizing watercourse impacts from above ground bridge and culvert structures and not for underground infrastructure. Regardless several design principles are still generally applicable and can be considered due to the anticipated river bed cover over the proposed infrastructure:

- Selected crossing should not require alteration to natural channel's form which will compromise the function of the watercourse
- A good design should not require hardening of the bed and bank of the watercourse
- It's important that a crossing be located, designed and constructed appropriately to minimize on-going repair, watercourse and riparian area remedial works, or the early and unanticipated need for replacement and/or relocation of structures caused by hydraulic characteristics of migrating or eroding watercourses. The culvert skewness must also be considered in the hydraulic analyses.

- The CVC's Fluvial Geomorphic Guidelines will assist in determining the hazard delineation and address fluvial geomorphological concerns.
    - The crossing design should respect fluvial geomorphic process in the watercourse in order to minimize the negative impacts on the aquatic and terrestrial environment
    - The 100-year local erosion hazard will determine the extent at which the crossing infrastructure should be placed in order to avoid future channel realignment or unnecessary hardening of the channel or banks. The assessment must be completed by a professional fluvial geomorphologist or equivalent. Any existing reports for the watercourse can also be considered for this purpose.
- CVC has developed scour assessment guidelines which contribute to the Fluvial Geomorphology Guidelines as an accepted reference for planning reviews related to engineering and infrastructure projects crossing under watercourses
- The geotechnical engineer must identify the erosion hazard and determine the impacts of the proposed works on the stability of the valley slopes.
- Further hydrogeological assessment may be required where a crossing structure may impact the natural movement of groundwater, inclusive of groundwater recharge and discharge. The assessment must provide mitigation strategies with considerations for the discharge during dewatering activities. A detailed dewatering plan would be required in instances where dewatering will occur during construction.
- The applicant is responsible for the submission and ultimate implementation of a comprehensive Erosion and Sediment Control plan for construction activity in or near a watercourse to mitigate the potential to contaminate downstream waterbodies with sediment laden runoff.

4.3 SLOPE STABILITY DEFINITION AND DETERMINATION GUIDELINE

The Slope Stability Definition and Determination guideline provides guidance on slope stability assessment. This document defines the components of a long term stable slope line which include a stability and an erosion aspect. A development setback component is also considered to provide a minimum allowance from the identified slope hazard area to take into account external conditions which could have an adverse effect on the existing natural conditions of the slope. Procedures and guidelines for establishing the stability component and erosion component of total setback are provided along with reference to CVC's Watershed Planning and Regulation Policies (2010) for minimum development setback allowances. These setbacks will be adhered to when determining the limits of the staging area at SA1.

4.4 TECHNICAL GUIDELINES FOR FLOODPROOFING

The Technical Guidelines for Floodproofing provide design considerations for dry floodproofing, which is the preferred approach, and wet floodproofing to render structures flood free, impervious and/or immovable. Some hydrotechnical design considerations include hydrostatic pressure, hydrodynamic load, sheer stress, frequency of flooding, duration of flooding, and ice jam effects. This guideline is geared towards buildings and structures with foundations, but some aspects are transferable to this project. All permanent structures in this project will be installed below ground level with minimal impact from flooding using a dry floodproofing approach. Precast sanitary sewer chambers in this project will be waterproofed with sealant and waterproofing membrane at all joints in order to reduce inflow and infiltration. This is of less concern for cast in place chambers as they will act as monolithic structures. All structures will be designed to withstand soil and groundwater pressures.

5. NEXT STEPS

Further consultation and consideration with the CVC may be undertaken as required and compliance with applicable guidelines will be ensured during the future detailed design phase. This memo will be appended to the Phase II Interim Report and ultimately be combined with the Phase I Interim Report to create the Project File Report. Assuming that no bump-up requests or Part II Orders are received, the project can move forward into detailed design and construction, including receipt of permits and approvals from review agencies.

6. REFERENCES

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- Peel WTD – Property Impacts and Requirements. August, 2019. Hatch Ltd.
- Hatch Corporation (2018). Request for Proposal for “Engineering Services for the West Trunk Diversions”, Project 08-2250” in Response to Region of Peel RFP 2018-482P dated February 1, 2016.

- Region of Peel (2018). Request for Proposal (RFP) No. 2018-482P for “Engineering Services for the West Trunk Diversions” dated June 22, 2018.

APPENDIX A – MATRIX FLUVIAL GEOMORPHIC SCOUR ASSESSMENT

PRELIMINARY FLUVIAL GEOMORPHIC SCOUR ASSESSMENT
WEST TRUNK DIVERSION
REGIONAL MUNICIPALITY OF PEEL

Prepared for:
HATCH

Prepared by:
MATRIX SOLUTIONS INC.

Version 1.0
November 2021
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PRELIMINARY FLUVIAL GEOMORPHIC SCOUR ASSESSMENT

WEST TRUNK DIVERSION

REGIONAL MUNICIPALITY OF PEEL

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DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

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VERSION CONTROL

Version	Date	Issue Type	Filename	Description
0.1	05-May-2020	Draft	27404-514 Geomorph Scour Assessment 2020-05-05 draft V0.1.docx	Issued to client for review
1.0	12-Nov-2021	Final	27404-514 Geomorph Scour Assessment 2021-11-12 final V1.0.docx	Updates throughout; Issued to client

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APPENDIX A Historical Channel Traces
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1 INTRODUCTION

Hatch, on behalf of the Regional Municipality of Peel (the Region), retained Matrix Solutions Inc. to provide a preliminary fluvial geomorphic scour analysis in support of the West Trunk Sanitary Sewer Diversion project. A sanitary trunk sewer (STS) is proposed for installation beneath the Credit River to convey wastewater to the existing Credit Valley trunk sewer. This proposed sewer crossing will be situated immediately downstream of the Britannia Road bridge.

Matrix has completed a preliminary fluvial geomorphic scour assessment to determine a preliminary depth of scour within the vicinity of the proposed pipe crossing. The following tasks were completed:

- collecting and reviewing background information, including reports, mapping, and aerial imagery
- completing a desktop analysis to assess lateral channel migration within the area surrounding the Britannia Road bridge
- completing a field investigation consisting of a detailed geomorphic survey to document existing fluvial geomorphic conditions and channel stability, and to determine maximum pool depth within the study area
- completing a preliminary assessment of maximum bankfull scour depth using surveyed pool depths
- evaluating the risk to proposed utilities from the fluvial process and developing recommended mitigation strategies

2 BACKGROUND REVIEW

2.1 Study Area

The study area is located in Mississauga, Ontario, where Britannia Road crosses the Credit River. This assessment focuses on the Credit River extending approximately 400 m upstream and 400 m downstream of Britannia Road (Figure 1). From here, the river continues on to flow south through Mississauga before discharging into Lake Ontario at Port Credit. This watercourse is regulated by Credit Valley Conservation (CVC).

This portion of the river is situated within the Peel Plain physiographic region (Chapman and Putnam 2007), which is characterized as gently rolling terrain and a topography that dips toward the Lake Ontario basin to the south. The Peel Plain is an area of low relief with the presence of bedrock at shallow depths. Surficial geology consists of Upper Till Plains (Halton Till), and till sheets consist of clayey silt to silty clay soils; although, there are sand to silt zones and boulder zones

(Chapman and Putnam 2007). Underlying bedrock consists of Upper Ordovician-aged red shales of the Queenston Formation (Hewitt 1972). The surficial deposits represent recent lacustrine deposits formed from small glacial meltwater ponds and are concentrated near river valleys. This physiographic region has been greatly altered by deforestation and wetland drainage to accommodate agricultural and urban land uses (Regional Municipality of Peel 2011). Land use is further discussed as a part of the historical assessment (Section 3).

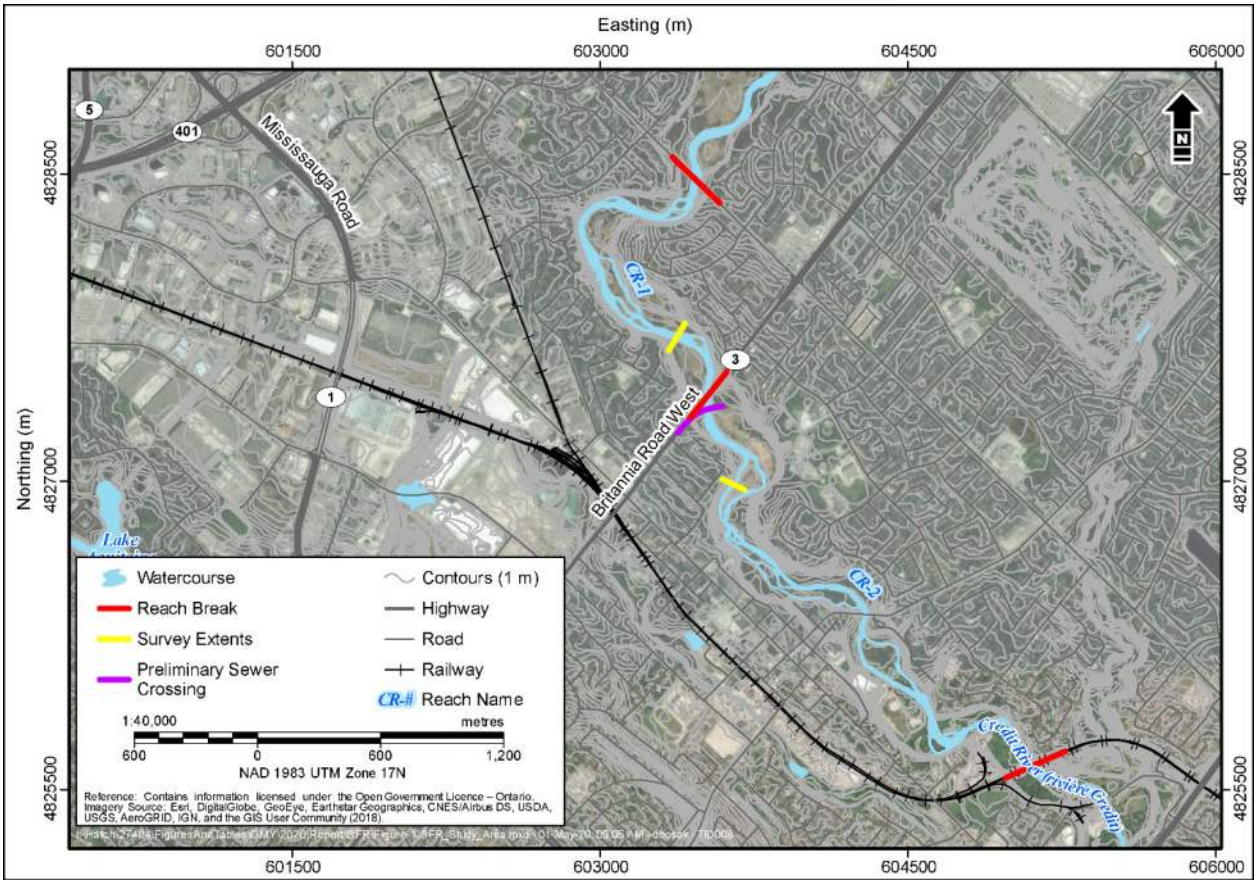

FIGURE 1 Study Area Overview and Reach Delineation (Section 4.1) for the Credit River Crossing with Highway 401

2.2 Previous Studies

Previous studies assessing channel morphology and scour potential within the Credit River proximal to the current study area were reviewed and are summarized in the following subsections.

2.2.1 Credit Valley Trunk Sewer - Phase I Geomorphologic and Erosion Assessment - Revised Report (PARISH 2006)

In 2006, PARISH Geomorphic Ltd. conducted a geomorphic investigation in support of the installation of a 1,500 mm STS proposed to cross the Credit River immediately upstream of Highway 401 at

Churchville Road (PARISH 2006). Rapid assessments and detailed geomorphic surveys were conducted along 600 m of the Credit River extending both upstream and downstream of the crossing at Highway 401. A scour analysis was completed within the vicinity of Highway 401 and considered regime equations and existing deep pools. A pool with a bankfull depth of 2.02 m was identified as the deepest pool during field reconnaissance. Given the proximity to the bridge crossing at Highway 401, and the propensity for ice and debris jams to occur along the Credit River, constricted flow conditions at the sewer crossing were identified to potentially locally increase scour depths. PARISH recommended including a factor of safety to the burial depth by doubling the predicted scour depth/maximum observed scour depth. PARISH recommended a burial depth of 2.87 m below the existing channel invert at the crossing; however, it was noted that this was not achievable and burial depth was limited to 1.17 m below the channel invert. As a result, additional engineering countermeasures were proposed to protect the sewer.

2.2.2 Credit River/Levi Creek Scour Assessment - Old Derry Road Sewer Crossing (PARISH 2014)

PARISH (2014) completed a geomorphic scour assessment in May 2014 on the Credit River at the crossing with Old Derry Road in Mississauga. The scour assessment was completed in support of the installation of a sanitary sewer crossing at this location. Field observations included a large scour pool at a Canadian Pacific Rail crossing upstream of Old Derry Road that was measured to have a scour depth (measured from the channel invert) of 4.3 m. The field-observed scour depth of 4.3 m was recommended as the design scour depth at the proposed crossing location. This value is greater than the one recommended in the PARISH (2006) study; however, the local deep point was noted to be directly attributable to infrastructure in the creek that causes flow constriction and local scour.

2.2.3 Fluvial Geomorphic Assessment - Highway 401 Watermain and Sanitary Sewer Project, (Credit River/Mullet Creek Scour Assessment) (Matrix 2019)

Matrix (2019) completed a fluvial geomorphic scour assessment in 2019 to evaluate the scour potential of the Credit River and Mullet Creek at their respective crossings with Highway 401, in support of several proposed watermain and sewer crossings. The scour analysis considered standardized scour equations in addition to maximum pool depths observed from the field assessment. In the Credit River, a field-identified maximum bankfull pool depth of 2.1 m was observed just upstream of the proposed pipe crossing and was more conservative than the depth of scour calculated using regime equations. Given the maximum bankfull depth of the channel was 1.15 m, the maximum scour depth below the existing channel bed invert would be 0.95 m. A 1.5x factor of safety was applied to the observed bankfull pool depth of 2.1 m to arrive at a scour depth of 3.2 m. At the proposed crossing, the final recommendation was that the pipe be buried at a minimum of 2.05 m below the lowest point of the channel bed (3.2 m minus the bankfull depth of 1.15 m).

3 HISTORICAL ASSESSMENT

Changes in the watershed, such as urbanization and/or deforestation, typically result in increased water contributions and decreased sediment supply to the watercourse, which in turn triggers a response in channel adjustment that can be documented through historical aerial photographs. A historic assessment was undertaken based on available aerial photographs for the years 1954, 1999, and 2017, spanning a time period of 63 years. The images were georeferenced and reviewed for changes in land use and planform in ESRI™ ArcMap mapping software. Historical imagery was obtained through the Region.

Since 1954, the land surrounding the Credit River has been developed substantially. In 1954, farm fields surrounded the watercourses outside of the floodplain. As reported in PARISH (2006), a large dam (the Huttonville Dam; approximately 9 km northwest of the study area) was breached in 1970, releasing a significant amount of water and sediment into the Credit River. However, the morphological changes that resulted were not reported. Downstream of Britannia Road, flows of the Credit River are further controlled by the Streetsville Dam. Upstream of the study area, the construction of Highway 401 began after 1954 and despite the construction of the highway, there has been minimal change to the planform of the Credit River. By 2017, land use was predominately residential around the upstream and downstream reaches of the Credit River. Due to the confinement of the valley in which the Credit River lies in within the study area, lateral migration has been limited historically.

Refer to Appendix A for historical planform traces for the Credit River.

4 EXISTING CONDITIONS

4.1 Reach Delineation

The parameters that influence channel form, amount, and size of sediment inputs, valley shape, land use, or vegetation cover vary throughout river systems. Lengths of channel that exhibit similar characteristics with respect to these parameters are known as reaches. The process of delineating reaches considers external parameters such as local geology, topography and valley setting, drainage area, hydrology, riparian vegetation, and land use. Consideration is also given to channel characteristics that develop in response to these influences such as sinuosity, gradient, and dimensions (PARISH 2001). Reach delineation is completed as part of the desktop assessment and is used to guide the subsequent field program. The reaches are then verified and finalized during the field assessment.

Road crossings often serve as reach breaks due to impacts from the crossing structure or changes in land use on either side of the road that impact channel morphology. Britannia Road forms such a break for the Credit River. Below the Britannia Road bridge, the channel is straightened, and bed and banks are armoured with riprap, further supporting the reach break. In this study, two reaches have been delineated, one upstream of Britannia Road (CR-1) extending approximately 400 m upstream and one

downstream of Britannia Road (CR-2) extending to approximately 400 m downstream. Reach breaks are shown in Figure 1.

A field assessment was completed in April 2020, which included rapid assessments and a detailed survey consisting of cross-sections and a channel profile. Fieldwork limits for the Credit River site were approximately 600 m upstream and 600 m downstream of Britannia Road for the rapid assessments, while detailed surveys extended 400 m upstream and downstream.

4.2 Rapid Assessments

Rapid assessments were completed to further document existing conditions as well as to identify dominant channel processes. Rapid assessments were completed during the field survey on April 20, 2020. Two tools were used to gather data on channel health and stability: the Rapid Geomorphic Assessment (RGA) and Rapid Stream Assessment Technique (RSAT).

The RGA is a semi-quantitative technique, developed by the Ontario Ministry of the Environment (MOE 2003) to document indicators of channel instability. Observations are quantified using an index that identifies channel sensitivity based on the presence or absence of aggradation, degradation, channel widening, and planform adjustment at the reach scale. Overall, the index produces values that indicate whether the channel is *stable* or *in regime* (score of less than or equal to 0.20), *transitional* or *stressed* (score of 0.21 to 0.40) or *adjusting* (score of 0.41 or greater). A stable score indicates that the channel morphology is within a range of variance for streams of similar characteristics. Any evidence of instability is isolated or associated with normal river meander propagation processes. A transitional score indicates that the channel morphology is within the range of variance of streams of similar hydrographic characteristics, but the evidence of instability is more frequent. An adjusting score indicates that the channel morphology is not within the range of variance, and evidence of instability is widespread.

The RSAT was developed by the Metropolitan Council of Governments (Galli 1996) and provides a more qualitative and broader assessment of the overall health and function of a reach. This system numerically scores a stream using six categories based on channel parameters: channel stability, erosion and deposition, physical instream habitat, water quality, riparian habitat conditions, and biological indicators. Once a condition is assigned a score, the tool produces an overall rating based on a 50-point scoring system. The result of the assessment then categorizes the stream as having a *low* (score of less than 20), *moderate* (score of 20 to 35), or *high* (score of greater than 35) degree of stream health.

During the rapid assessments, bankfull channel dimensions are identified. In natural, stable streams, the “bankfull” channel area often represents the maximum capacity of the channel before flow spills into the floodplain, and the discharge at this stage is referred to as the bankfull discharge. Field indicators of bankfull flow elevation include obvious breaks or inflections in the cross-section profile, the top elevation of point bars, and changes in vegetation.

The study reaches are described in the following subsections with all references to left or right banks when looking in the downstream direction. Refer to Appendix B for site photographs.

4.2.1 CR-1

Field work for reach CR-1 was conducted over a distance of approximately 600 m upstream of the bridge at Britannia Road. The reach is characterized as a multithread, sinuous channel. The channel bifurcates in numerous places forming medial bars and vegetated islands. Bankfull dimensions at riffles and runs are approximately 30 to 35 m in width and 0.6 to 0.8 m in depth. At the time of the survey, wetted widths ranged between 26 and 32 m, while wetted depths ranged between 0.24 and 0.28 m. No distinct pools were observed in this reach; the channel generally remained flat and consisted of riffle/runs with coarse substrate. The bed material generally consists of platy pebbles, cobbles, and boulders with minor sand embedded in between. The substrate of riffles is approximately 50% embedded due to the deposition of finer material. The platy material was likely sourced from underlying bedrock, with bedrock exposures noted on the bed and banks toward the bridge crossing. The substrate Britannia Road is coarser, consisting of angular riprap likely placed during the recent bridge construction. The channel is confined on the left bank by steep valley wall, while on the right, the channel is unconfined with good floodplain access. There is evidence of minor bank erosion where the channel has widened along the right side. High flows frequently overtop the floodplain on the right, as evidence by a washed-out pedestrian pathway and high deposition of fine sediment in the overbank zone. There is a small stormwater outfall on the left bank approximately 60 m upstream from the highway bridge with no signs of active erosion downstream of the outfall. Additionally, no erosion or scouring was observed around the footings of the Britannia Road bridge.

Overall, CR-1 was assessed an RGA score of 0.27, indicating that it is *transitional* in condition. Based on the indicators observed, the dominant geomorphic processes/modes of adjustment are widening and aggradation. The reach was scored 32 using the RSAT protocol, indicating moderate stream health.

4.2.2 CR-2

Field limits for reach CR-2 extend approximately 600 m downstream of the Britannia Road bridge. Downstream of the bridge the channel is also multithread and sinuous and, at meander bends, is substantially wider. Bankfull widths of riffles and runs are generally the same as CR-1 (30 to 36 m) while bankfull depths are deeper ranging from and 0.8 to 1.1 m. The largest pool observed contained a bankfull depth of 1.9 m. Channel substrate is dominated by platy pebbles, cobbles, and small boulders. The right bank of the channel is confined by the valley wall along the entire reach, where the banks are very steep and vertical. Indicators such as exposed tree roots, leaning trees and minor channel undercutting of up to 10 cm provide evidence that the channel has widened to the right. The floodplain is easily accessed by flows on the left side of the channel along this section. Debris caught in trees along the left floodplain is indicative of higher flows and is caught as high as 1.5 m above the channel bed. Approximately 150 m downstream of the bridge, there is a stormwater outfall along the right bank discharging into the river via

a small outfall channel. Banks within the vicinity of the outfall are near-vertical and hardened with riprap. Large, continuous bedrock shelves were observed along the channel bed 100 m downstream of the outfall. This provides evidence that the shale bedrock does fracture and contribute sediment to the river system. Downstream of the large meander at the end of the survey extent, a channel design has recently been constructed and the left bank has severely eroded, depositing large sediment in the overbank area.

Overall, CR-2 was assessed with an RGA score of 0.32, indicating that it is *transitional* in condition. Based on the indicators observed, the dominant geomorphic processes/modes of adjustment are widening and aggradation. The reach was scored 26 using the RSAT protocol, indicating moderate stream health.

4.3 Sediment Characterization

A modified Wolman (1954) pebble count was conducted at each cross-section surveyed to determine the grain size distribution of the channel substrate. A step-toe pebble count procedure was employed by selecting 50 grains along each of the surveyed cross-sections. Averaged results from counts across all reaches are presented for the Credit River in Table 1.

In general, bed substrates as counted were similar in range throughout reaches CR-1 and CR-2 and the geometric shape of sediment was mostly platy. Platy material often consisted of large, but thin pieces of shale that has eroded from the underlying bedrock. Several bedrock exposures were observed in the channel bed and banks during the detailed field assessment. Riffle and run bed substrate in reach CR-1 is typically pebble, cobble, and boulder-dominated, with fine sand accumulation on riffles embedding the coarser material. The median grain size (D_{50}), where 50% of the sampled grains have a diameter that is equal to or smaller than, is 90 mm (small to medium cobble). The D_{90} is 280 mm, representing the small boulder fraction of bed material. The maximum grain size recorded at a cross-section upstream was a platy boulder 410 mm in diameter.

Riffle and run bed substrate in reach CR-2 is also pebble, cobble, and boulder-dominated, although there is an increase in pebble material. The median grain size (D_{50}) is 80 mm (small cobble). The D_{90} is 180 mm (medium cobble). The maximum grain size recorded at a cross-section downstream was a platy boulder 330 mm in diameter.

TABLE 1 Substrate Size Distribution for Riffle/Runs at the Credit River at Britannia Road (Reach Average)

Parameter	Average Substrate Size (mm)	
	CR-1	CR-2
D_{10}	5	10
D_{50}	90	80
D_{84}	280	180

4.4 Detailed Geomorphic Survey

Using survey-grade GPS equipment (sub-centimetre accuracy), detailed field data consisting of cross-sections and a longitudinal profile along the channel thalweg were surveyed. Cross-sections were measured both upstream and downstream of Britannia Road for the Credit River. The channel bed substrate (i.e., D_{50}, D_{84}) was measured using a pebble count approach (Wolman 1954). The survey was completed to obtain improved definition of channel geometry.

A longitudinal profile approximately 850 m long and three cross-sections were measured along the Credit River in the study area. Selected parameters and calculated bankfull hydraulics from the detailed assessment are provided in Table 2.

TABLE 2 Comparison of Bankfull Parameters at Riffle and Runs for the Credit River at Britannia Road (Reach Average)

Channel Parameter	CR-1	CR-2
Measured		
Average bankfull width (m)	32.5	33
Average bankfull depth (m)	0.70	0.95
Maximum bankfull depth (m)	1.0	1.2
Average bankfull width-to-depth ratio	46	35
Bankfull gradient (m/m)	0.002	0.002
Channel bed gradient (m/m)	0.003	0.003
Substrate D_{50} (mm)	90	80
Substrate D_{84} (mm)	280	180
Bank materials	Clay, silt, fine sand	Clay, silt, fine sand
Estimated Manning's roughness, n	0.035	0.035
Computed		
Average bankfull discharge (m^3/s)	28	32
Average bankfull velocity (m/s)	1.1	1.3
Average bankfull shear stress (N/m^2)	18	22
Stream power at bankfull (W/m^2)	635	960
Unit stream power (W/m^2)	19	29

For the current study, measured bankfull widths at riffle cross-sections range between 30 and 36 m, while average bankfull depths range between 0.6 and 1.1 m. The maximum bankfull depths range between 0.8 and 1.2 m. Maximum bankfull depths were measured at pool and generally range between 1.2 and 1.7 m at these features. The overall bankfull gradient at the site is 0.2%.

Bankfull discharge for each reach was calculated using surveyed cross-sectional dimensions and profile slope with a Manning's roughness value (n) of 0.035. Reach CR-1, with a bankfull gradient of 0.2%, was calculated to have a bankfull discharge of 28 m^3/s with an average velocity of 1.1 m/s. Reach CR-2, with a bankfull gradient of 0.2% for was calculated to have a bankfull discharge of 32 m^3/s with an average velocity of 1.3 m/s. Average bankfull shear stress values for CR-1 and CR-2 were calculated to be 18 N/m^2 and 22 N/m^2, respectively. Additional bankfull hydraulic information is summarized in Table 1.

5 CHANNEL MIGRATION ANALYSIS

Siting infrastructure outside of the erosion hazard limit is ideal, in order to avoid future risk to the infrastructure from fluvial processes. For the current assignment, a meander belt width (MBW) analysis was not completed as the proposed pipe crossing is so proximal to the bridge, where channel migration is limited due to channel straightening and armouring through the structure. As the channel is restricted from migrating through, and in proximity to the bridge, an MBW analysis was determined to be not applicable. Channel migration rates were calculated for the Credit River upstream of the bridge crossing and were found to be in the range of 0.2 m/year. However, meander migration in the downstream direction is not anticipated to be an issue due to limitations at and proximal to the bridge, as previously described. Additionally, historical aerial imagery reveals that within the study area, the Credit River has remained relatively stable in planform within the past 20 years, with only minor evidence of bank erosion and widening. The river is further confined by steep valley walls in most locations, minimizing the potential for lateral migration. Within the proximity of the bridge, the bed, and banks are currently stabilized with riprap and no signs of active erosion were observed.

Although there is little risk to infrastructure due to lateral erosion, there is a vertical scour component that should be considered. Therefore, it is recommended that the entire length of the pipe be buried below the maximum scour depth along the span of the bridge, should the channel occupy that location at some point in the future.

6 SCOUR ASSESSMENT

To evaluate risk to the infrastructure from channel incision where the pipe crosses the watercourse (vertical erosion risk), a preliminary scour assessment has been completed to predict the maximum scour depth below the creek bed using surveyed bankfull pool depths. As this is a preliminary scour assessment, standard scour equations were not used to estimate scour depth.

Results of the scour analysis are presented in Table 3 and are compared to the scour depths that were determined nearby by Matrix (2019) and PARISH (2006), for the Credit River. During the current field investigation, the deepest pool identified had a maximum bankfull pool depth of 1.7 m (Figure 2). A 1.5x factor of safety was applied to the maximum bankfull pool depth to arrive at a scour depth of 2.6 m. Near the proposed sewer crossing, the bankfull depth was approximately 0.85 m. By subtracting the bankfull depth (0.85 m) from the observed maximum bankfull pool depth (2.6 m), the depth of scour

below the existing channel invert would be 1.8 m. This suggests that, at the crossing location, the channel has the potential to scour down an additional 1.8 m below the existing bed (elevation of 148.7 m asl at pipe crossing) to reach the same maximum depth as identified along the study reach (Figure 2). As the proposed crossing is downstream of the Britannia Road bridge, local constriction from woody debris or ice jamming is not anticipated, nor is any localized scour enhancement as a result. Therefore, it is recommended that the proposed sewer pipe be buried 1.8 m below the lowest point of the existing channel bed at a minimum.

TABLE 3 Comparison of Scour Parameters and Depth of Scour for the Credit River

Channel Parameter	Current Study	(MATRIX 2019)**	(PARISH 2006)**
Bankfull gradient (m/m)	0.002	0.0015	0.003
Bankfull discharge (m^3/s)	30	26	36
Substrate D_{50} (mm)	85	64	49
Substrate D_{84} (mm)	235	124	130
Average bankfull width (m)	33	32	29
Average bankfull depth (m)	0.85	0.87	0.74
Maximum bankfull pool depth (m)	1.7	2.1	2.0
Scour Depth (m)	2.6*	3.2*	N/A
Maximum scour depth (m)	1.8	2.05	2.8

*Includes a 1.5x factor of safety
**Standard regime equations were used in the study to determine maximum depth of scour
Highway 401 Watermain and Sanitary Trunk Sewer Fluvial Geomorphic Assessment, Mississauga, Ontario (Matrix 2019)
Credit Valley Trunk Sewer – Phase 1 Geomorphological and Erosion Assessment, Revised Report (PARISH 2006)

When comparing the depth of scour to that of the other studies summarized in Table 3, the depth of scour calculated in the current study (1.8 m) is lower than that of the other two studies, although bankfull parameters and substrate characterization between the three studies are very similar. It is important to recognize that these studies also took several standardized scour equations into account for a more detailed analysis. The current study is a preliminary assessment for planning purposes and solely relies on observed bankfull pool depths in addition to a conservation 1.5x factor of safety. When evaluating the longitudinal profiles in the three studies, the difference in scour depths appears to be the result of the observed maximum pool depths which were 2.05 m (Matrix 2019) and 2.8 m (PARISH 2006). In the current study, the maximum observed pool depth was only 1.8. Overall, it is recommended a more thorough scour assessment be completed using standardized scour equations to confirm the depth of scour throughout the detailed design stage.

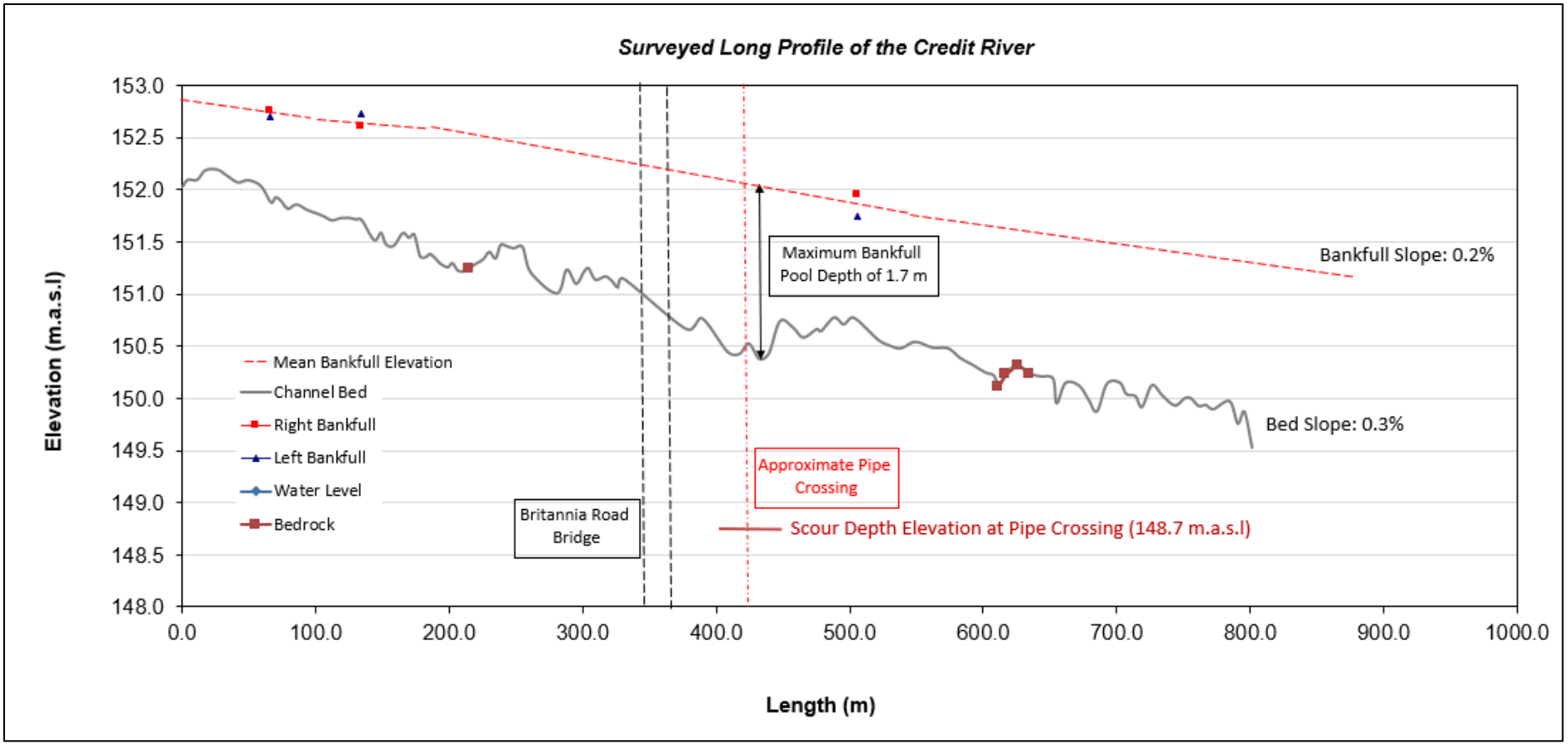

FIGURE 2 Surveyed Long Profile of the Credit River Upstream and Downstream of Britannia Road

7 SUMMARY OF RECOMMENDATIONS

The proposed West Diversion STS is being installed to convey wastewater to the Credit Valley trunk sewer and is proposed to cross the Credit River approximately 50 m downstream of Britannia Road. A preliminary geomorphic scour assessment was completed to determine a maximum scour depth using surveyed bankfull pool depths.

A channel migration analysis was completed to ascertain lateral erosion risk. Results reveal the channel has not historically migrated within the past 20 years, and the risk to lateral migration is low given the pipe crossing is proximal to the bridge and the bed and banks are well armoured. An MBW analysis was not completed given the pipe location is proximal to the bridge and natural lateral migration processes are restricted by the bridge structure and the associated bank armouring. Should the location of the pipe crossing change to an area of the river with greater potential for lateral migration, an MBW analysis should be completed and, at a minimum, the pipe should be buried to the scour depth at all locations within the MBW. However, this option is not always feasible and alternatively erosion countermeasures (e.g., buried stone treatment) may be necessary to provide protection to infrastructure. Regardless of the location within an active floodplain or stabilized banks, the vertical erosion risk must be considered.

To evaluate risk of pipe exposure from channel incision, a scour assessment was completed to calculate the maximum potential scour depth (vertical erosion risk). The estimated maximum scour depth of 1.8 m is measured from the lowest existing channel bed elevation (thalweg), corresponding to an elevation of 148.7 m asl at the pipe crossing location. The crest of the pipe should be located 1.8 m below the existing channel invert, at a minimum, at the crossing to account for channel scour that could occur upstream or downstream of the pipe. It is also recommended that the pipe be buried at the maximum scour depth of 1.8 m along the span of the bridge to account for failure in bank armouring that may occur at higher flows. Once the pipe crossing location is confirmed, a more thorough scour assessment should be completed using standardized scour equations (Blench 1969, Hey 1997, Lacey 1930) in conjunction with hydraulic data (i.e., peak flows and velocities) to confirm the depth of scour.

The recommended pipe burial extent and depth is based solely on fluvial geomorphic considerations and the presence of exposed bedrock along the channel bed may result in the requirement of an alternate sewer profile due to geotechnical reasons, with the consideration of subsurface conditions and construction installation methods. The shale bedrock is friable, and susceptible to freeze/thaw cycles and over time, will erode. As such, it is recommended that detailed borehole logs be obtained within the vicinity of the pipe crossing to accurately delineate the depth of bedrock. As construction methods are finalized, in-channel works (i.e., re-establishment of cover over the pipe if open-cut) should be developed with considerations of natural channel design principles and stream/riparian ecology. Consultation with and approval from CVC, Fisheries and Oceans Canada, and Ministry of Natural Resources and Forestry may be necessary to proceed with any in-stream works along the Credit River.

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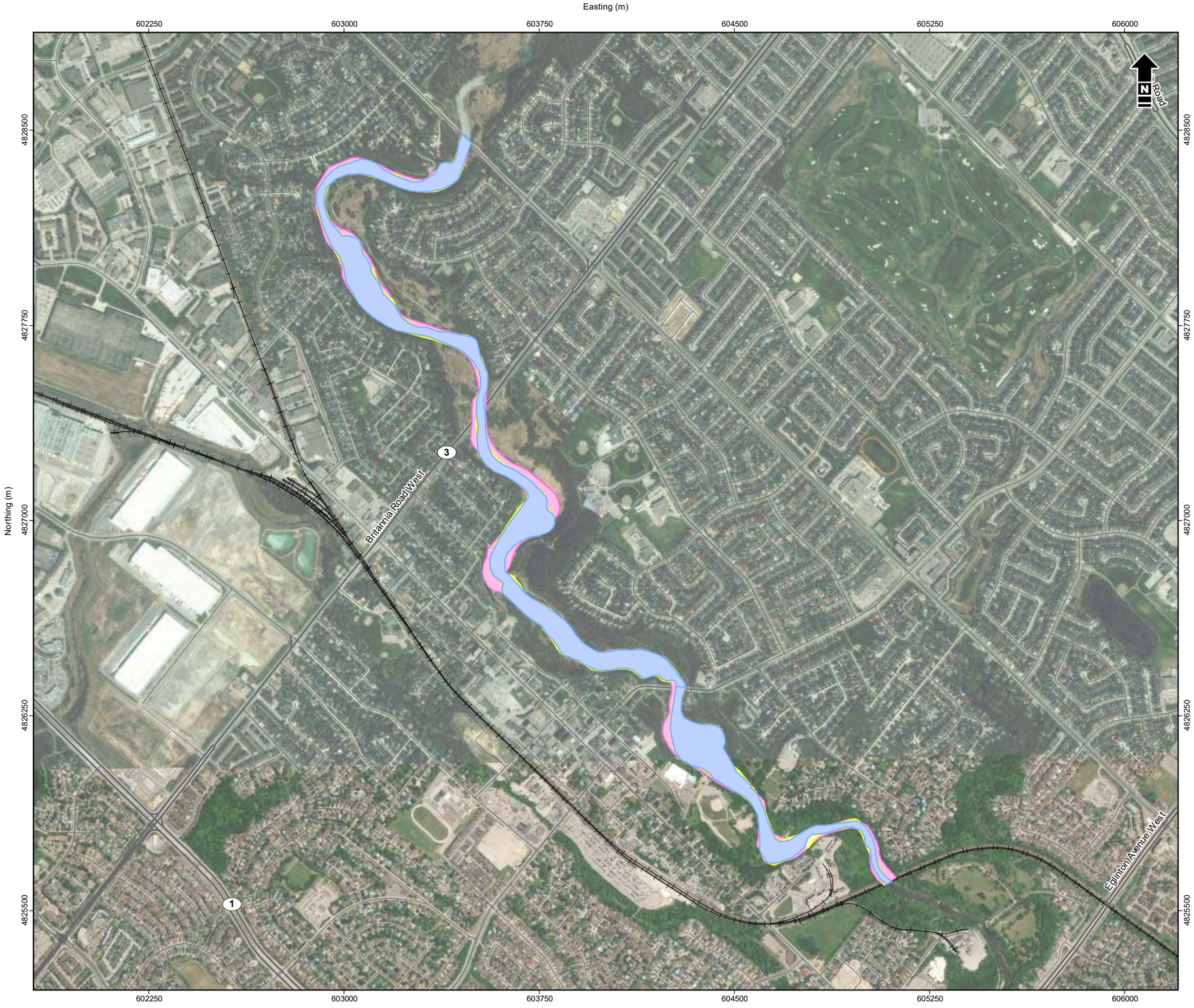
APPENDIX A
Historical Channel Traces



Watercourse 2017
Watercourse 1999
Watercourse 1954
Highway
Road
Railway

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2018).

1:15,000 metres
150 0 150 300
NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Hatch Corporation
West Trunk Diversion Area

Historical Channel Traces – Credit River at Britannia Rd. Mississauga, Ontario

Date:	Project:	Submitter:	Reviewer:
May 2020	27404	N. Cyples	J. McDonald

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Figure A1

I:\Hatch\27404\FiguresAndTables\GMY2020\Report\Appendix\Figure-A1-Historical_Channel_Traces.mxd - Tabloid_L - 01-May-20, 01:10 PM - dbosak - TB005

1:15,000 metres
150 0 150 300
NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Orthophoto (1954) provided by the Region of Peel.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Hatch Corporation
West Trunk Diversion Area

Historical Orthophotos of the Credit River - Orthophoto 1954

Date:	Project:	Submitter:	Reviewer:
May 2020	27404	N. Cyples	J. McDonald

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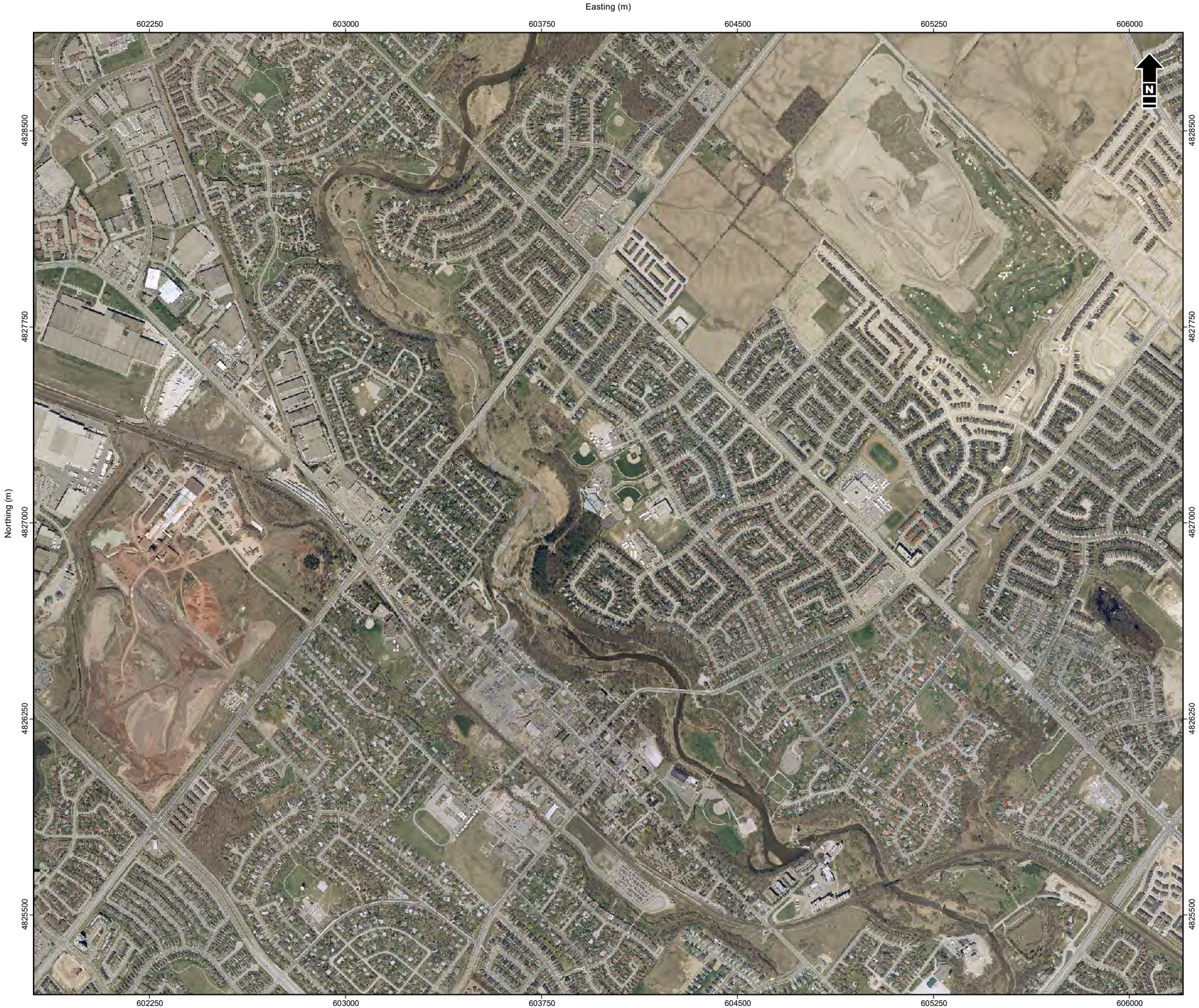
Figure
A2

I:\Hatch\27404\FiguresAndTables\GMV\2020\Report\Appendix\Figure-A-2-Historical_Orthophotos_of_the_Credit_River_Orthophoto_1954.mxd - Tabloid_L - 01-May-20, 10:33 AM - dbosak - TID05



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NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Orthophoto (199) provided by the Region of Peel.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Hatch Corporation
West Trunk Diversion Area

Historical Orthophotos of the Credit River - Orthophoto 1999

Date:	Project:	Submitter:	Reviewer:
May 2020	27404	N. Cyples	J. McDonald

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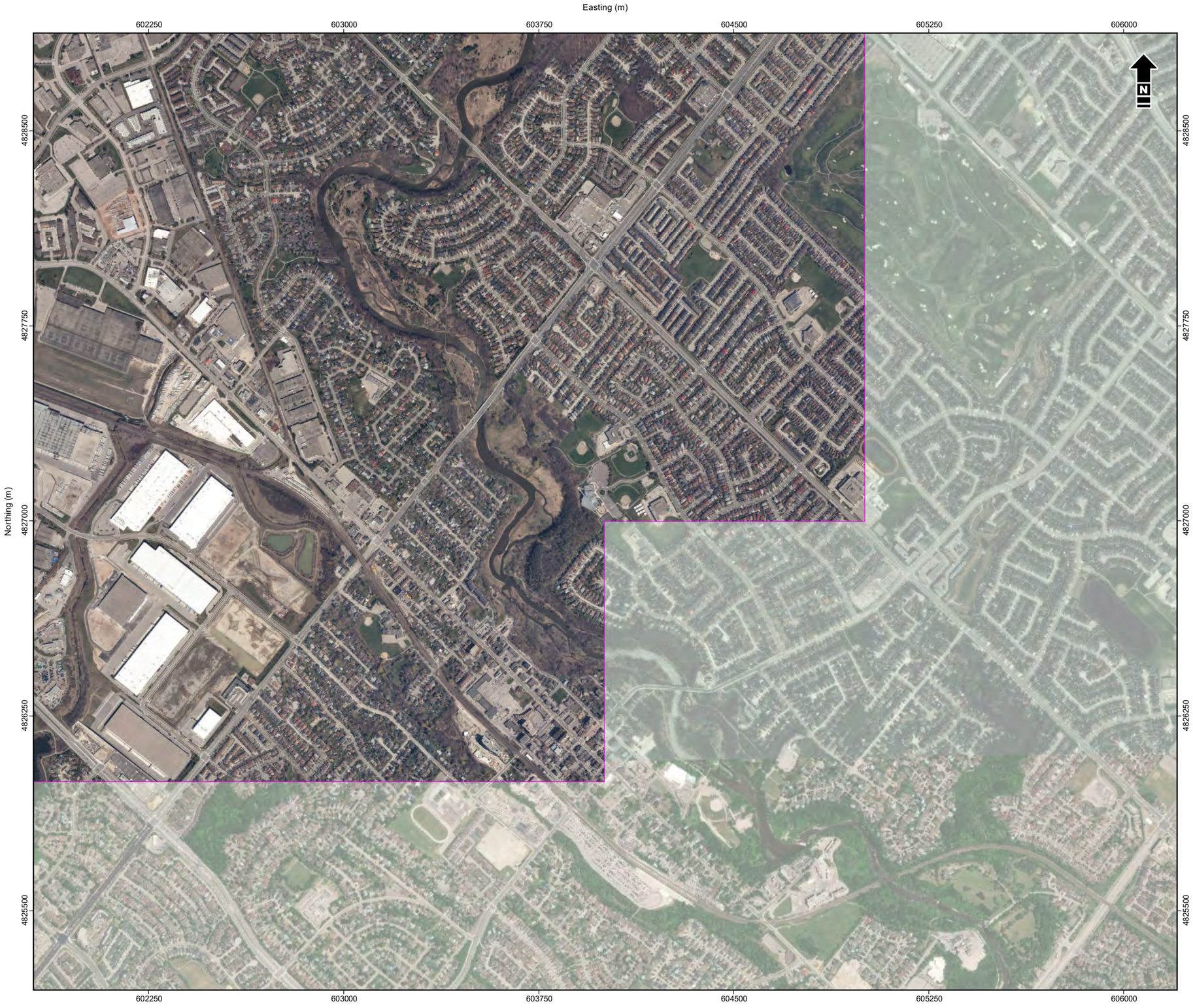
Figure
A3

I:\Hatch\27404\FiguresAndTables\GMY\2020\Report\Appendix\Figure-A-3-Historical_Orthophotos_of_the_Credit_River_Orthophoto_1999.mxd - Tabloid_L - 01-May-20, 01:07 PM - dbosak - TID005



Reference: Contains information licensed under the Open Government Licence – Ontario. Orthophoto (2017) provided by the Region of Peel. Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (2018).

1:15,000 metres

150 0 150 300

NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Hatch Corporation
West Trunk Diversion Area

Historical Orthophotos of the Credit River - Orthophoto 2017

Date:	Project:	Submitter:	Reviewer:
May 2020	27404	N. Cyples	J. McDonald

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Figure
A4

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APPENDIX B
Site Photographs

Matrix Solutions Inc.
April 20, 2020

1. Upstream extent of detailed assessment (~400 m upstream of Britannia Road) at pedestrian bridge crossing the Credit River.

Matrix Solutions Inc.
April 20, 2020

2. View facing upstream; left side of channel confined by steep valley slope, while the right side has access to the floodplain.

Matrix Solutions Inc.
April 20, 2020

3. View facing downstream; steep valley wall along left, with numerous fallen and leaning trees. No woody debris noted in channel at the time of the survey.

Matrix Solutions Inc.
April 20, 2020

4. Right bank has slumped into channel, leaving it at near-vertical and susceptible to erosion.

Matrix Solutions Inc.
April 2, 2020

5. Debris caught in tree 1.1 m above ground and is indicative of the height of higher flows.

Matrix Solutions Inc.
April 20, 2020

6. Bedrock exposure along left channel bank immediately upstream of Britannia Road crossing; at this location bedrock was also exposed along the channel bed.

Matrix Solutions Inc.
April 20, 2020

7. View downstream towards Britannia Road bridge crossing.

Matrix Solutions Inc.
April 20, 2020

8. Small outfall on left bank discharging into the Credit River.

Matrix Solutions Inc.
April 20, 2020

9. View downstream towards bridge crossing; approaching the bridge, the banks are armoured with riprap to provide further bank stability.

Matrix Solutions Inc.
April 20, 2020

10. Right bank heavily armoured below bridge; no active erosion observed within the vicinity of the bridge.

Matrix Solutions Inc.
April 20, 2020

11. Woody debris caught in front of one of the bridge footings; at the time of the assessment, the channel had not scoured down.

Matrix Solutions Inc.
April 20, 2020

12. Downstream of bridge crossing, bank slumping has occurred on right bank.

Matrix Solutions Inc.
April 20, 2020

13. Downstream view of meander bend, where the channel has widened to the right where it is confined by the valley wall.

Matrix Solutions Inc.
April 20, 2020

14. Small outfall channel on right along the valley slope, discharging into the river.

Matrix Solutions Inc.
April 20, 2020

15. Small gravel bar has formed along the left side of the channel; the channel is widened out in this section is flow is much lower than in other areas.

Matrix Solutions Inc.
April 20, 2020

16. Downstream view towards where channel bifurcates into a multi-thread system; banks are stable in this area and bedrock is exposed on the channel bed.

Matrix Solutions Inc.
April 20, 2020

17. Bifurcation of channel.

Matrix Solutions Inc.
April 20, 2020

18. Downstream view towards downstream extent of detailed survey; previous channel design in this area has been washed out on the left bank with major bank erosion observed.

Matrix Solutions Inc.
April 20, 2020

19. Location where left bank has been substantially eroded, and platy material from within the channel has been deposited in the overbank zone.

APPENDIX L

EATM-02 Construction Dust, Noise and Vibration

West Trunk Diversion (WTD)

Environmental Assessment Technical Memorandum for the Peel West Trunk Diversion (EATM-02)

Construction Dust, Noise and Vibration Mitigation and Monitoring

December 3, 2021

Report Prepared For:

Regional Municipality of Peel

Report Prepared By:

Hatch Ltd.
2655 Upper Middle Road, 5th Floor
Oakville, Ontario
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Hatch Project: H-358800

Issue and Revision Record					
Rev	**Date**	**Originator**	**Checker**	**Approver**	**Description**
0	2019-04-18	Derek Kan	Graeme Henderson	Marc Gelinas	Issued for Review
1	2021-12-03	Derek Kan	Graeme Henderson	Marc Gelinas	Issued for EA

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ACRONYMS

EA	Environmental Assessment
CVTS	Credit Valley Trunk Sewer
Peel Region	Regional Municipality of Peel
Hatch	Hatch Corporation
MOECP	Ministry of the Environment, Conservation, and Parks
WTS	West Trunk Sewer
RFP	Request for Proposal
SCADA	Supervisory Controls and Data Acquisition
TBM	Tunnel Boring Machine
TM	Technical Memorandum
WTD	West Trunk Diversion
WTT	West Trunk Twinning
ZOI	Zone of Influence
NPC	Noise Pollution Control
OPSS	Ontario Provincial Standard Specification

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The Peel West Trunk Diversion Project (WTD) serves as the groundwork to facilitate the future rehabilitation of the existing Credit Valley Trunk Sewer (CVTS) which was originally built in the late 1960s and has been servicing the west portion of the Regional Municipality of Peel (Peel Region) since then. Peel Region has identified additional benefits of linking the recently constructed West Trunk Sewer (WTS) with the CVTS using newly installed permanent trunk sanitary sewers first as a redundancy measure, and second as operational dynamicity via the inclusion of automated Supervisory Controls and Data Acquisition (SCADA) controlled gates.

1.2 PURPOSE OF DOCUMENT

Hatch has prepared this Technical Memorandum (TM) to assess the impact of dust, noise and vibration emitted by various construction activities of the WTD project on surrounding properties. This TM documents anticipated construction activities that will generate dust, noise, or vibration and best management practices that can be employed to minimize construction impacts through the application of appropriate mitigation measures and monitoring requirements.

2. STUDY AREA

The WTD is located in the Streetsville neighbourhood of the City of Mississauga between the Credit River and Erin Mills Parkway from west of Britannia Road West to Eglinton Avenue. Four preliminary alignment alternatives are being considered to divert flows from the CVTS to the WTS in order to facilitate future rehabilitation works and manage peak wet weather flows.

The proposed routes run along major roads and will be in close proximity to residential, commercial, and industrial properties. Construction of the sanitary sewer will take place mostly below grade using tunnelling methods. However, there are tunnel shaft/construction sites where construction activities will occur at grade which make them sources for construction dust, noise, and vibration. Detailed analysis will need to be performed to minimize the impact of these emissions to surrounding sensitive receptors including residential properties and the Credit Valley Hospital.

The four proposed EA alignment alternatives are illustrated in Figure 1.

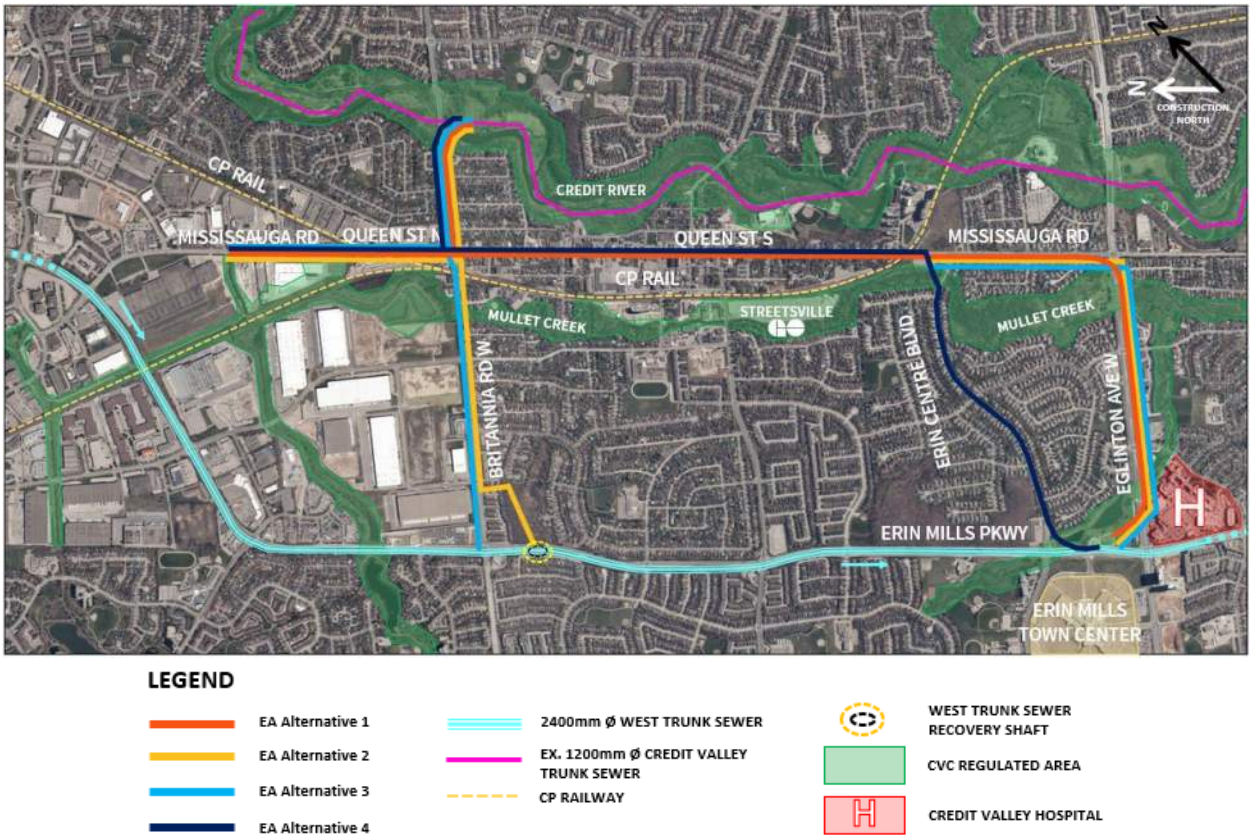

Figure 1 – EA Alignment Alternatives

3. CONSTRUCTION DUST CONTROL

3.1 REGULATIONS AND GUIDELINES

City of Mississauga by-laws do not have general regulations for dust control. Dust that may have a health or environmental impact is regulated by the Ontario Ministry of the Environment, Conservation and Parks (MOECP) and the Ministry of Labour. The mitigation of construction dust is addressed under the following guidelines and regulations:

- Environment Canada "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Environment Canada, 2005) document provides several mitigation measures to reduce emissions during construction.

- MOECP Technical Bulletin – Management Approaches for Industrial Fugitive Dust Sources (MOECP, 2017)

- Ontario Provincial Standard Specification (OPSS) 506 "Construction Specification for Dust Suppressants" (OPS, 2013).

3.2 IMPACT ASSESSMENT AND MITIGATION MEASURES

Fugitive dust can be emitted from truck traffic, loading and unloading of materials, wind erosion, storage piles, movement of construction equipment, and other construction activities. Due to the potential for adverse dust impacts, the following preliminary dust mitigation measures should be considered at proposed construction sites:

1. Placement of mud mats at all truck entry and exit points

2. Water spraying or application of non-chloride dust suppressants to reduce particulate emissions

3. Construction of wind barriers/ hoarding around the construction area to reduce the suspension of particles and control wind erosion

4. Utilize enclosures/coverings for storage piles

5. Perform street sweeping to minimize collection of dust

It should be noted that the above recommendations are preliminary and based on past construction of a similar nature. Once construction details are finalized, more detailed dust control methods should be evaluated for each site.

4. CONSTRUCTION NOISE IMPACTS AND MITIGATION

4.1 REGULATIONS AND GUIDELINES

The management of noise emissions, including those from construction activities, are addressed under the following guidelines, regulations and by-laws:

- The Corporation of the City of Mississauga Noise Control By-Law 360-79

- Ontario MOECP Noise Pollution Control (NPC) guidelines:
  - NPC-115 'Construction Equipment'
  - NPC-118 'Motorized Conveyances'
  - NPC-300 'Stationary and Transportation Sources – Approval and Planning'

4.2 IMPACT ASSESSMENT AND MITIGATION MEASURES

Construction phases that are anticipated to contribute to noise emissions are shaft excavation and tunneling. A list of construction equipment that would typically be used during each phase along with their corresponding sound levels is provided in Appendix A. This list was developed by Hatch based on experience working on projects of similar size and scope of work. Note that contractors are free to use equipment specific to their own means and methods of construction. If additional, or materially different, equipment from that listed in Appendix A is used, this noise impact assessment may need to be re-evaluated.

Some of the most prevalent construction noise sources are expected to be from truck traffic, bulldozers, loaders, excavators and on-site generators. Noise generated by such equipment operate at a constant noise level akin to a hum or buzz and are considered an annoyance by most individuals.

Noise generated from the Tunnel Boring Machine (TBM) is not expected to be audible due to its location below grade which provides sufficient noise attenuation. Noise emitted above grade through the shaft opening at each of the construction sites is expected to be well below the expected noise that the construction equipment would generate if at grade.

Due to the potential for adverse noise impacts, the following preliminary noise mitigation measures should be considered at proposed construction sites:

1. Advise surrounding residents and businesses of construction and anticipated schedule prior to commencing work.

2. Perform the highest noise generating activities during daytime hours.

3. Installation of acoustic barrier walls where applicable.

4. Use of construction equipment or methods that generate lower noise levels.

5. Ensure all internal combustion engines are fitted with appropriate muffler systems and operate as per NPC-115 requirements.

6. Limiting on-site truck idling and management of truck traffic.

7. Implementation of a reactive complaint investigation procedure.

It should be noted that the above recommendations are preliminary and based on past construction of a similar nature. Once construction details are finalized, more detailed acoustic modelling should be completed to evaluate the required mitigation measures for each site.

5. CONSTRUCTION VIBRATION IMPACTS, MITIGATION AND MONITORING

5.1 REGULATIONS AND GUIDELINES

City of Mississauga by-laws do not provide defined limits for construction vibration levels. However, appropriate vibration limits can be inferred from the City of Toronto (CoT) By-Law No 514-2008. As a pre-emptive measure, the CoT By-Law requires that a vibration impact assessment first be conducted to establish the vibration “Zone of Influence” (ZOI). The ZOI is the furthest distance around construction equipment or the site where a potential vibration of 5 mm/sec Peak Particle Velocity (PPV) is anticipated to be achieved.

Under the CoT By-Law, where the ZOI crosses a property boundary with an existing structure present (house, building, bridge, etc.), a pre-construction cosmetic and structural survey is required to establish the structures’ existing state. Where the ZOI overlaps any part of a structures’ footprint outside of the construction site, continuous site and building monitoring is required.

Where monitoring is required under the CoT By-Law, the construction vibration monitoring alarm limits must follow those listed in Table 1. Construction activity must cease if vibrations exceed these limits.

Table 1 – Prohibited Construction Vibrations (City of Toronto By-Law 514-2008)

Frequency of Vibration (Hz)	Vibration Peak Particle Velocity (mm/sec)
Less than 4	8
4 to 10	15
Greater than 10	25

Pre-construction background vibration measurements are recommended to be taken if there are existing vibration sources, such as nearby industrial sources, high traffic roads, or active rail lines in the area.

Under the CoT By-Law, where construction activity that includes blasting, deep foundations, drilled caissons, large scale soil compaction, construction within the water table or any other

activity or method that has the potential to cause vibrations which may impact buildings or structures outside of the construction zone, vibration monitoring is automatically required.

5.2 IMPACT ASSESSMENT AND MITIGATION MEASURES

Two significant construction phases that contribute to vibration are shaft excavation and tunneling. A list of construction equipment that would typically be used during each phase along with their corresponding zone of influence is provided in Appendix B. This list was developed by Hatch based on experience working on projects of similar size and scope of work. Note that contractors are free to use equipment specific to their own means and methods of construction. If additional, or materially different, equipment from that listed in Appendix B is used, this vibration impact assessment may need to be re-evaluated.

Some of the most prevalent construction vibration sources are expected to be from loaded trucks, large bulldozers, vibratory rollers, and rotary drilling rigs. It is noted that many buildings are within the expected threshold distance of annoyance identified within the Region of Peel RFP 2018-482P to be an approximately 100m radius. Field investigations and analysis will be performed for all properties and features within 100m of the proposed sanitary trunk sewer route.

Due to the potential for adverse vibration impacts, the following preliminary vibration mitigation measures are recommended for consideration at proposed construction sites:

1. Notify surrounding property owners within the zone of influence prior to the start of construction

2. Conduct pre-construction building surveys of adjacent structures within the expected zone of influence to determine existing conditions.

3. Establish a construction monitoring plan for all structures that fall within the zone of influence prior to the start of construction

4. Establish a reactive complaints protocol.

It should be noted that the above recommendations are preliminary and based on past construction of a similar nature. Once construction details are finalized, more detailed vibration modelling should be completed to evaluate the required mitigation measures for each site.

6. REFERENCES

1. The Corporation of the City of Mississauga. Noise Control By-Law 360-79.
2. City of Toronto (2008). Construction Vibration By-Law No. 514-2008.
3. Environment Canada. (2005). Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities.
4. Ontario Ministry of Climate, Environment and Parks (MOECP). (2017). Management Approaches for Industrial Fugitive Dust Sources
5. Ontario Ministry of Climate, Environment and Parks (MOECP). NPC-115 Construction Equipment.
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7. Ontario Ministry of Climate, Environment and Parks (MOECP) (2013). NPC-300 Stationary and Transportation Sources - Approval and Planning.
8. Ontario Provincial Standards (OPS) (2013). Ontario Provincial Standard Specification (OPSS) 506 “Construction Specification for Dust Suppressants”.
9. Peel Region (2018). Request for Proposal 2018-482P, prepared by Peel, issued June 2018.
10. US Federal Transit Administration. (2006). Transit Noise and Vibration Impact Assessment.

APPENDIX A - CONSTRUCTION EQUIPMENT (NOISE)

Table 2 – Construction Equipment for Shaft Excavation Phase

Equipment	Octave Band Sound Power Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Auger Crane	106	97	95	92	90	85	77	68
Shaft Crane	106	97	95	92	90	85	77	68
Crane Transportation	107	99	106	103	106	98	89	83
Loaders	120	112	111	105	104	102	99	90
Concrete Pump	103	104	99	98	99	96	92	88
Bobcat	105	114	103	103	99	97	92	83
Boom Truck	111	105	103	103	102	125	95	91
Compressor	112	101	92	87	85	83	86	75
Dozer	113	102	104	101	100	106	90	84
Dump Truck	114	107	107	107	107	112	97	88
Dumper	112	109	102	101	100	96	89	81
Tracked Excavator	105	114	103	103	99	97	92	83
Vibratory Roller	118	110	101	100	98	93	87	82
Water Pump	98	103	88	86	93	94	87	90
Total Sound Power	**124**	**120**	**115**	**113**	**113**	**125**	**104**	**98**

Table 3 – Construction Equipment for Tunnelling Phase

Equipment	Octave Band Sound Power Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Tunnel Boring Machine*	-	-	-	-	-	-	-	-
Locomotives*	-	-	-	-	-	-	-	-
Grout Pumps	103	104	99	98	99	96	92	88
Shotcrete Pump	112	104	98	99	101	101	94	86
Shaft Crane	106	97	95	92	90	85	77	68
Compressor	112	101	92	87	85	83	86	75
Loaders	120	112	111	105	104	102	99	90
Excavator	105	114	103	103	99	97	92	83
Pumps	99	92	92	95	91	85	82	77
Drills	113	121	106	107	108	107	104	102
Concrete Pump	103	104	99	98	99	96	92	88
Concrete Saw Machine	100	117	109	108	108	110	114	113
Road Header	105	114	103	103	99	97	92	83

Equipment	Octave Band Sound Power Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Fork Lift	107	101	99	103	100	95	87	78
150 T Crane	109	105	94	90	87	85	79	74
Shaft Crane Transportation	107	99	106	103	106	98	89	83
Muck Car	113	102	106	101	101	102	95	91
Grout Car	111	102	94	97	98	106	88	83
Generator	103	100	104	98	97	93	84	75
50 T Crane	81	77	69	67	62	60	61	51
Total Sound Power	**124**	**120**	**115**	**113**	**113**	**125**	**104**	**98**

* Equipment is operating underground, therefore has negligible surface noise impact and is excluded from overall sound power.

APPENDIX B - CONSTRUCTION EQUIPMENT (VIBRATION)

ZONE OF INFLUENCE DETERMINATION

Ground borne vibration attenuation is commonly expressed as a function of the expansion of the wave front (geometrical attenuation) and the dissipation of the energy within the soil. It is assumed that the ground conditions used to measure the reference levels of the equipment are similar to the ground conditions at the construction site. As a result, the dissipation of energy within the soil condition is removed from the equation and the geometrical attenuation component is left, resulting in the following simplified equation. The geometric attenuation factor typically ranges between 0.8 and 1.7, and is commonly set to 1.5 (US Federal Transit Administration, 2006). The PPV equation is shown below.

$$PPV_{rec} = PPV_{Ref} * \left(\frac{D_{ref}}{D}\right)\gamma$$

Where:

PPV_{rec} is the peak particle velocity in mm/sec at the receiver in question.

PPV_{Ref} is the reference vibration level of the equipment at the reference distance.

D_{ref} is the reference distance at which the reference vibration PPVref was measured.

D is the distance in metres from the equipment to the receiver.

γ is the geometric attenuation.

The above equation is re-arranged to evaluate “D” or the ZOI, the distance from the equipment at which 5 mm/sec is achieved. Appendix B lists the reference vibration level and distance for the anticipated construction equipment.

$$ZOI = D = D_{ref} * \left(\frac{PPV_{rec}}{PPV_{Ref}}\right)^{\frac{-1}{\gamma}}$$

Where:

D_{ref} is the distance from the reference equipment where the vibration level was measured (m).

PPV_{rec} is the peak particle velocity (5mm/sec).

PPV_{Ref} is the equipment reference Peak Particle Velocity in mm/sec vibration level.

γ is the geometric attenuation (set to 1.5).

Table 4 – Construction Equipment for Shaft Excavation Phase

Equipment	Category	Ref. Distance Value (m)	PPV_{ref} (mm/s)	DZOI (m)
Auger Crane	Crane	1.0	15.0	2.1
Shaft Crane	Crane	1.0	15.0	2.1
Loaders	Small bulldozer	7.6	0.1	0.5
Concrete Pump*	-	-	-	-
Bobcat	Excavator	1.0	21.0	2.6
Boom Truck	Loaded trucks	7.6	1.9	4.0
Compressor*	-	-	-	-
Dozer	Large bulldozer	7.6	2.3	4.5
Dump Truck	Dump truck	1.0	30.0	3.3
Tracked Excavator	Excavator	1.0	21.0	2.6
Vibratory Roller	Vibratory Roller	7.6	5.3	8.0
Water Pump*	-	-	-	-
			Largest Distance	**8.0**

* Equipment has negligible impact on vibration.

Table 5 – Construction Equipment for Tunnelling Phase

Equipment	Category	Ref. Distance Value (m)	PPV_{ref} (mm/s)	DZOI (m)
Tunnel Boring Machine	Excavator	1.0	21.0	2.6
Tunnel Boring Machine Crane	Crane	1.0	15.0	2.1
Grout Pump*	-	-	-	-
Shotcrete Pump*	-	-	-	-
Shaft Crane	Crane	1.0	15.0	2.1
Compressor*	-	-	-	-
Loaders	Small Bulldozer	7.6	0.1	0.5
Hydraulic Excavator	Excavator	1.0	21.0	2.6
Pumps*	-	-	-	-
Drills	Rotary Drilling Rig	1.0	40.0	4.0
Concrete Pump*	-	-	-	-
Concrete Saw Machine*	-	-	-	-
Road Header	Excavator	1.0	21.0	2.6
Fork Lift	Small Bulldozer	7.6	0.1	0.5

Equipment	Category	Ref. Distance Value (m)	PPV_{ref} (mm/s)	DZOI (m)
150 T Crane	Crane	1.0	15.0	2.1
Shaft Crane Transportation	Loaded trucks	7.6	1.9	4.0
Muck Car*	-	-	-	-
Grout Car*	-	-	-	-
Generator*	-	-	-	-
50 T Crane	Loaded trucks	7.6	1.9	4.0
			Largest Distance	**4.0**

* Equipment has negligible impact on vibration.

APPENDIX M

Geophysics Report

GEOPHYSICS GPR
INTERNATIONAL INC.

GEOPHYSICAL INVESTIGATION,
WEST TRUNK DIVERSIONS, REGION OF PEEL
MISSISSAUGA, ONTARIO
PROJECT 08-2205-445T

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January 2020 GPR-19-1661

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1 INTRODUCTION

Geophysics GPR International Inc. was requested by The Region of Peel to carry out geophysical seismic surveys along segments of Britannia Road West, Mississauga Road, Queen Street, Eglinton Avenue West, within Turney Woods and adjacent to the storm water storage ponds in Woodland Chase Trail Park as a component of a preliminary geological investigation for the West Trunk Diversions Project (08-2205-445T), Mississauga, Ontario (Figure 1 and Figure 2).

The purpose of this investigation was to produce seismic wave velocity profiles and to map variations in subsurface materials that could influence the design options for the West Trunk Diversions Project and to provide additional focus to follow-up geotechnical investigations.

The seismic refraction and Multi-channel Analysis of Surface Waves (MASW) methods were applied.

A total of approximately 8.5 km of seismic data were collected.

Data were collected between November 18th and December 6th, 2019.

This report deals with the various aspects of the survey including field techniques, interpretation techniques, and finally an interpretation in the form of depth to bedrock profiles.

Throughout this report, geophysical parameters (seismic velocities) are used to infer the nature of the subsurface materials. The term overburden, will refer to both the fill material and native sediments. The terms bedrock and interpreted bedrock refer to high velocity layers typical of rock or potentially very dense tills.

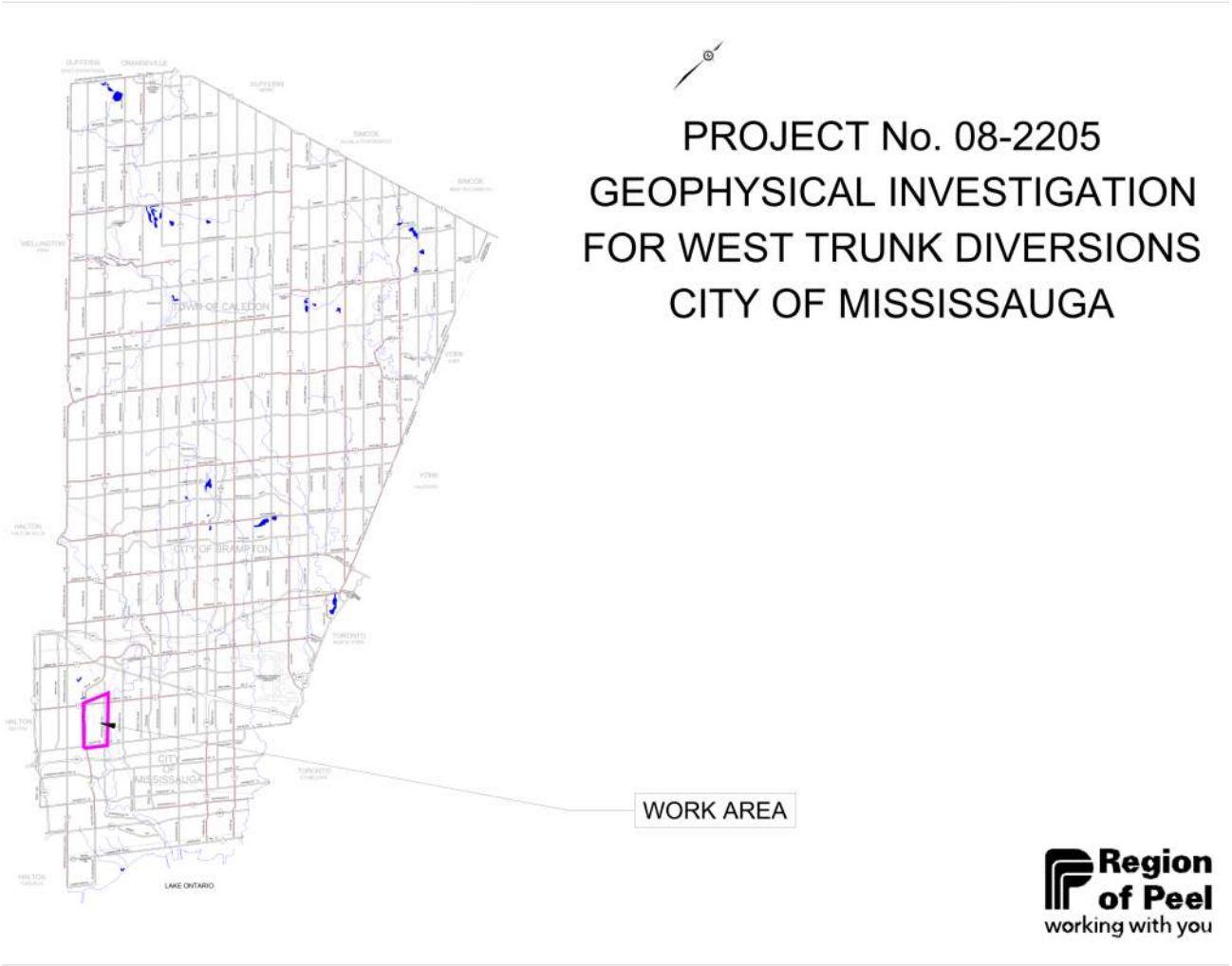

Figure 1: Project Work Area, Mississauga, ON

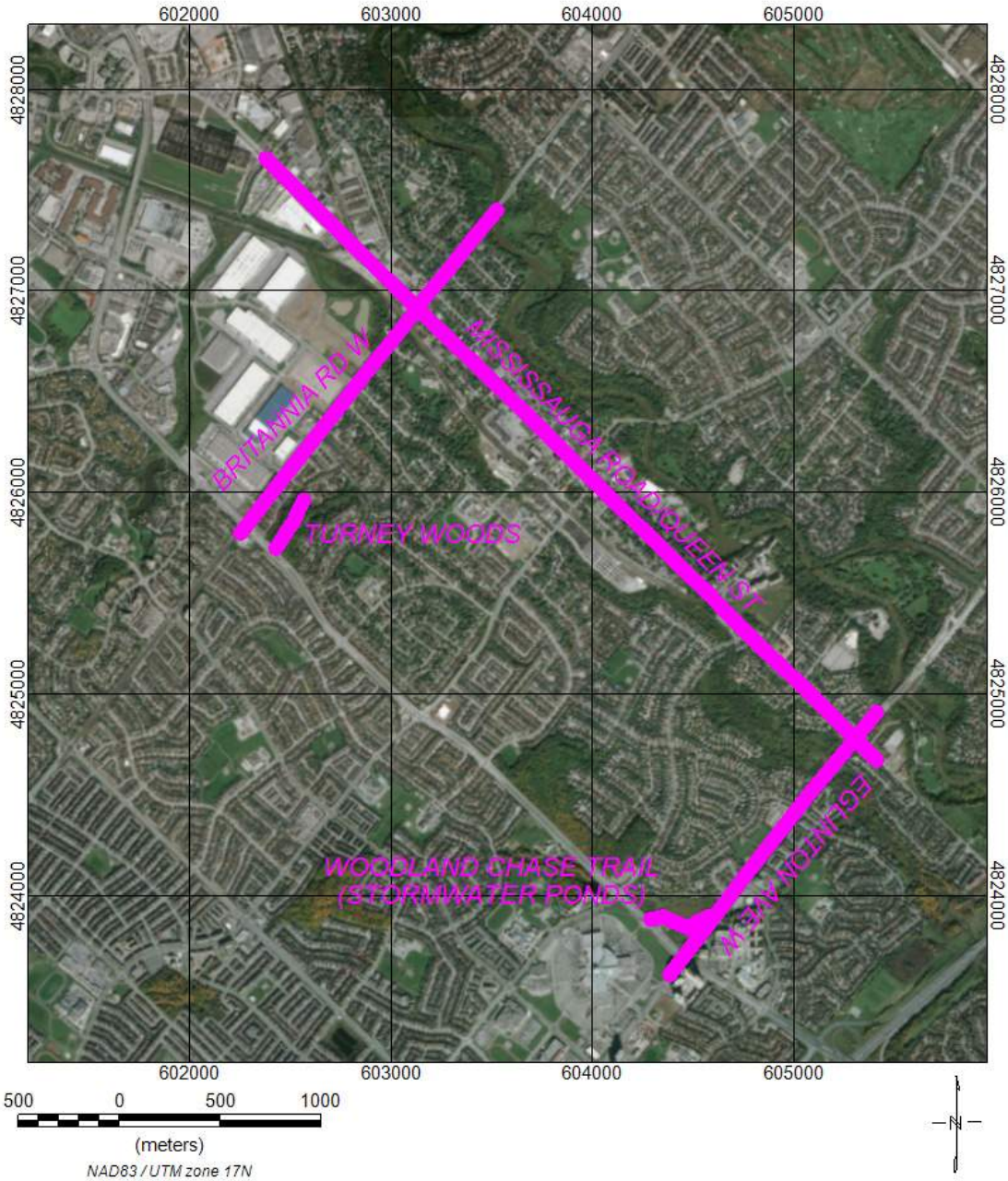

Figure 2: Basemap with geophysical alignments

2 METHODOLOGY

2.1 Positioning, Topography and Units of Measurement

Positioning was controlled by a combination of global navigation satellite system with differential corrections (DGPS) and chaining. The GPS coordinates were converted to an arbitrary project chainage. The accuracy of the DGPS measurements are typically sub-metre. The overall accuracy of the positioning along the roadways is estimated to be on the order of +/- 1 m.

The horizontal positioning along the off-road profiles (Turney Woods and Woodland Chase Trail are estimated to be on the order of +/- 3 to 4 m due to tree coverage and GPS accuracy.

The start/end coordinates of the profiles are outlined in Table 2. The coordinate system is NAD83 UTM z 17N.

Interpreted profiles were generated as depths below ground surface. The depths are converted to elevations based on topography data.

Topographic data were obtained from combination of methods as outlined in Table 1.

The overall accuracy of the topographic data with consideration for the combination of the various methods is estimated to be on the order of +/- 1.5 m.

Table 1: Sources of Topographic Data

Seismic Profile	**Source of Topographic Data**
Britannia Road West	DGPS data and CAD File provided by Hatch
Mississauga Road/Queen Street	DGPS data and CAD File provided by Hatch
Eglinton Avenue West	CAD File provided by Client
Turney Woods	Approximated
Woodland Chase Trail (Pond)	Levelling referenced to CAD file provided by Hatch

Table 2: Profile start and end shot locations (NAD83 coordinate system)

Profile	Start of Line (0+00)		End of Line		Length (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
Britannia Ave West	602252	4825801	603519	4827403	2043
Mississauga/Queen St	602374	4827657	605405	4824678	4250
Eglinton Ave West	605404	4824913	604380	4823613	1655
Turney Woods	602565	4825962	602427	4825725	280
Woodland Chase Trail	604564	4823899	604288	4823884	318

2.2 Seismic Methods

Seismic methods for geologic mapping involve measuring/recording the response of vibration sensors. Multiple techniques and methodologies are available for analysis of the data depending on the ultimate goal of the investigation. With the exception of the segments of data collected off-road, this particular investigation utilized a streamer arrangement; whereby the geophones and seismic sources are dragged behind a vehicle with records being recorded at set intervals along the alignment. Two essentially independent techniques were used to analysis the resulting data; namely, seismic refraction tomography and 2D MASW.

2.2.1 Seismic Refraction

Basic Theory

The seismic refraction method relies on measuring the transit time of the wave that takes the shortest time to travel from the shot-point to each geophone. The fastest seismic waves are the compressional (P) or acoustic waves, where displaced particles oscillate in the direction of wave propagation. The energy that follows this first arrival (including reflected waves, transverse (S) waves and resonance) is not considered under routine seismic refraction interpretation. Figure 3 illustrates the basic operating principle for refraction surveys.

Survey Design

The seismic spread consisted of 24 vibration monitoring devices (geophones) connected in line to a seismograph (ABEM Terraloc Mark 6). Spacing between geophones was set to 3 m. The seismic source was an elastic propelled weight drop. The shot offset was 6 m from one end of the spread. The distance between shots was 12 m for the majority of the profile.

The off-road seismic profiles used a stationary geophone arrays with a geophone spacings of 3 m to 5 m.

Interpretation Method and Accuracy of Results

The interpretation of the seismic refraction data was based on the refraction tomography and critical distance methods. A full refraction analysis (which gives the "true" material velocity and

determines the depth beneath each geophone) would require multiple shot locations for a given spread location and a more thorough data analysis/interpretation.

The refraction tomography processing was done using the SeisImager Plotrefa software package (ver 3.1.0.5). The refraction tomography method involves a computer ray tracing inversion process to fit a velocity model to the interpreted time-distance arrival time data. How well the travel-times computed from the velocity model match the interpreted travel-times from the raw data are reported as an RMS error in milliseconds. This RMS error gives an indication of the accuracy of the model but are not a true measure of the velocities. Noisier data will, in general, give higher RMS error values. Tomographic inversion can provide more accurate models than the standard interpretation method in areas of gradational changes in velocity and in areas of extreme topography.

Typically the accuracy of a full refraction surveys is +/- 1m for depths less than 10m and +/-10% for depths greater than 10m. The estimated error from simple critical distance calculations and the tomography modelling with no reverse shots will be higher.

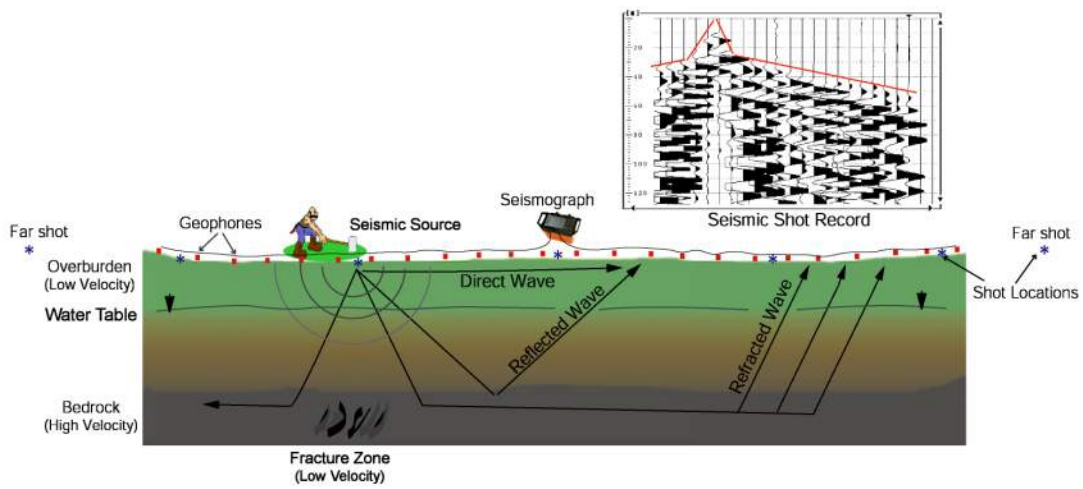

Figure 3: Seismic Refraction Operating Principle

2.2.2 Surface Wave Analysis (MASW)

Basic Theory

The Multi-channel Analysis of Surface Waves (MASW) is a seismic method used to evaluate the shear-wave velocities of subsurface materials through the analysis of the dispersion properties of Rayleigh surface waves ("ground roll"). The dispersion properties are measured as a change in phase velocity with frequency. Surface wave energy will decay exponentially with depth. Lower frequency surface waves will travel deeper and thus be more influenced by deeper velocity layering than the shallow higher frequency waves. Inversion of the Rayleigh wave dispersion curve yields a shear-wave (Vs) velocity depth profile (sounding). Figure 4 and Figure 5 outline the basic operating procedure for the MASW method. A more detailed description of the method can be found in the paper Multi-channel Analysis of Surface Waves, Park, C.B., Miller, R.D. and Xia, J. Geophysics, Vol. 64, No. 3 (May-June 1999); P. 800–808.

The two dimensional Multi-channel Analysis of Surface Waves (2D-MASW) is an extension of the 1D analysis and the basic theory behind the method is similar. The 2D method involves collecting multiple shot records along a profile. The shot records are compared and combined based on shot/receiver geometry (common-mid-point (CMP)). A multi-channel analysis is then performed on the CMP gathers to generate a phase dispersion curve for calculating the surface wave phase velocities. A non-linear least-squares inversion is run to generate a 2D shear wave velocity model. A more detailed description of the method can be found in the paper CMP Cross-Correlation Analysis of Multi-Channel Surface-Wave Data, Hayashi, K., and Suzuki, H. Exploration Geophysics, (2004) 35, 7-13.

Survey Design

The MASW data analysis used the same data set as the seismic refraction survey discussed above.

Interpretation Method and Accuracy of Results

The main processing sequence involved the use of the SeisimagerSW-2D software package for compiling the common-mid-point gathers, picking of the dispersion curves and 2D inversion of the MASW shot records.

The theoretical maximum depth of investigation is approximately half of the total spread geophone length. In practice, the maximum depth of investigation is controlled by the lowest frequency of the dispersion curve that can be resolved and the material velocity. This in turn is controlled primarily by the geology, background noise and energy source. The model resolution will decrease with depth and will be horizontally smoothed/interpolated.

The main sources of error are generally related to the identification of the fundamental mode of the dispersion curve. Typically, the fundamental mode is the dominant mode; however, it some cases, higher modes can be dominant. An additional source of error is in the modelling/inversion process. As with most inversion problems, the solution is non-unique and must be judged geologically realistic.

The accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The estimated error is higher for shear-wave velocities within rock formations and, in general, the resolution decreases with depth.

The accuracy of the interpreted layer contacts with the MASW method is on the order of +/- 10 % to 15%. The estimated error will be higher for contacts between materials of lower velocity contrast (e.g. dense till over weathered shale).

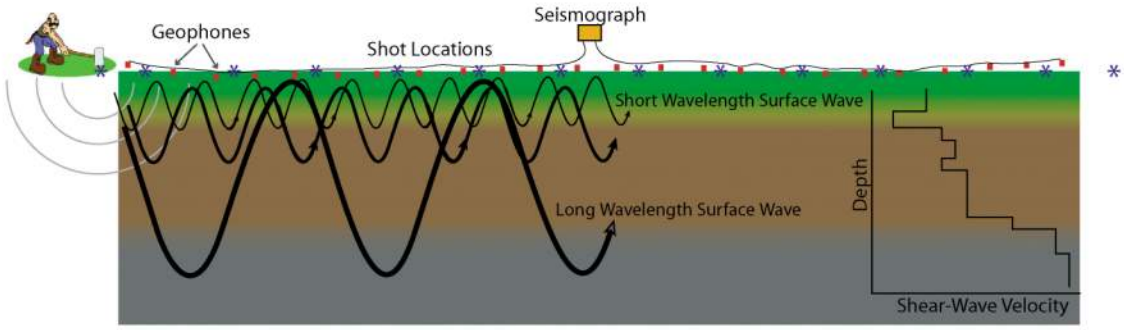

Figure 4: 1-D MASW Operating Principle

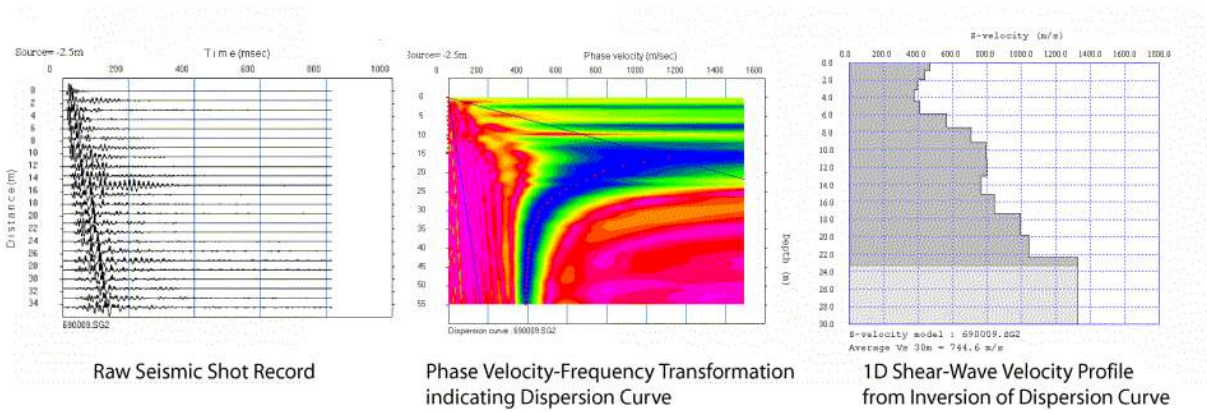

Figure 5: MASW Processing Work Flow – Raw shot record, phase velocity/frequency curve and resulting 1d shear wave velocity model

3 RESULTS

The results of the 2D seismic surveys along segments of Brtiannia Road West, Mississauga Road/Queen Street, Eglinton Avenue West, Turney Woods and Woodland Chase Trail are presented as Drawings in Appendix B.

The plan view plots overlain on earth imagery are provided as Figures 6 to 10.

The data along the roadways were collected at night when background noise from traffic was at a minimum.

The off-road segments were collected during the day with stationary geophone arrays.

The seismic arrival time data were clear for the majority of the survey profile. The quality of the resulting dispersion curves were also well defined for the majority of the shot records.

The following are descriptions of the features presented in the seismic profile drawings:

Topography – The topography has been extracted from a variety of sources including CAD files provided by the client, levelling and DGPS readings. The topography data should be used for reference purposes only.

Interpreted Top of Potential Bedrock – The interpreted bedrock elevation is based on a combined interpretation of the P-wave and S-wave velocities.

Interpreted Overburden Contact (Water Table) – The blue line is derived from the P-wave refraction tomography model and approximately follows the 1500 m/s contour. This layer is interpreted to represent the top of saturated material.

Interpreted Overburden Contact (Vs=400 m/s) – The green line represents approximately the 400 m/s S-wave velocity contour interpreted from the 2D MASW profiles. S-wave velocities greater than 400 m/s are typical for hard/dense overburden.

Potential Zone of Increased Bedrock Weathering – The hatched area along the profiles provide a relative estimate of the potential of bedrock weathering based on a combination of the steepness of the seismic velocity gradients and variation between the compressional and shear-wave models. As such, this zone can also provide a relative indicator of interpretation confidence.

Appendix A contains a tables of seismic velocities for various soil and rock types.

Based on the interpretation of the seismic velocity models, suggested locations for geotechnical boreholes are provide in Table 3.

The following paragraphs provide a summary of the results for each segment

Britannia Road West

The seismic profiles along Britannia Road West are presented in Drawings GPR-191661_A1 and A2 and plan view Figure 6.

The data were collected in the North-east bound driving lane from Erin Mills Parkway to the south of the bridge over the Credit River.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of lower shear-wave velocities (Vs < 300 m/s) were modelled in some areas suggesting the presence of softer/looser material in these areas; however no zones of very low shear wave velocities (Vs <200 m/s) were detected.

The second overburden layer, with velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 575 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 800 m/s with a range of 500 to 1600 m/s. This velocity range is typical for unsaturated to saturated moderately compact to dense sediments.

The median apparent P-wave velocity of the interpreted bedrock layer was on the order of 3500 m/s, with a range of 2700 m/s to 5200 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The interpreted bedrock elevation ranges from approximately 143 m to 171 m. The depth to interpreted bedrock ranged from approximately 3.5 m to 34 m below grade.

The northeast side of the bedrock is less well defined with a higher degree of uncertainty. The valley wall appears to be quite steep with possible interference in the seismic data due to lateral variations in bedrock depth offset from the seismic line (3D-effect).

Boreholes are recommended to better define the maximum depth and slopes of the interpreted bedrock valley at the south-west end of the seismic profile.

Additional Boreholes are recommended to better define the extent of weathering along the alignment.

There is potential interference from the box culvert/creek between Pioneer Drive and Brookside Dr. (chainage 1+100 to 1+150).

Mississauga Road/Queen Street

The seismic profiles along Mississauga Road, Queen St N, and Queen St S, are presented in Drawings GPR-191661_B1 through B3 and plan view Figure 7.

The data were collected in the south-east bound driving lane from Matlock Avenue towards Eglinton Avenue West.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of low shear-wave velocities (Vs < 200 m/s) were modelled in some areas suggesting the presence of softer/looser material in these areas (Notable chainages 0+680, 1+405 and 2+450).

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 575 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 1100 m/s with a range of 500 to 1600 m/s. This velocity range is typical for unsaturated to saturated moderately compact to dense sediments.

The median apparent P-wave velocity of the interpreted bedrock layer was on the order of 3900 m/s, with a range of 2650 m/s to 5500 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The interpreted bedrock elevation ranges from approximately 162 m at the northwest end to approximately 139 m at the southeast end of the alignment. The depth to interpreted bedrock ranged from approximately 4.5 m to 13.5 m below grade.

Areas of potentially increased bedrock weathering (based on lower seismic modelled velocities) are indicated on the drawing, notably in the vicinity of chainage 0+700, 1+150, 1+525 to 2+400. Boreholes are recommended to better define the extent of weathering along the alignment.

Eglinton Avenue West

The seismic profiles along Eglinton Avenue West are presented in Drawing GPR-191661_C1 and plan view Figure 8.

The data were collected in the south-west bound driving lane from North of Mississauga Road to Erin Mills Parkway.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of lower shear-wave velocities (Vs < 300 m/s) were modelled suggesting the presence of softer/looser material in these areas; however no zones of very low shear wave velocities (Vs <200 m/s) were detected.

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 575 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 1100 m/s with a range of 500 to 1800 m/s. This velocity range is typical for unsaturated to saturated moderately compact to dense sediments.

The median apparent P-wave velocity of the interpreted bedrock layer was on the order of 3700 m/s, with a range of 2550 m/s to 5200 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The interpreted bedrock elevation ranges from approximately 134 m at the northeast end to approximately 162 m at the southwest end of the alignment. The depth to interpreted bedrock ranged from approximately 3.5 m to 18 m below grade.

An interpreted dip in the bedrock surface is noted between chainages 1+200 to 1+430. Boreholes are recommended to better define the maximum depth and slopes of the interpreted bedrock valley at the south-west end of the seismic profile.

Areas of potentially increased bedrock weathering (based on lower seismic modelled velocities) are indicated on the drawing, notably in the vicinity of chainage 0+300, 0+600, 1+315. Boreholes are recommended to better define the extent of weathering along the alignment.

There is potential interference from the box culvert/creeks at chainage 1+100 to 1+150. Stationary Seismic profiles offset from the road could be collected to avoid interference from this infrastructure.

Woodland Chase Trail (Storm water Ponds)

Three stationary seismic spreads were collected adjacent to the storm water ponds at the north side of the intersection of Erin Mills Parkway and Eglinton Avenue West.

The seismic profiles through the property are presented in Drawing GPR-191661_D1 and plan view Figure 9.

Due to length of the spreads and turning points, 2D MASW processing was not effective. A 1d MASW sounding was generated for the central spread.

The seismic shear-wave velocities suggest two to three layers. The uppermost layer, with velocities less than approximately 300 m/s, is interpreted as soft to loose overburden material. This layer extends down to a depth of approximately 4 m below grade. Very low shear wave velocities (Vs <200 m/s) are noted in the upper 2 m.

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a denser till.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 600 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 360 m/s with a range of 300 to

420 m/s. This velocity range is typical for unsaturated compact sediments. A second overburden layer, with a velocity of approximately 1600 m/s is interpreted as water saturated sediments or a denser till material.

The P-wave velocity of the interpreted bedrock layer was on the order of 2900 m/s to 3900 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The interpreted bedrock elevation ranges from approximately 145 m at the northeast end to approximately 158 m at the southwest end of the alignment. The depth to interpreted bedrock ranged from approximately 6.5 m to 18 m below grade.

An interpreted dip in the bedrock surface is noted between chainages 0+000 to 0+070. A boreholes is suggested to better define the maximum depth and degree of weathering.

Turney Woods (Intersection of Britannia and Erin Mills Parkway)

Three stationary seismic spreads were collected within the woodlot at the northeast side of the intersection of Britannia and Erin Mills Parkway.

The seismic profiles through the property are presented in Drawing GPR-191661_E1 and plan view Figure 10.

Due to the tree coverage, the topography has been approximated and assumed flat.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of lower shear-wave velocities (Vs < 300 m/s) were modelled suggesting the presence of softer/looser material in these areas; however no zones of very low shear wave velocities (Vs <200 m/s) were detected.

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 600 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 360 m/s with a range of 330 to 480 m/s. This velocity range is typical for unsaturated compact sediments. A second overburden layer, with a velocity of approximately 880 to 1500 m/s is interpreted as water saturated sediments or a denser till material.

The P-wave velocity of the interpreted bedrock layer was on the order of 3200 m/s to 3600 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The depth below grade to interpreted bedrock ranged from approximately 23 m at the northeastern end to 7.5 m at the southwestern end. The elevation was assumed flat.

Boreholes are recommended to better define the maximum depth and slope of the interpreted bedrock valley at the northeastern end of the seismic profile. The P-wave data suggests slightly deeper bedrock than the S-wave velocity model.

Table 3: Proposed Borehole Locations

Alignment	BH ID	Chainage	Easting	Northing	Comments
Britannia	BH-BR1	0+024	602267	4825820	Suspected Bedrock Valley
Britannia	BH-BR2	0+078	602300	4825863	Suspected Bedrock Valley
Britannia	BH-BR3	0+148	602343	4825919	Suspected Bedrock Valley
Britannia	BH-BR4	0+222	602388	4825977	Suspected Bedrock Valley
Britannia	BH-BR5	0+267	602415	4826013	Suspected Bedrock Valley
Britannia	BH-BR6	0+316	602445	4826052	Suspected Bedrock Valley
Britannia	BH-BR7	0+606	602626	4826279	Potential Dip in Bedrock
Britannia	BH-BR8	0+867	602787	4826484	Potential Increased Bedrock Weathering
Britannia	BH-BR9	1+110	602937	4826675	Potential Dip in Bedrock
Britannia	BH-BR10	1+468	603156	4826958	Potential Increased Bedrock Weathering
Britannia	BH-BR11	1+733	603326	4827161	Potential Increased Bedrock Weathering
Britannia	BH-BR12	1+878	603415	4827275	Potential Increased Bedrock Weathering
Britannia	BH-BR13	1+970	603473	4827347	Suspected Bedrock Valley
Queen	BH-QN1	0+024	602391	4827640	
Queen	BH-QN2	0+691	602867	4827172	Potential Increased Bedrock Weathering
Queen	BH-QN3	1+164	603205	4826841	Potential Increased Bedrock Weathering
Queen	BH-QN4	1+524	603464	4826592	Potential Increased Bedrock Weathering
Queen	BH-QN5	1+685	603578	4826478	Potential Increased Bedrock Weathering
Queen	BH-QN6	2+122	603888	4826170	Potential Increased Bedrock Weathering
Queen	BH-QN7	2+377	604070	4825991	Potential Increased Bedrock Weathering
Queen	BH-QN8	3+940	605185	4824896	Potential Increased Bedrock Weathering
Eglinton	BH-EG1	0+016	605394	4824900	Potential Increased Bedrock Weathering
Eglinton	BH-EG2	0+318	605203	4824666	Potential Dip in Bedrock
Eglinton	BH-EG3	0+616	605023	4824442	Potential Dip in Bedrock
Eglinton	BH-EG4	1+218	604646	4823960	Suspected Bedrock Valley
Eglinton	BH-EG5	1+277	604611	4823913	Suspected Bedrock Valley
Eglinton	BH-EG6	1+327	604580	4823873	Suspected Bedrock Valley
Eglinton	BH-EG7	1+379	604549	4823832	Suspected Bedrock Valley
Eglinton	BH-EG8	1+464	604497	4823764	Suspected Bedrock Valley
Turney Woods	BH-TW1	0+025	602552	4825941	Suspected Bedrock Valley
Turney Woods	BH-TW2	0+120	602513	4825854	Suspected Bedrock Valley
Turney Woods	BH-TW3	0+240	602447	4825753	Potential Increased Bedrock Weathering
Woodland Chase Trail Storm Water Ponds	BH-WCT1	0+025	604540	4823887	Potential Dip in Bedrock
Woodland Chase Trail Storm Water Ponds	BH-WCT2	0+170	604417	4823869	

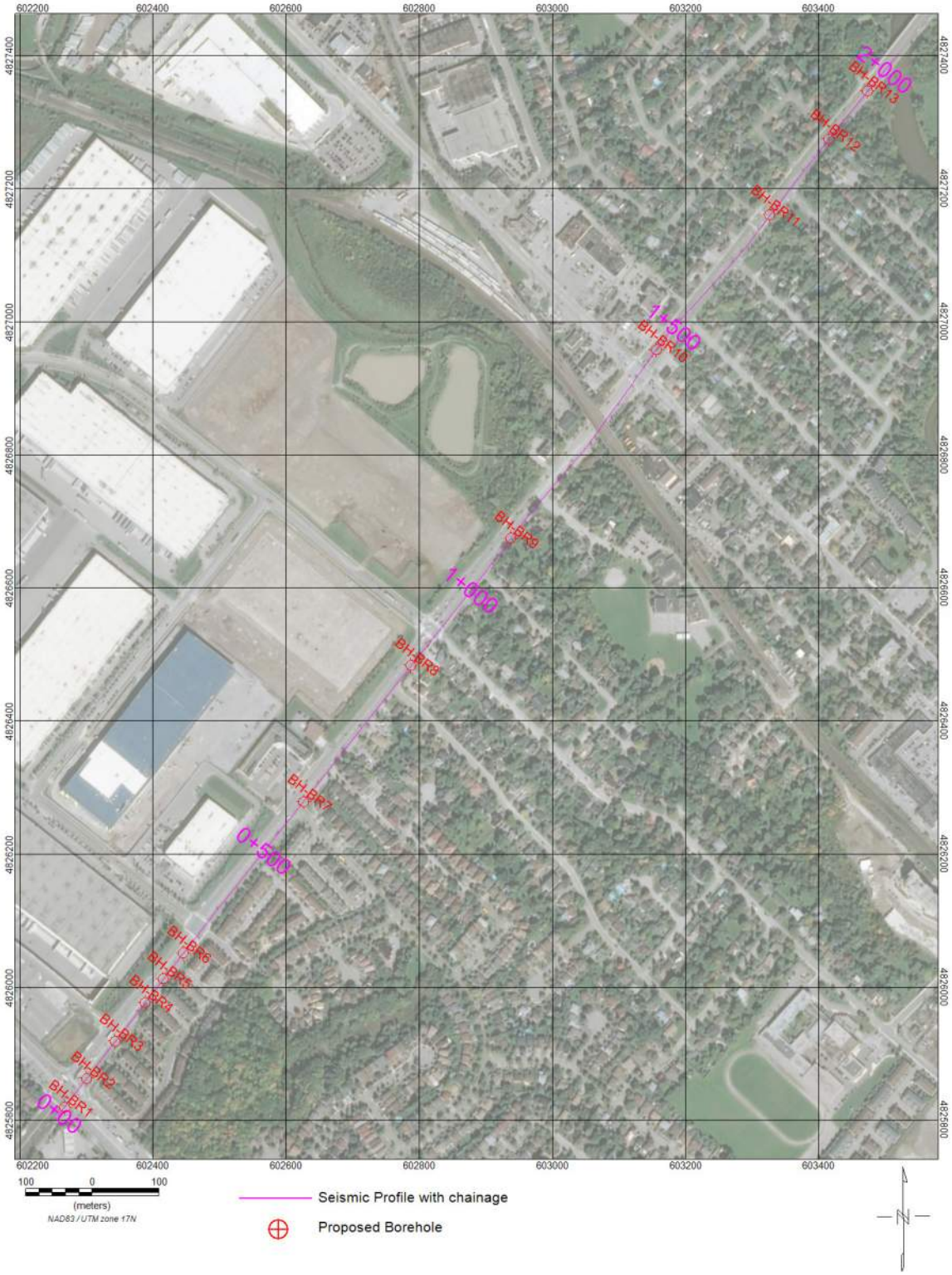

Figure 6: Britannia Road West - Seismic Profile

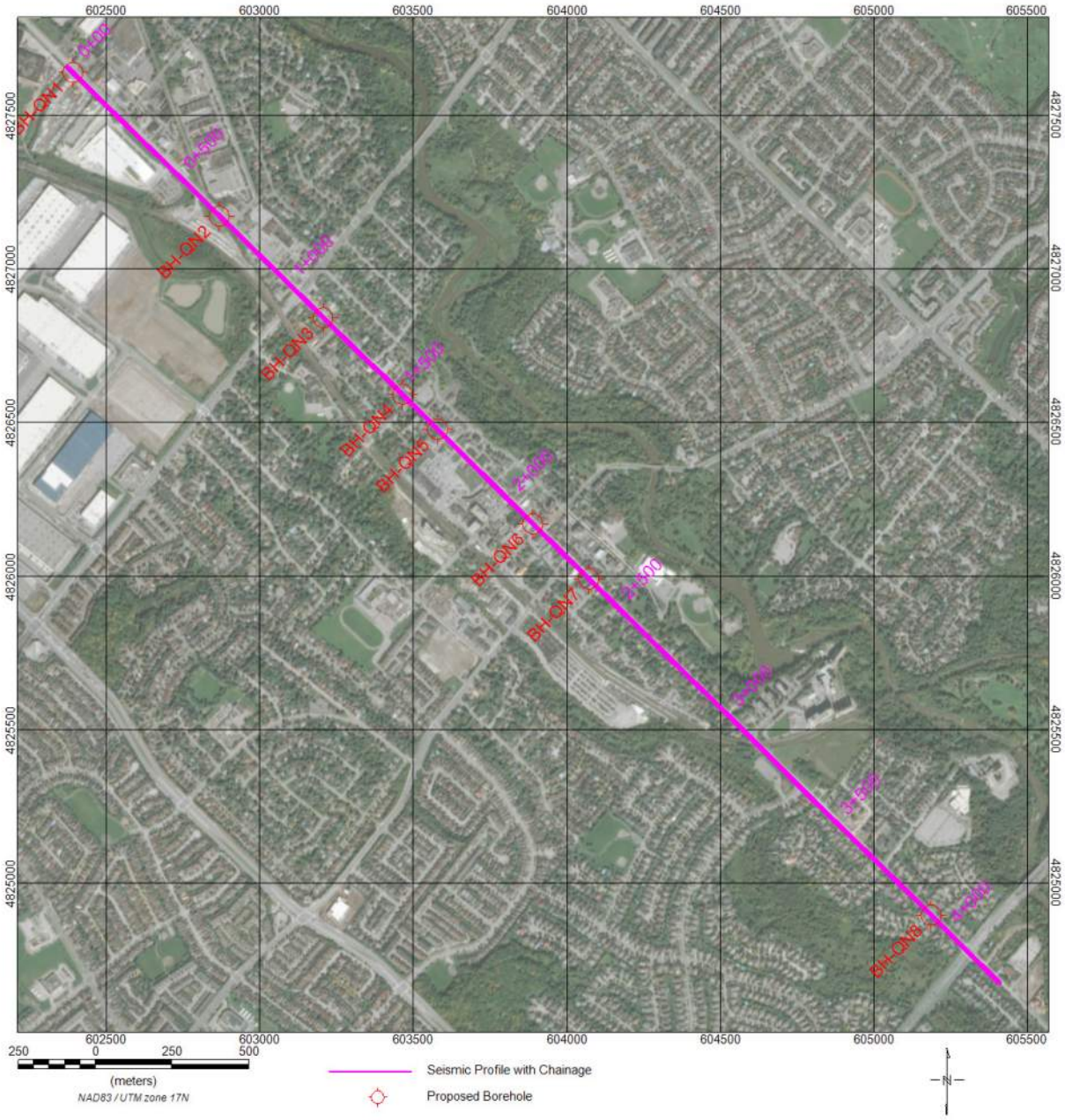

Figure 7: Mississauga Road / Queen St - Seismic Profile

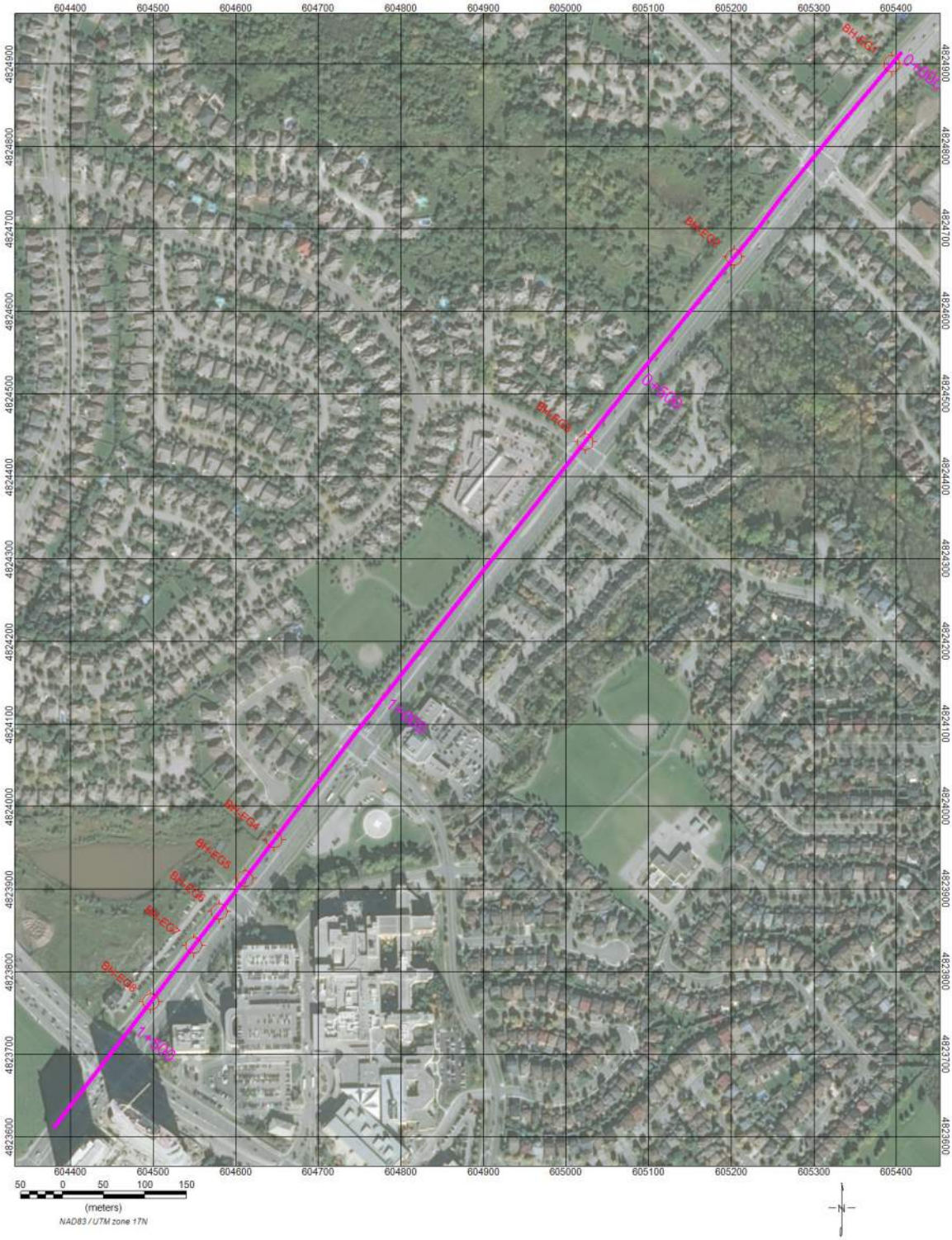

Figure 8: Eglinton Avenue West - Seismic Profile

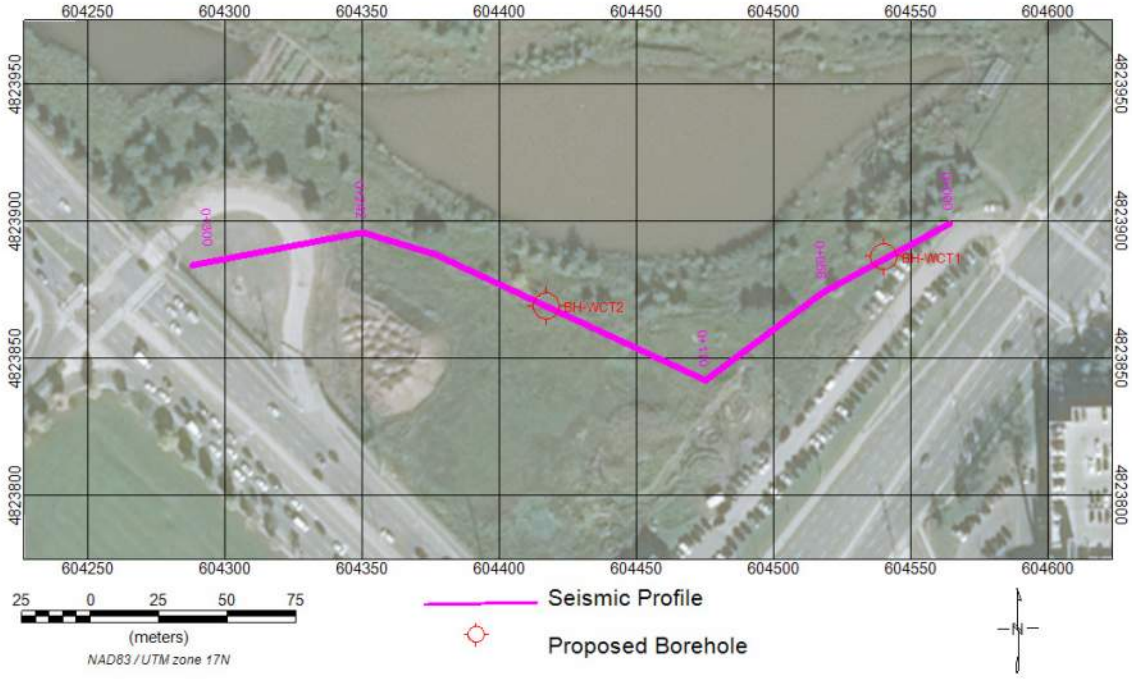

Figure 9: Woodland Chase Trail (Storm water ponds) Seismic Profile

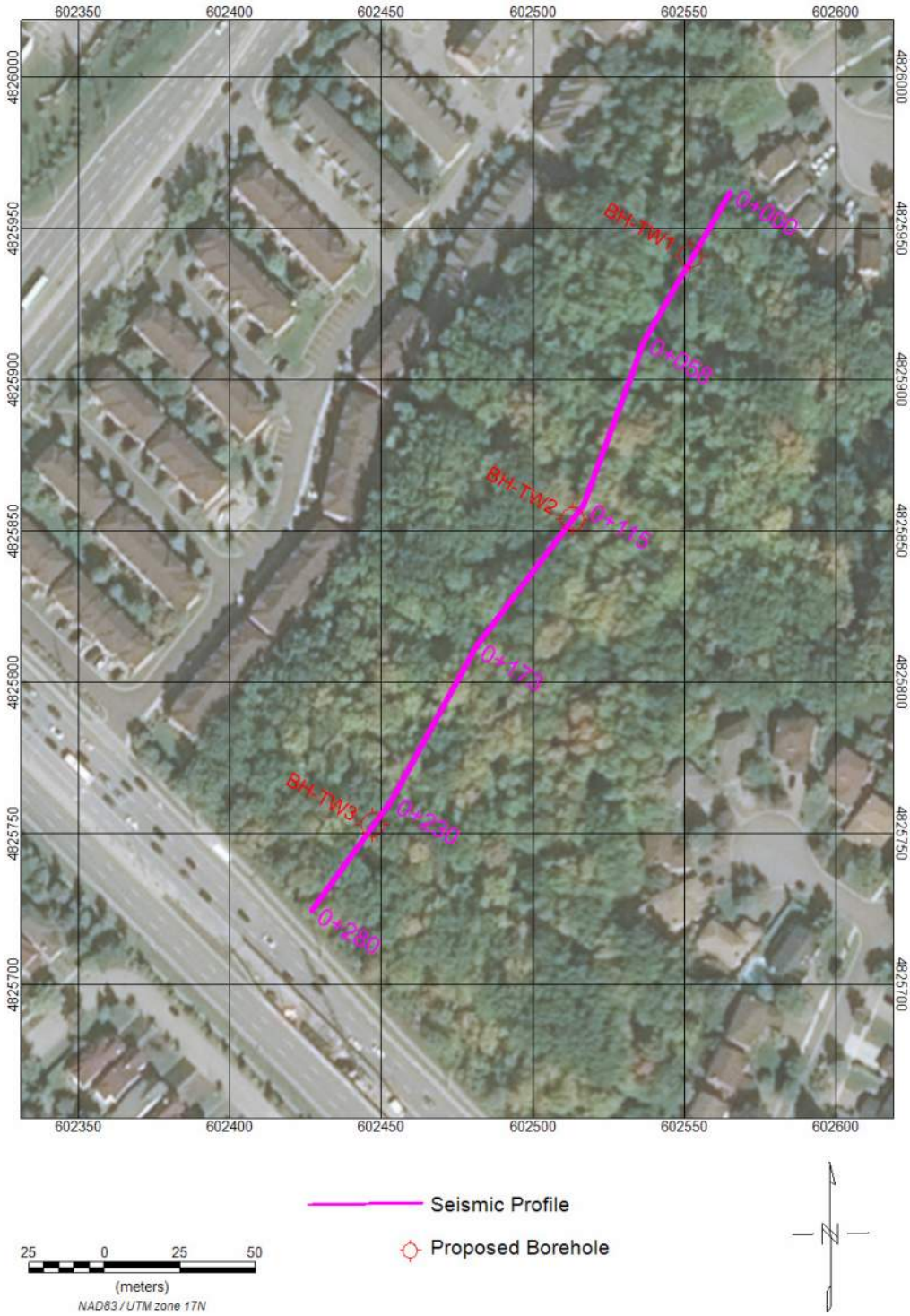

Figure 10: Turney Woods Seismic Profile

4 CONCLUSIONS & RECOMMENDATIONS

Seismic refraction and MASW interpretation techniques were performed on common data sets along segments of Britannia Road West, Mississauga Road/Queen Street, Eglinton Avenue West, Turney Woods and Woodland Chase Trail as a component of the West Trunk Diversions Project, City of Mississauga, ON.

Seismic data were collected over a total length of approximately 8.5 km. The chainages are relative to the starting point of the seismic data. If a standardized project chainage is established, the seismic chainages can be converted.

The results of the 2D MASW and refraction tomography modelling are presented in Drawings GPR-191661_A1/A2 (Britannia), GPR-191661_B1/B2/B3(Queen St), GPR-191661_C1 (Eglinton), GPR-191661_D1 (Woodland Chase Trail), and GPR-191661_E1 (Turney Woods). The corresponding plan view plots are presented as Figures 6 to 10. The base maps (BING images) are presented for references purposes only.

The MASW results are presented as colour contoured plots of S-wave velocities. The accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The accuracy of the modelled shear-wave velocities within the bedrock are typically higher. The resolution decreases with depth and will be horizontally smoothed/interpolated. The accuracy of the interpreted layer contacts with the MASW method is on the order of +/- 10 % to 15%. The estimated error will be higher for contacts between materials of lower velocity contrast (e.g. dense till over weathered shale).

The seismic refraction data are presented as colour contoured plots of the refraction tomography models. The refraction models are based on apparent velocities as opposed to true velocities as data were collected in one direction only.

The interpreted geological profile is based on the combined S-wave and P-wave velocity models.

Project specific borehole data were not available at the time of interpretation. The depth to bedrock from regional boreholes was used as a general guide in interpretation, and, in general, was in good agreement with the seismic data with consideration for the borehole offsets. When additional borehole data becomes available it can be used to further refine the interpreted bedrock profile based on the seismic velocities. In particular, the slopes of the interpreted valley features along Britannia Road West and Eglinton Avenue West.

Table 3 provides a list of suggested borehole locations based on interpretation of the modelled seismic velocities. These boreholes would be in addition to, or provide a focus to, a standard drilling program. Note that the proposed borehole coordinates are provided without consideration for factors that must be considered prior to drilling including utilities, infrastructure and other logistical issues.

Areas where bedrock weathering may extend to deeper than typical depths are indicated in the drawings.

Cross-hole and down-hole seismic methods provide direct measurements of the shear-wave velocity (as opposed to modelled velocities obtained through the MASW method) and will have better resolution at depth. If more accurate wave velocities are required, it is recommended that down-hole seismic tests are performed as a component of an intrusive drilling program. Borehole geophysical tools, including optical and acoustic televiewers, can be used to provide additional insights in to the bedrock geology.

Additional Seismic data could be collected within or north of the storm water ponds and potentially offset from the box culverts located along Eglinton Avenue West and Britannia Road.

Geophysics GPR would like to acknowledge Hatch and Regional Of Peel personnel for their assistance and cooperation in the coordination, safety and logistics of the geophysical surveys.

This report has been written by Ben McClement, P.Eng.

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Geophysicist

LICENSED PROFESSIONAL ENGINEER
R.B. McCLEMENT
2021/11/04
PROVINCE OF ONTARIO

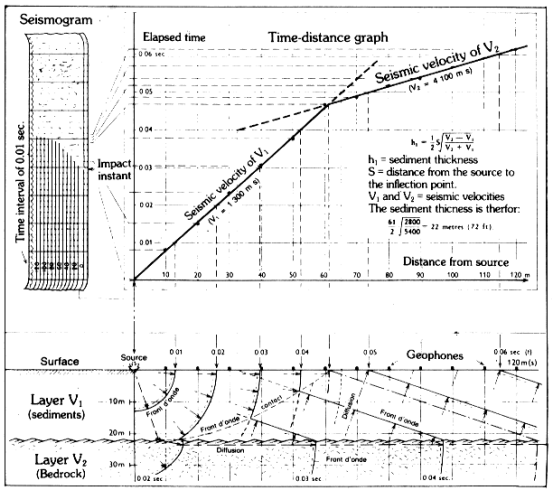
APPENDIX A

Seismic Methodology Fact Sheets

SEISMIC REFRACTION

Seismic refraction consists of recording the length of time taken for an artificially provoked surface vibration to propagate through the earth. By processing the data, the seismic velocities and depths of the underlying rock layers can be determined. These velocities are characteristic of the nature and quality of the bedrock; a fissured, fractured or sheared rock will be characterized by reduced seismic velocities.

The method is generally used to obtain a better geological analysis of the sub-surface and to determine the following characteristics: the quality, profile and depth of bedrock, its nature, degree of alteration and any other physical contrasts. Seismic refraction ensures that maximum information may be gained from geological field work, and that direct investment costs (drilling, excavation), will be reduced.



PRINCIPLE OF SEISMIC REFRACTION

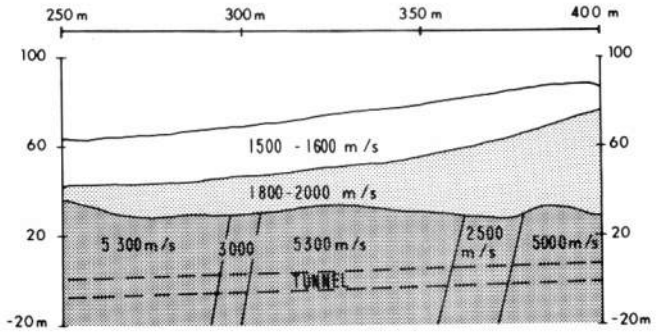
FEATURES

- Precise determination of soil thickness .
- Precise determination of the seismic velocities (rock type and quality).
- Localization and identification of geological units.
- Detailed analysis of soil.
- Year-round use.
- Sea and land surveys (above and below ground).
- Great accessibility possible to rough terrain and remote regions.

AREAS OF APPLICATION

Civil Engineering/Mining Exploration - Exploitation/Petroleum and Gas Sectors/ Geotechnology/Geology/ Hydrology.

- Identification of faults, fractures, shear zones.
- Detection of rock differences (veins, dykes, cavities, etc.).
- Determination of rock topography.
- Evaluation of volume of soil present or to be excavated.
- Excellent complement to geological mapping.
- Recognition of geophysical anomalies such as VLF, gravimetry, etc.
- Drill site selection, better target identification.
- Evaluation of the size, thickness and condition of surface shafts (mining exploitation).
- Mass Rock Quality Determination (MRQD).
- Detection of rock irregularities and breaks.
- Hydrogeology (detection of water tables, veins, reservoirs).
- Excellent complement to any geological analysis.



Interpretation results of a seismic profile

ADDITIONAL REMARKS

Geophysics GPR International Inc. has been recognized for the past fifteen years as a leader in both the application and the development of seismic methods. Seismic refraction is currently used in both civil and mining engineering; the use of lighter high-performance equipment and better tomographical interpretation of the results have contributed to its growing popularity.

GEOPHYSICS G P R INTERNATIONAL INC.

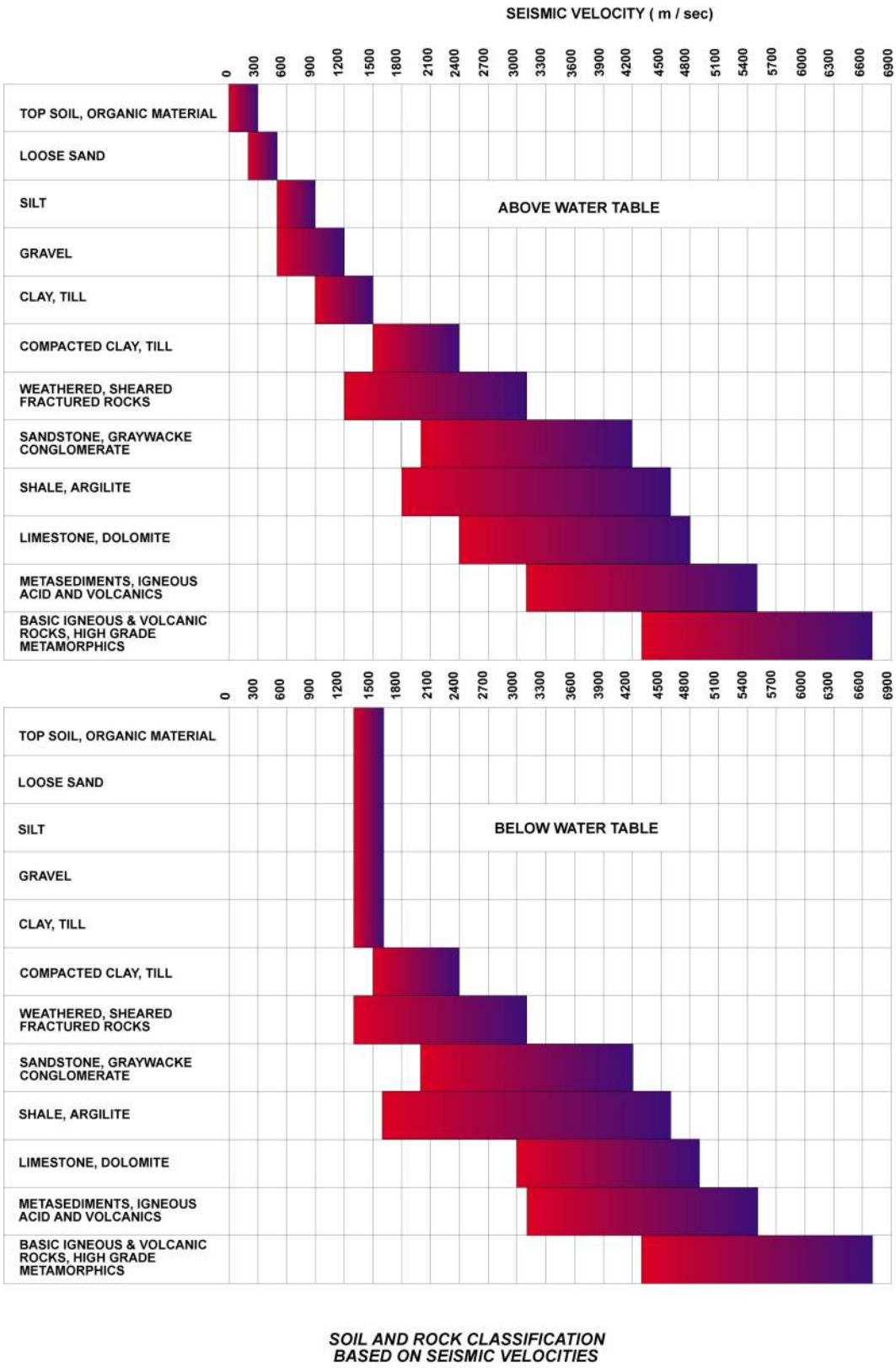


Table of P-wave velocities for given materials

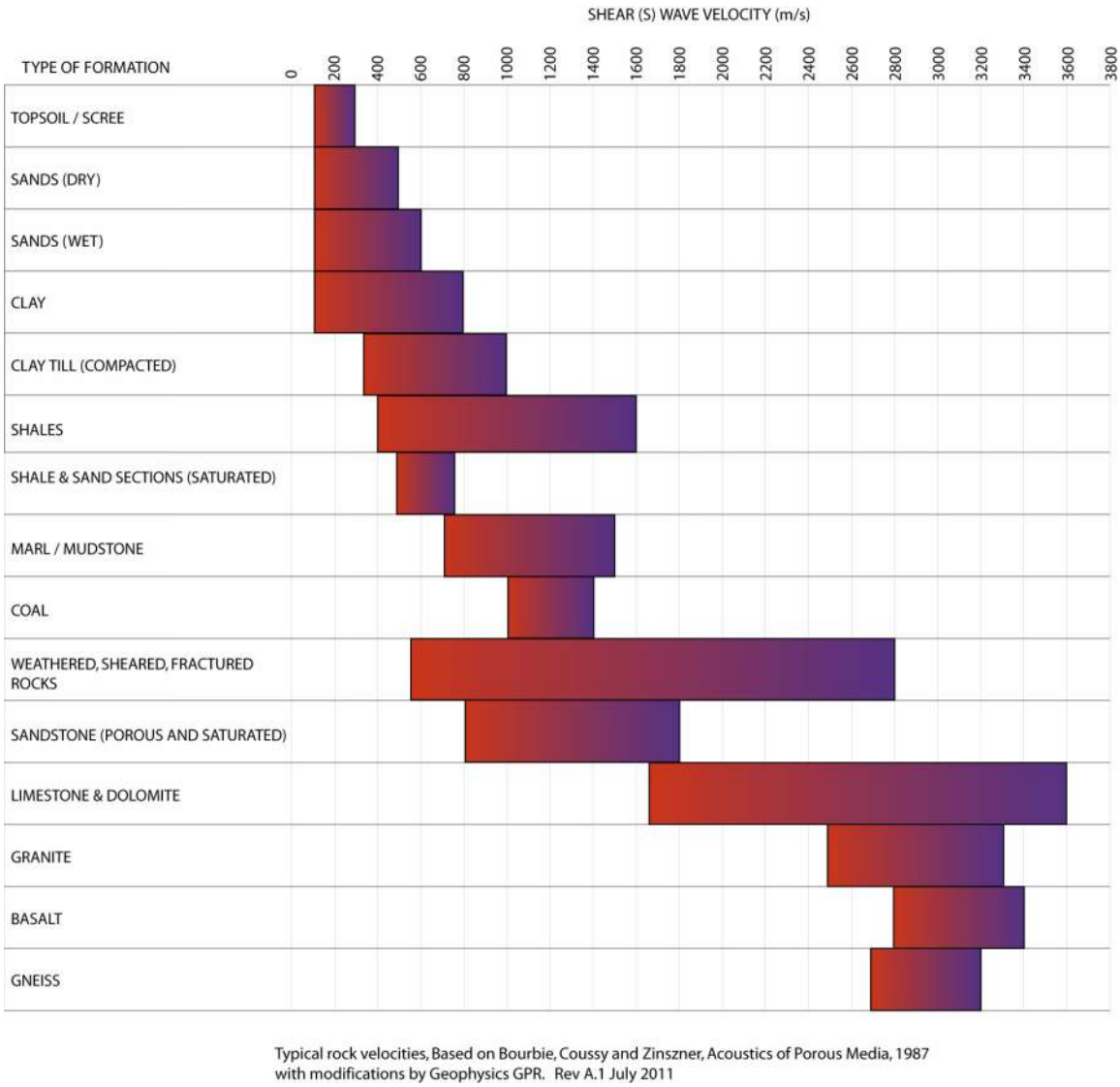
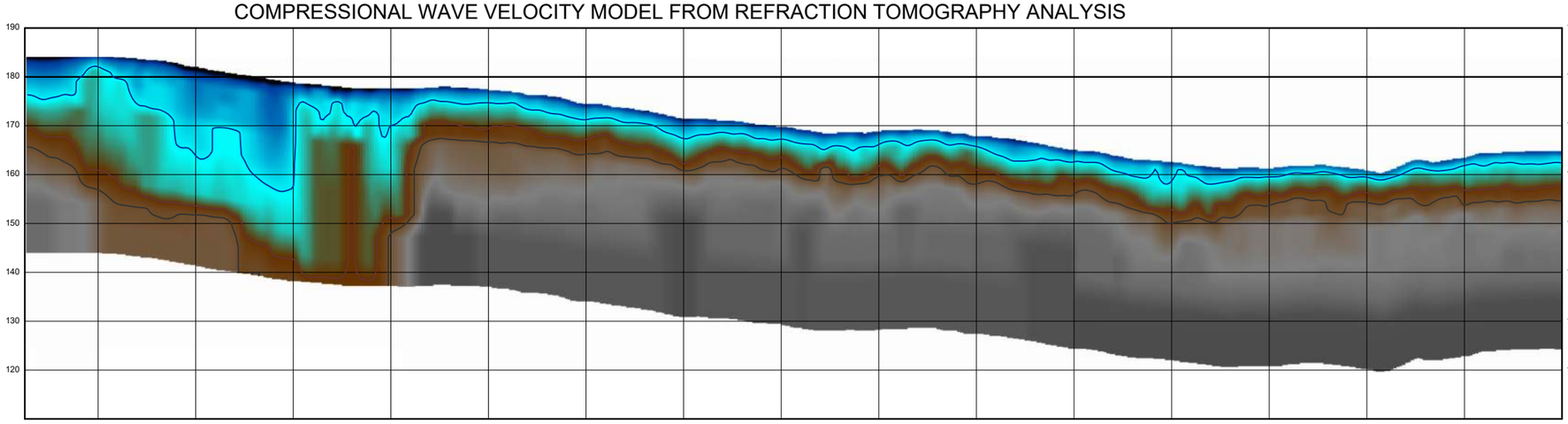


Table of S-wave velocities for given materials

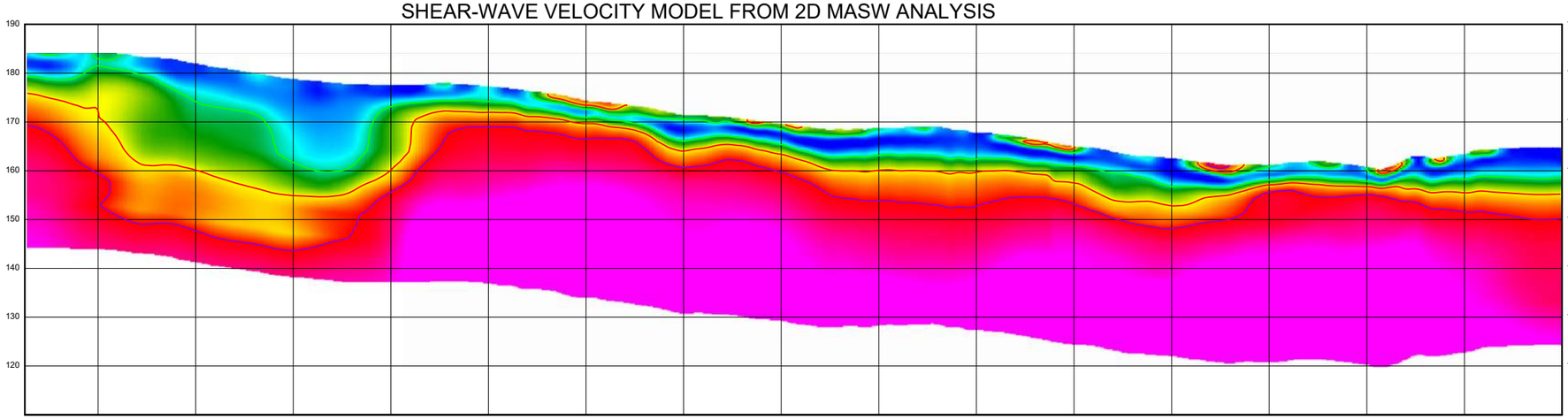
APPENDIX B

Drawings
GPR-191661_A1/A2 (Britannia Rd W)
GPR-191661_B1/B2/B3(Mississauga Rd/Queen St)
GPR-191661_C1 (Eglinton Ave W)
GPR-191661_D1 (Woodland Chase Trail)
GPR-191661_E1 (Turney Woods).

COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS

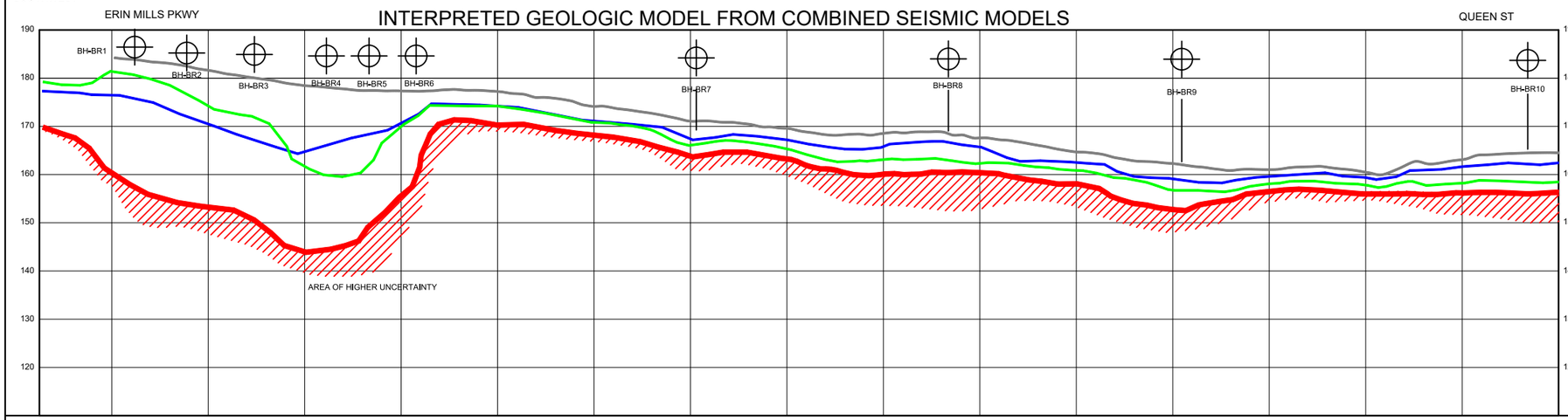


SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



SOUTHWEST NORTHEAST

INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS

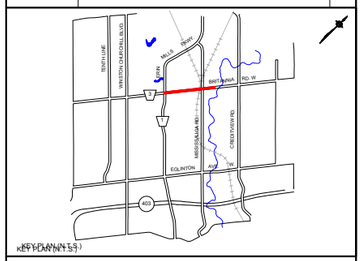


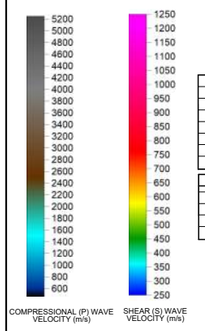
SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

DATE	DETAILS	INIT.
JAN 10, 2020	ISSUED AS DRAFT	R.B.M.
NOV 4, 2021	ISSUED AS FINAL	R.B.M.





Pwave Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
500 to 800	Stiff/Compact Overburden/Fill
800 to 1350	Stiff/Compact Overburden/Fill or Partially Saturated Overburden
1350 to 1650	Water Saturated Overburden or Stiff/Compact Overburden/Fill
1650 to 2500	Hard/Dense Overburden/Fill
2500 to 3000	Very Hard/Dense Fill or Weathered Bedrock
> 3000	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Fill
200 to 360	Stiff/Compact Overburden/Fill
360 to 580	Hard/Dense Overburden/Fill
580 to 790	Very Hard/Dense Fill or Weathered Bedrock
> 790	Interpreted Bedrock or Very Hard/Dense Fill

NOTES

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NOT VALID FOR CONSTRUCTION

Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp=1450m)
- Interpreted Overburden Contact (approx. Vs=400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

BRITANNIA ROAD WEST

(From Erin Mills Parkway to Credit River Crossing)

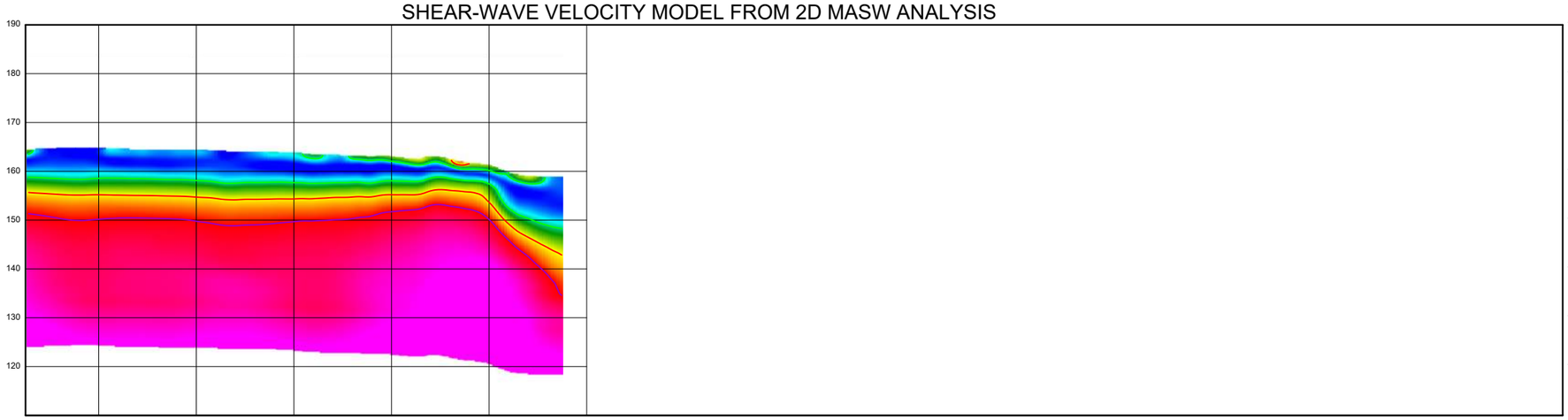
GEOPHYSICAL SEISMIC SURVEY

STA. 0+000 TO STA. 1+500

CAD Area	X-XX	Area	X-XX	Project No.	08-2205
Checked by		Drawn by	R.B.M.		
Date	JANUARY 2020	Sheet	1 of 2	DRAWING:	GPR-191661_A1

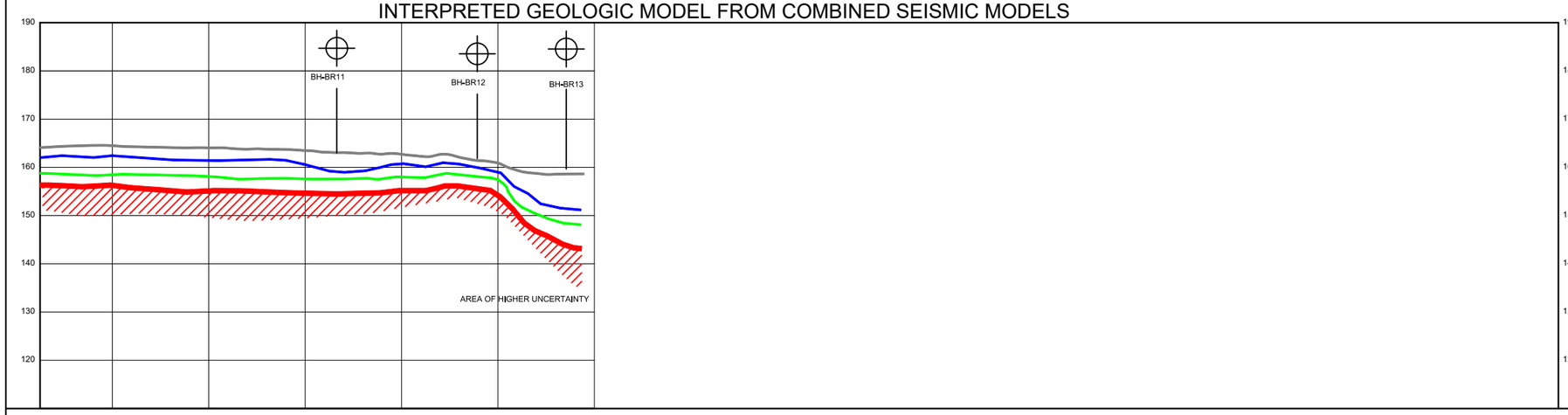
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS

SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



SOUTHWEST NORTHEAST

INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



1+500 1+600 1+700 1+800 1+900 2+000 ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

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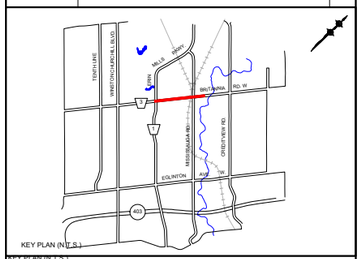
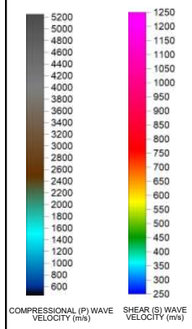
NOV 4, 2021	ISSUED AS FINAL	R.B.M.



KEY PLAN (N.T.S.)



Pwave Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
500 to 800	Stiff/Compact Overburden/Fill
800 to 1350	Stiff/Compact Overburden/Fill or Weathered Bedrock
1350 to 1650	Water Saturated Overburden or Stiff/Compact Overburden/Fill
1650 to 2500	Hard/Dense Overburden/Fill
2500 to 3000	Very Hard/Dense Fill or Weathered Bedrock
> 3000	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Fill
200 to 360	Stiff/Compact Overburden/Fill
360 to 560	Hard/Dense Overburden/Fill
560 to 760	Very Hard/Dense Fill or Weathered Bedrock
> 760	Interpreted Bedrock or Very Hard/Dense Fill

NOTES

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NOT VALID FOR CONSTRUCTION

Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp=1450m/s)
- Interpreted Overburden Contact (approx. Vs=400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

BRITANNIA ROAD WEST

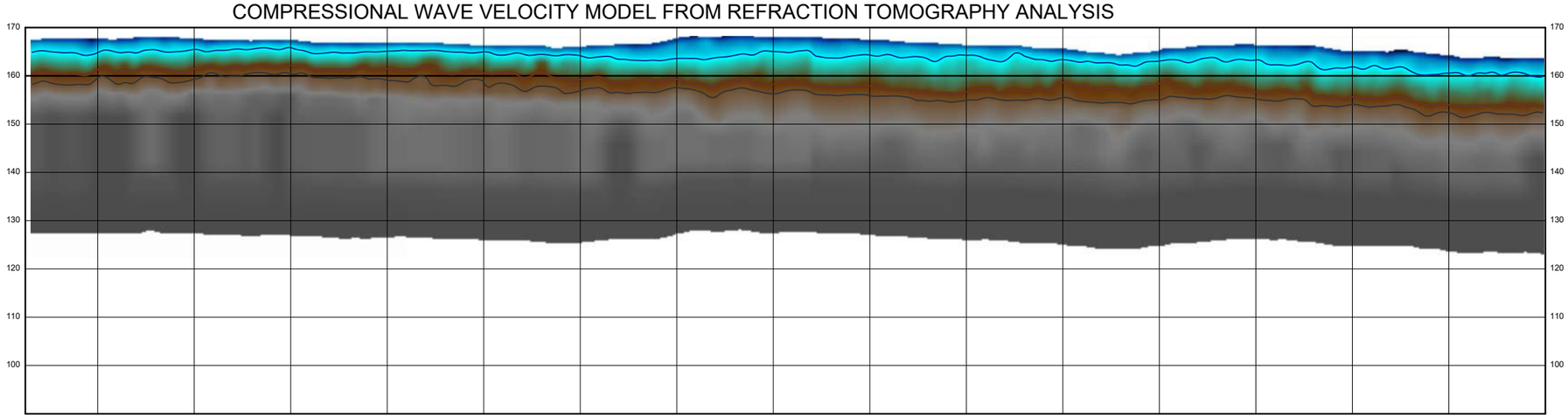
(From Erin Mills Parkway to Credit River Crossing)

GEOPHYSICAL SEISMIC SURVEY

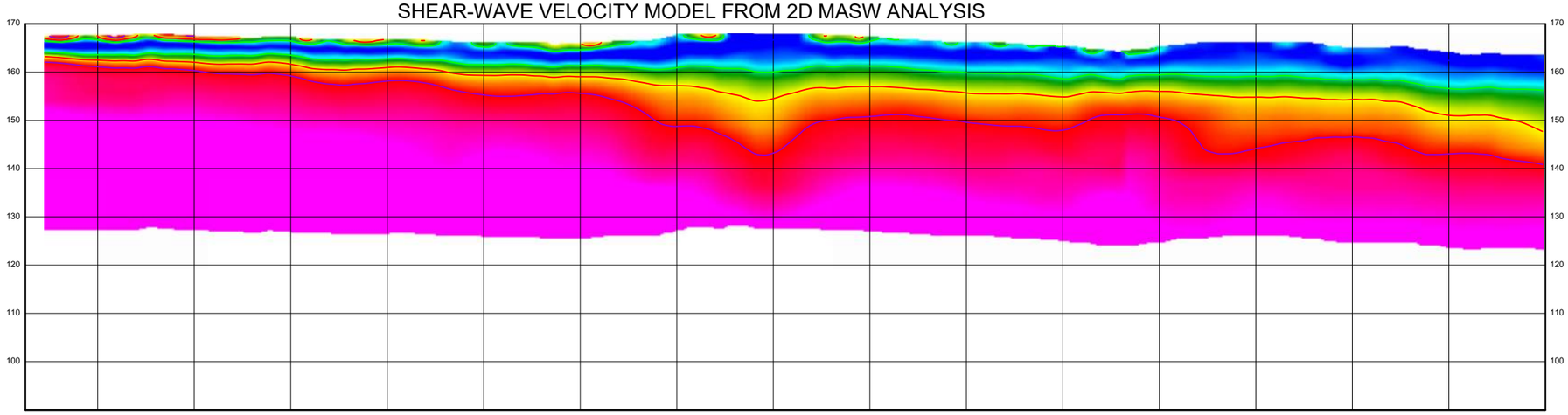
STA. 1+500 TO STA. 2+000

CAD Area	X-XX	Area	X-XX	Project No.	08-2205
Checked by		Drawn by	R.B.M.		
Date	JANUARY 2020	Sheet	2 of 2	DRAWING:	GPR-191661_A2

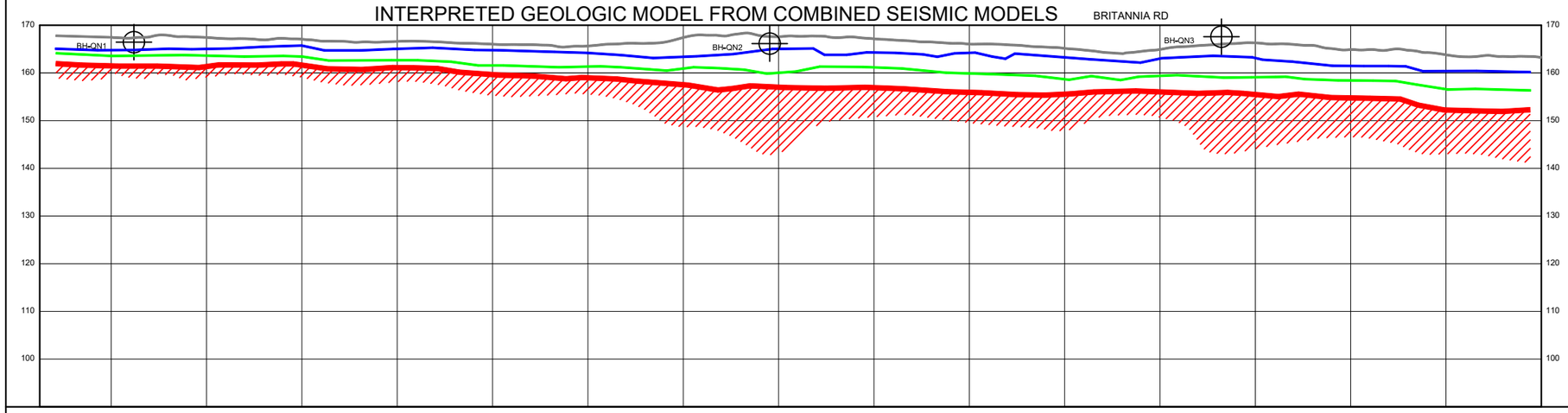
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	EX. ROAD ELEV.
0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

DATE	DETAILS	INIT.
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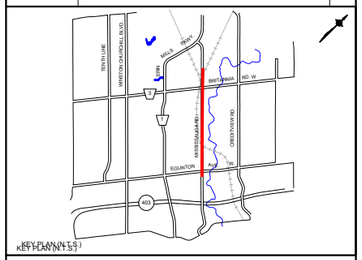
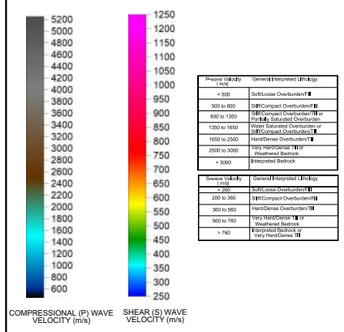
NOV 4, 2021	ISSUED AS FINAL	R.B.M.





Pressure Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
500 to 800	Stiff/Compact Overburden/Fill
800 to 1300	Stiff/Compact Overburden/Fill or Partially Saturated Overburden
1300 to 1650	Hard/Dense Overburden/Till
1650 to 2500	Stiff/Compact Overburden/Till
2500 to 3000	Hard/Dense Overburden/Till
> 3000	Very Hard/Dense Till or Weathered Bedrock
	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Fill
200 to 360	Stiff/Compact Overburden/Fill
360 to 560	Hard/Dense Overburden/Till
560 to 760	Very Hard/Dense Till or Weathered Bedrock
> 760	Interpreted Bedrock or Very Hard/Dense Till

NOTES

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NOT VALID FOR CONSTRUCTION

Designed by ____ Chkd. ____ Approved by ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp=1450m/s)
- Interpreted Overburden Contact (approx. Vs=400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

MISSISSAUGA RD/QUEEN ST

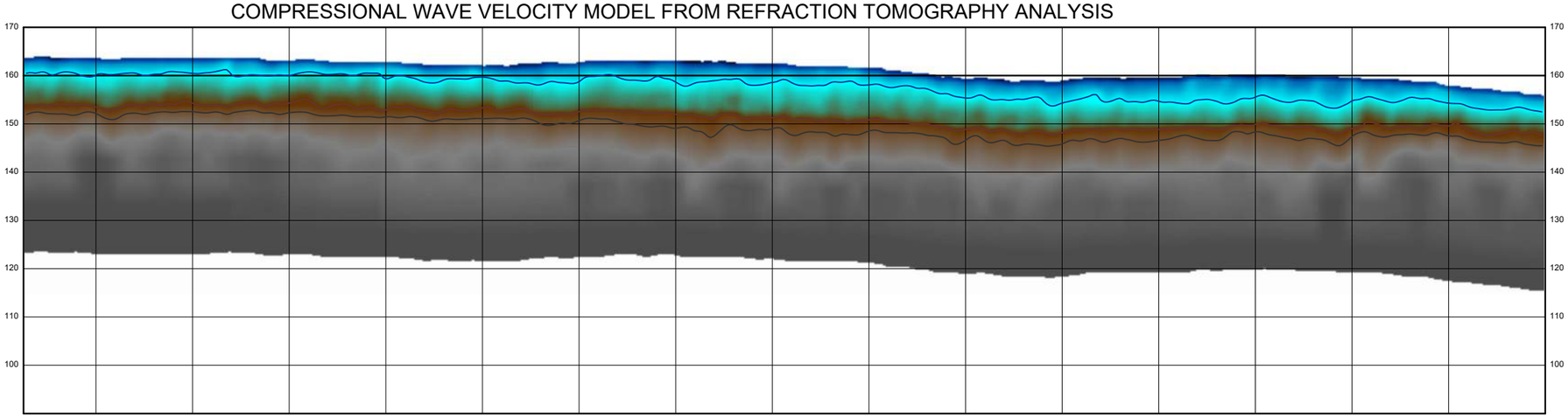
(FROM MATLOCK AVE TO EGLINTON AVE W)

GEOPHYSICAL SEISMIC SURVEY

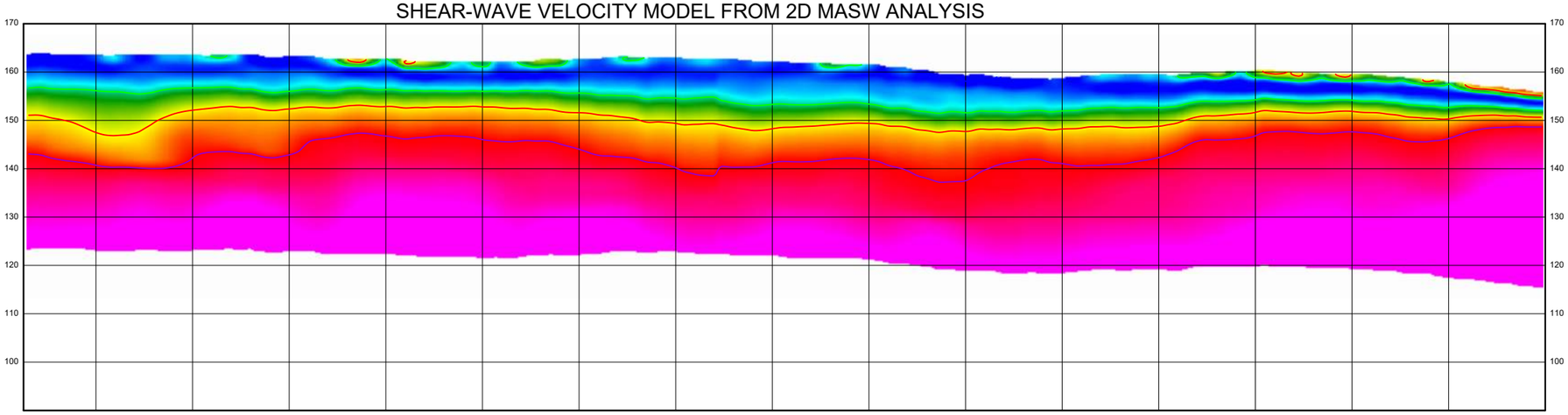
STA. 0+000 TO STA. 1+500

CAD Area X-XX	Area X-XX	Project No.	08-2205
Checked by	Drawn by R.B.M.		
Date JANUARY 2020	Sheet 1 of 3	DRAWING:	GPR-191661_B1

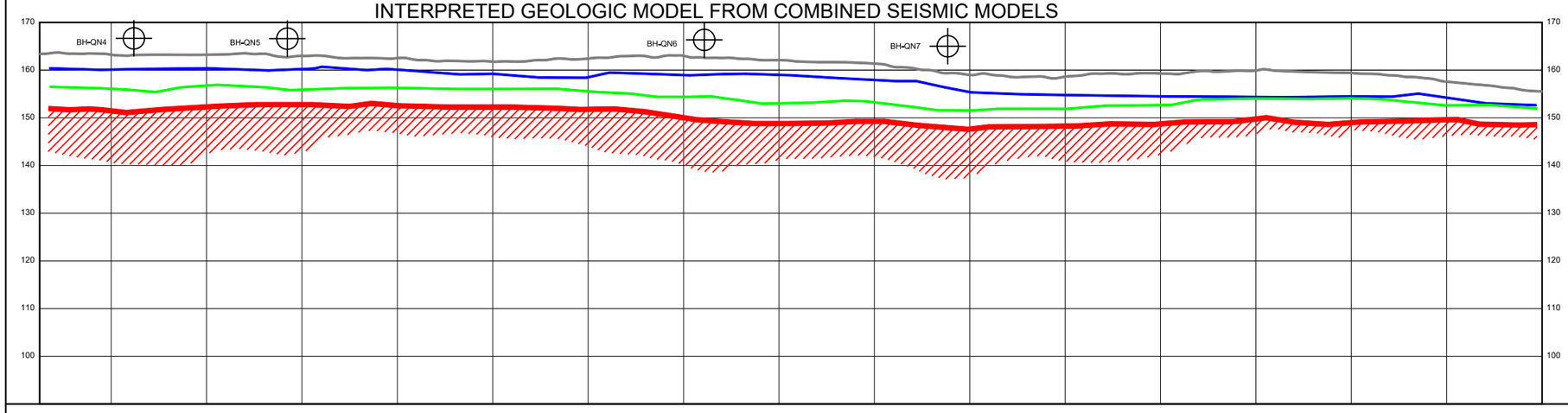
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	EX. ROAD ELEV.
1+500	1+600	1+700	1+800	1+900	2+000	2+100	2+200	2+300	2+400	2+500	2+600	2+700	2+800	2+900		ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

DATE	DETAILS	INIT.
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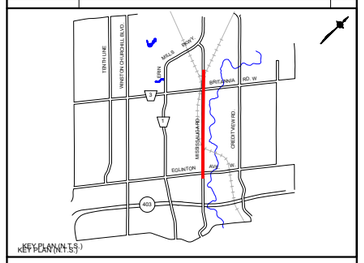

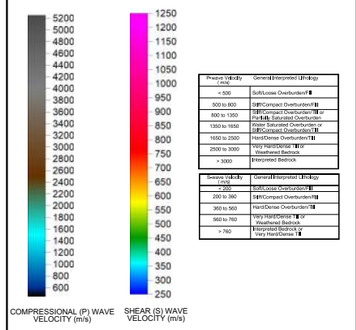

Preserve Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Till
500 to 800	Stiff/Compact Overburden/Till
800 to 1350	Stiff/Compact Overburden/Till or Partially Saturated Overburden
1350 to 1650	Water Saturated Overburden or Stiff/Compact Overburden/Till
1650 to 2500	Hard/Dense Overburden/Till
2500 to 3000	Very Hard/Dense Till or Weathered Bedrock
> 3000	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Till
200 to 360	Stiff/Compact Overburden/Till
360 to 560	Hard/Dense Overburden/Till
560 to 760	Very Hard/Dense Till or Weathered Bedrock
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NOT VALID FOR CONSTRUCTION

Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
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50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

MISSISSAUGA RD/QUEEN ST

(FROM MATLOCK AVE TO EGLINTON AVE W)

GEOPHYSICAL SEISMIC SURVEY

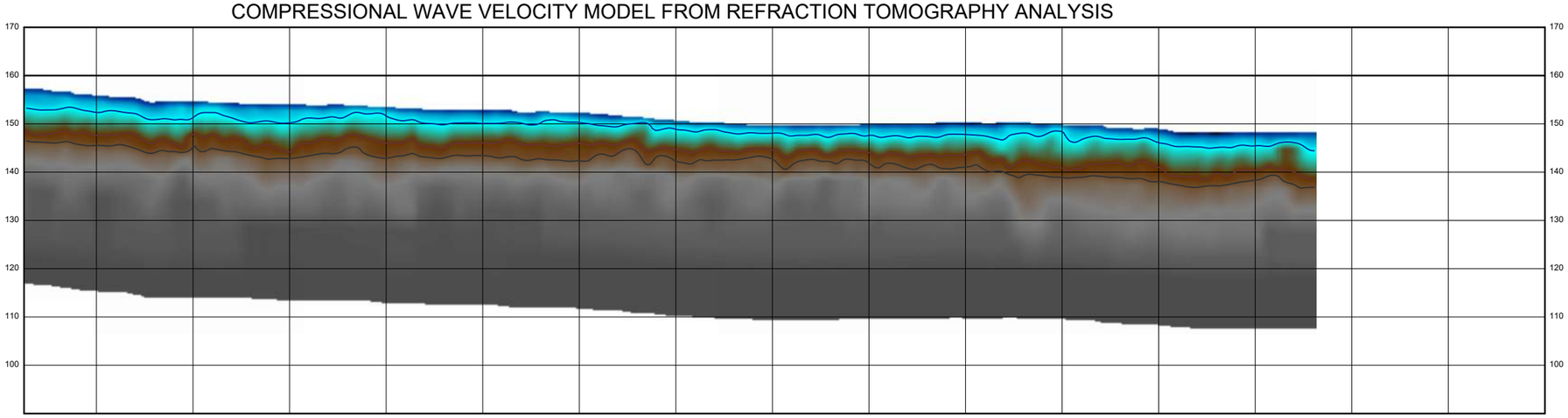
STA. 1+500 TO STA. 3+000

CAD Area	X-XX	Area	X-XX
Checked by		Drawn by	R.B.M.
Date	JANUARY 2020	Sheet	2 of 3

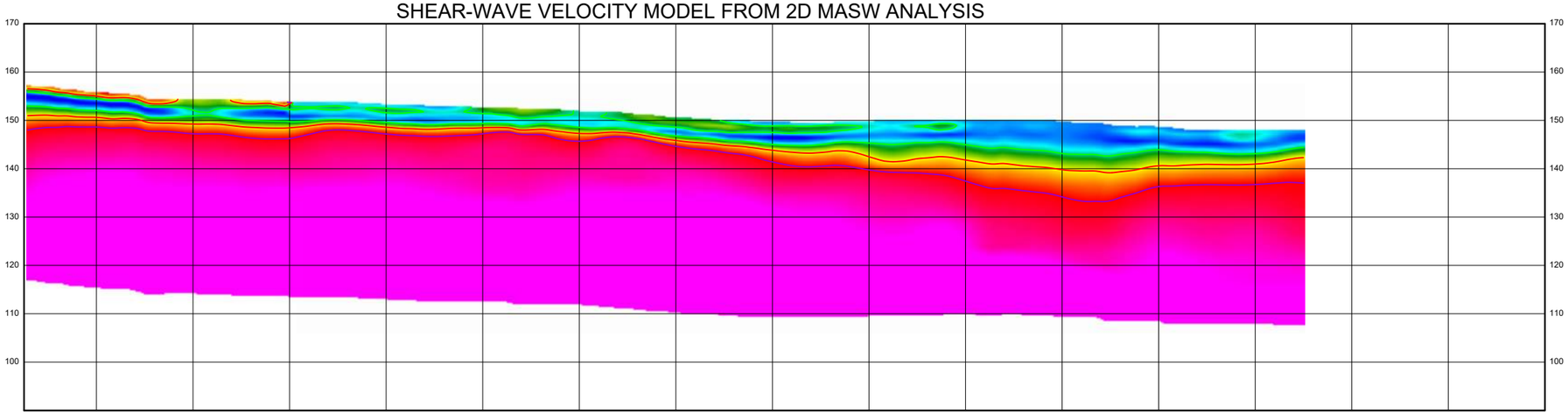
Project No. 08-2205

DRAWING: GPR-191661_B2

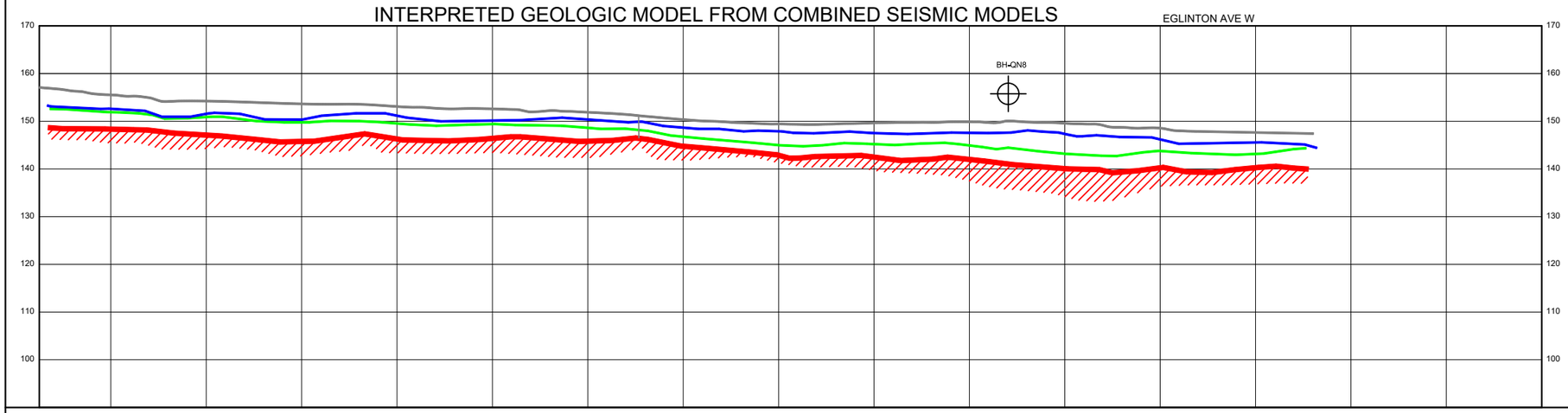
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	EX. ROAD ELEV.
3+000	3+100	3+200	3+300	3+400	3+500	3+600	3+700	3+800	3+900	4+000	4+100	4+200	4+300	ROAD CHAINAGE

SERVICE DATA

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REVISIONS

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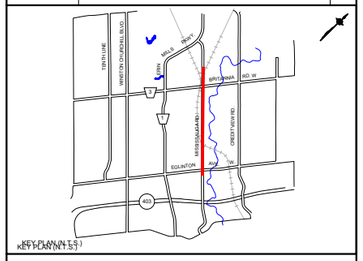

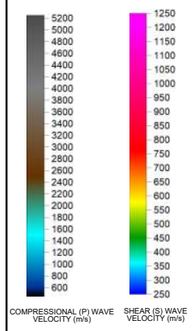

Preserve Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
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2500 to 3000	Very Hard/Dense Till or Weathered Bedrock
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Swave Velocity (m/s)	General Interpreted Lithology
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NOT VALID FOR CONSTRUCTION

Designed by ____ ____ ____ ____ Chkd. ____ Approved by ____ ____ ____ ____ ____

LEGEND

- Topography (Approximate)
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50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

MISSISSAUGA RD/QUEEN ST

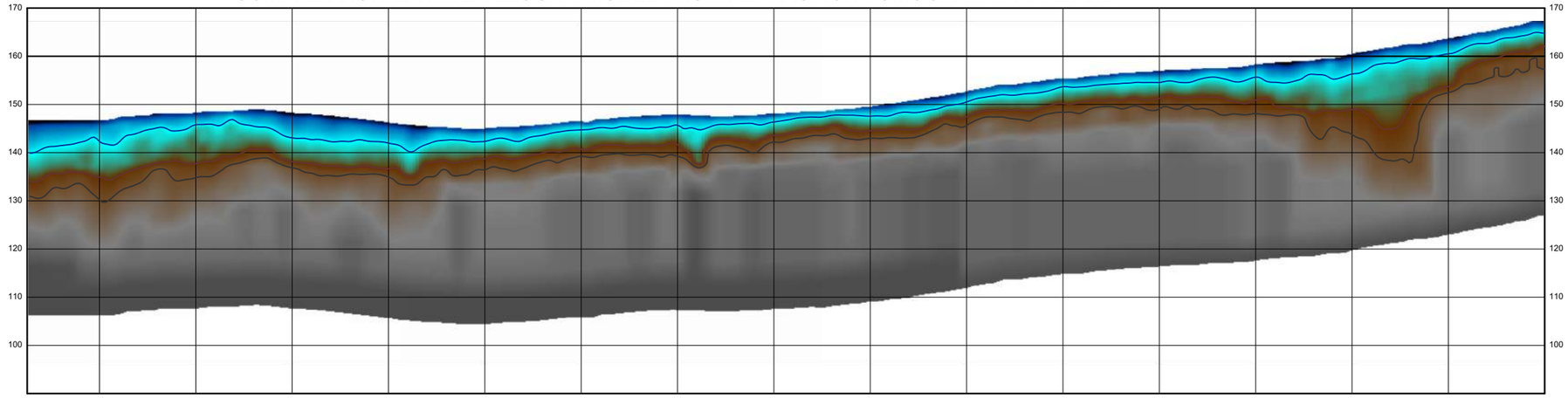
(FROM MATLOCK AVE TO EGLINTON AVE W)

GEOPHYSICAL SEISMIC SURVEY

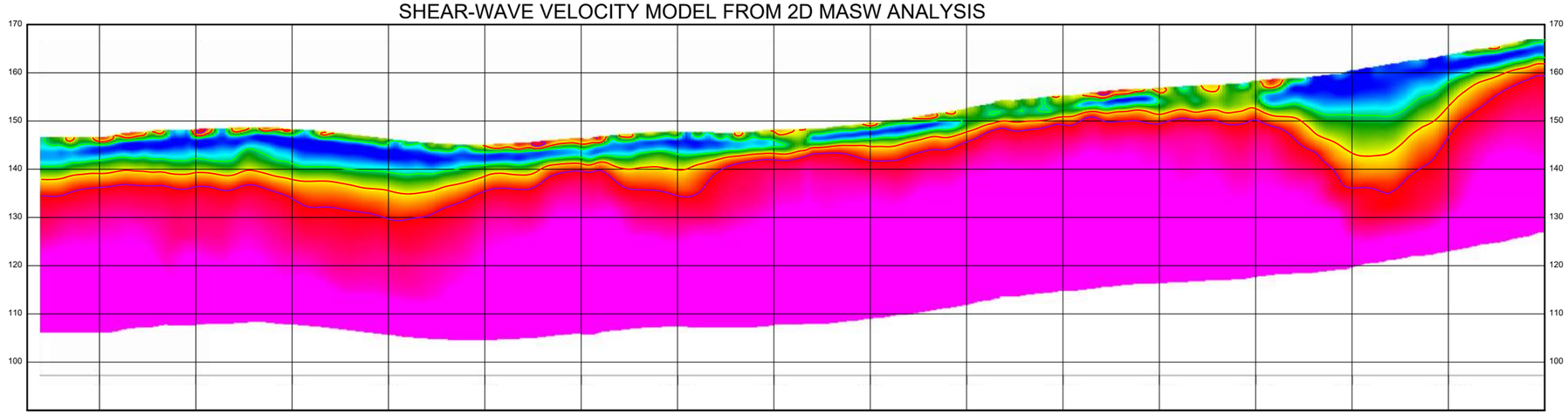
STA. 3+000 TO STA. 4+200

CAD Area	X-XX	Area	X-XX	Project No.	08-2205
Checked by		Drawn by	R.B.M.		
Date	JANUARY 2020	Sheet	2 of 3	DRAWING:	GPR-191661_B3

COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS

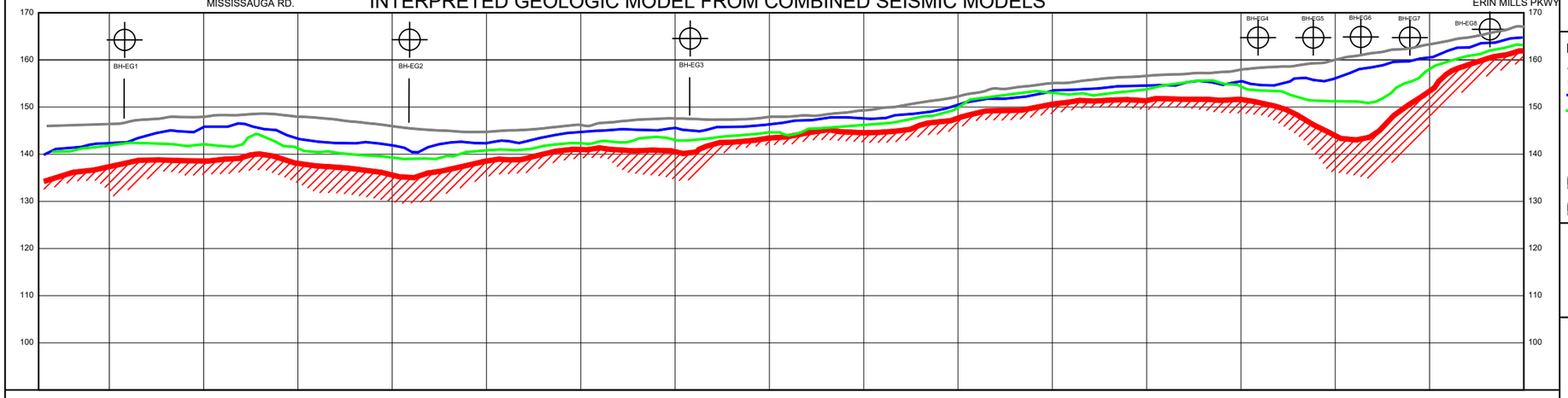


SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS

NORTHEAST — MISSISSAUGA RD. — SOUTHWEST — ERIN MILLS PKWY



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0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400		ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

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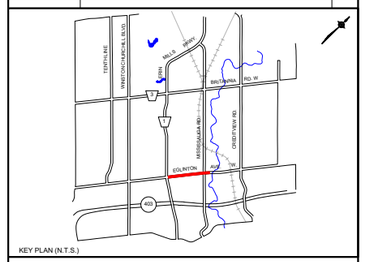

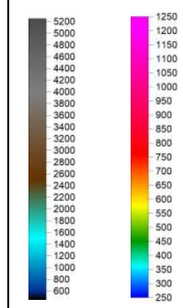

Pwave Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
500 to 800	Stiff/Compact Overburden/Fill
800 to 1350	Stiff/Compact Overburden/Fill or Partially Saturated Overburden
1350 to 1650	Water Saturated Overburden or Stiff/Compact Overburden/Fill
1650 to 2500	Hard/Dense Overburden/Till
2500 to 3000	Very Hard/Dense Till or Weathered Bedrock
> 3000	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Fill
200 to 360	Stiff/Compact Overburden/Fill
360 to 560	Hard/Dense Overburden/Till
560 to 760	Very Hard/Dense Till or Weathered Bedrock
> 760	Interpreted Bedrock or Very Hard/Dense Till

NOTES

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NOT VALID FOR CONSTRUCTION

Designed by ____ Chkd. ____ Approved by ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp≈1450m/)
- Interpreted Overburden Contact (approx. Vs≈400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

EGLINTON AVENUE WEST

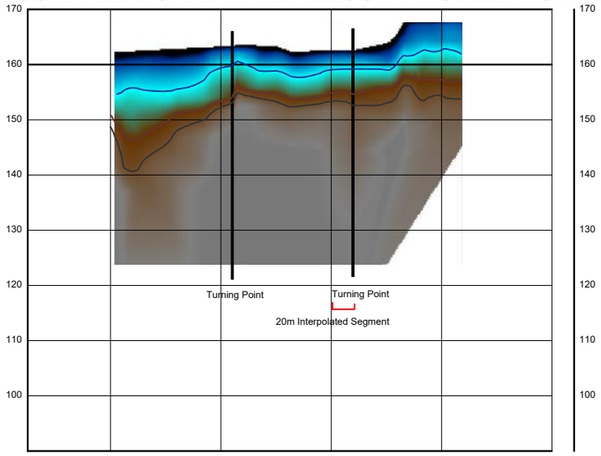
(FROM MISSISSAUGA ROAD TO ERIN MILLS PARKWAY)

GEOPHYSICAL SEISMIC SURVEY

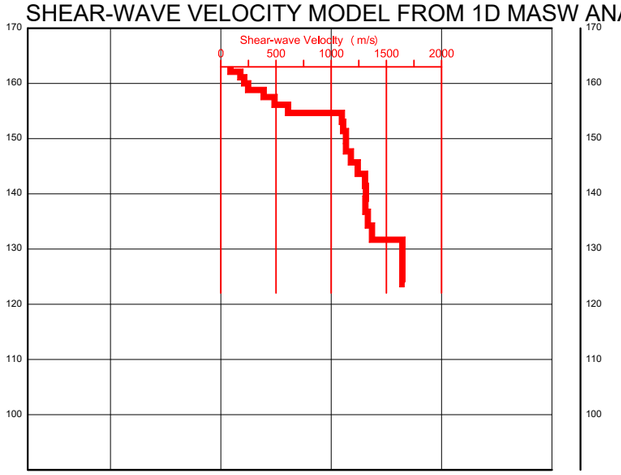
STA. 0+000 TO STA. 1+500

CAD Area	Area	Project No.	08-2205
Checked by	Drawn by R.B.M.		
Date JANUARY 2020	Sheet 1 of 1	DRAWING:	GPR-191661_C1

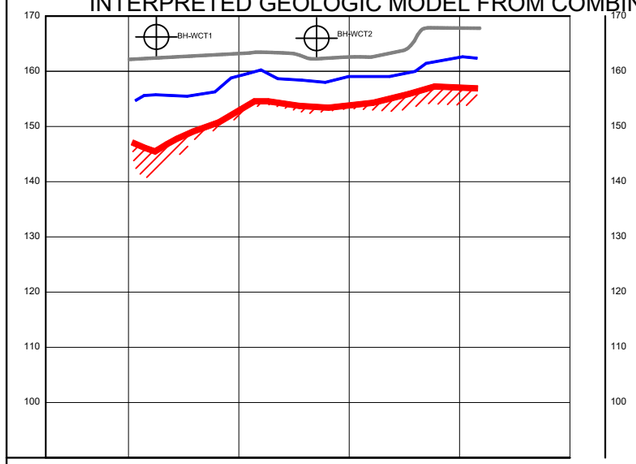
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



SHEAR-WAVE VELOCITY MODEL FROM 1D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



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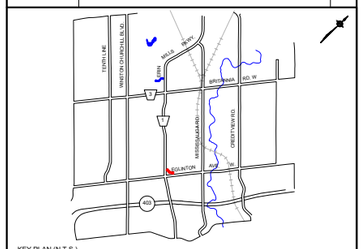
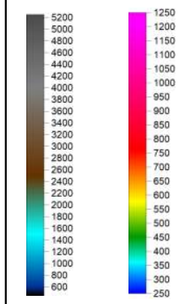


KEY PLAN (N.T.S.)



COMPRESSIONAL (P) WAVE VELOCITY (m/s)

SHEAR (S) WAVE VELOCITY (m/s)

Pwave Velocity (m/s)	General Interpreted Lithology
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500 to 800	Stiff/Compact Overburden/Till
800 to 1350	Stiff/Compact Overburden/Till or Very Hard/Dense Overburden
1350 to 1650	Very Hard/Dense Overburden/Till
1650 to 2500	Hard/Dense Overburden/Till
2500 to 3000	Very Hard/Dense Till or Weathered Bedrock
> 3000	Interpreted Bedrock

Swave Velocity (m/s)	General Interpreted Lithology
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Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp≥1450m/)
- Interpreted Overburden Contact (approx. Vs≥400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

WOODLAND CHASE TRAIL

(EGLINTON AVE WEST TO ERIN MILLS PARKWAY)

GEOPHYSICAL SEISMIC SURVEY

STA. 0+000 TO STA. 0+320

CAD Area	Area	Project No.	08-2205
Checked by	Drawn by R.B.M.		
Date JANUARY 2020	Sheet 1 of 1	DRAWING:	GPR-191661_D1

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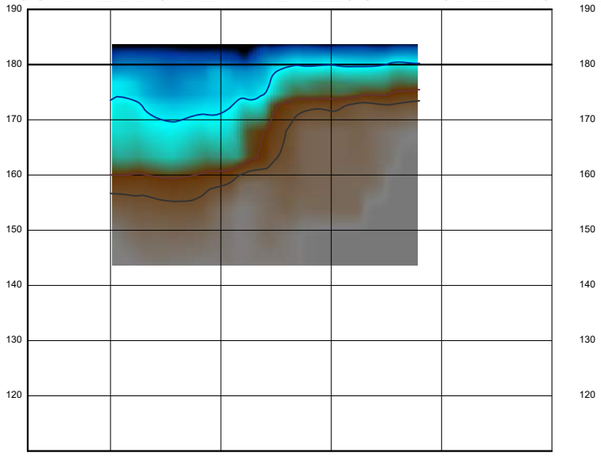
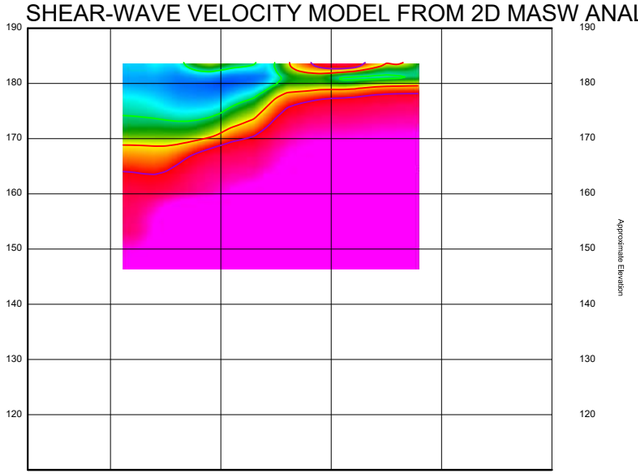
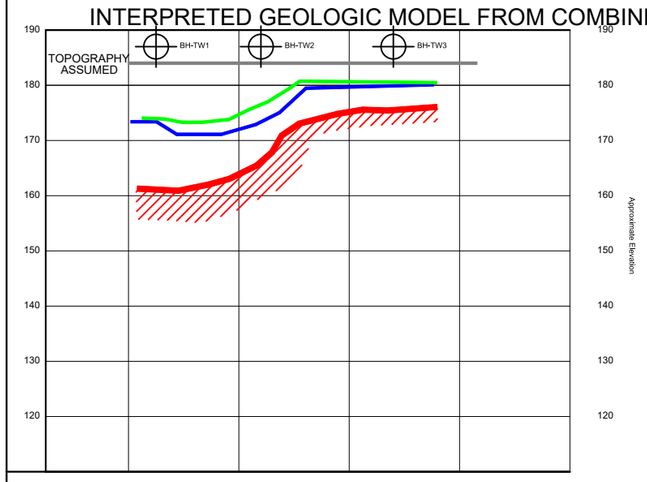


SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



NORTHEAST SOUTHWEST

INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



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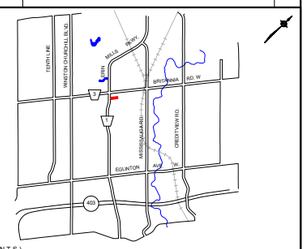

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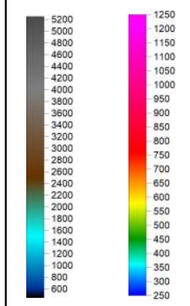

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- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

TURNEY WOODS

(Britannia And Erin Mills Pkwy)

GEOPHYSICAL SEISMIC SURVEY

STA. 0+000 TO STA. 0+280

CAD Area	Area	Project No.	08-2205
Checked by	Drawn by R.B.M.		
Date JANUARY 2020	Sheet 1 of 1	DRAWING:	GPR-191661_E1

GEOPHYSICS GPR
INTERNATIONAL INC.

GEOPHYSICAL INVESTIGATION,
ERIN CENTRE BLVD AND ERIN MILLS PKWY, REGION OF PEEL
MISSISSAUGA, ONTARIO
PROJECT T213017

Presented to :

Public Works, Wastewater Collection & Conveyance
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON
L6T 4B9

Geophysics GPR International Inc.
6741 Columbus Road, Unit 14
Mississauga (Ontario) L5T 2G9
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info@geophysicsgpr.com

August 2021 GPR-21-3017

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1 INTRODUCTION

Geophysics GPR International Inc. was requested by The Region of Peel to carry out geophysical seismic surveys along segments of Erin Centre Blvd and Erin Mills Parkway as a component of Project (08-2205-445T), Mississauga, Ontario (Figure 1 and Figure 2).

The purpose of this investigation was to produce seismic wave velocity profiles and to map variations in subsurface materials that could influence the design options for the West Trunk Diversions Project and to provide additional focus to follow-up geotechnical investigations.

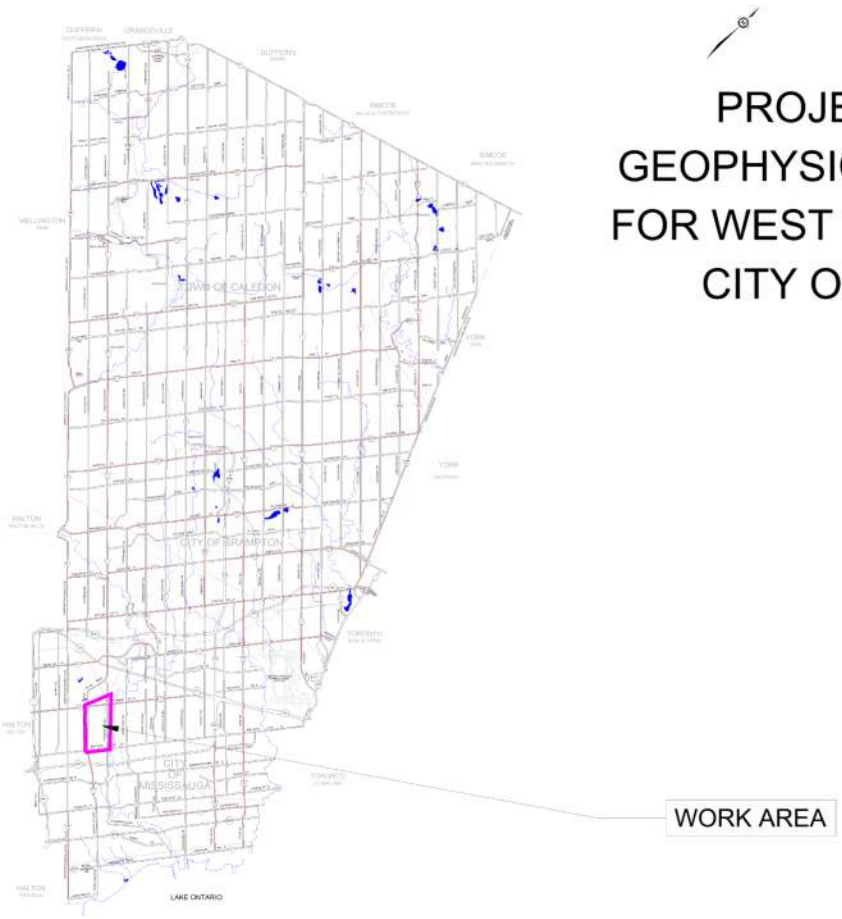
The seismic refraction and Multi-channel Analysis of Surface Waves (MASW) methods were applied.

A total of approximately 1.5 km of seismic data were collected.

Data were collected June 14/15, 2021

This report deals with the various aspects of the survey including field techniques, interpretation techniques, and finally an interpretation in the form of depth to bedrock profiles.

Throughout this report, geophysical parameters (seismic velocities) are used to infer the nature of the subsurface materials. The term overburden, will refer to both the fill material and native sediments. The terms bedrock and interpreted bedrock refer to high velocity layers typical of rock or potentially very dense tills.



PROJECT No. 08-2205
GEOPHYSICAL INVESTIGATION
FOR WEST TRUNK DIVERSIONS
CITY OF MISSISSAUGA

Region of Peel
working with you

604200
604400
604600
4825200
4825000
4824800
4824600
4824400
4824200
4824000
SOL.
EOL.
SOL.
EOL.
140
100
0
100
200
(meters)
NAD83 / UTM zone 17N

2 METHODOLOGY

2.1 Positioning, Topography and Units of Measurement

Positioning was controlled by a combination of global navigation satellite system with differential corrections (DGPS) and chaining. The GPS coordinates were converted to an arbitrary project chainage. The accuracy of the DGPS measurements are typically sub-metre. The overall accuracy of the positioning along the roadways is estimated to be on the order of +/- 1 m.

The horizontal positioning along the off-road profile is estimated to be on the order of +/- 3 to 4 m.

The start/end coordinates of the profiles are outlined in Table 2. The coordinate system is NAD83 UTM z 17N.

Interpreted profiles were generated as depths below ground surface. The depths are converted to elevations based on topography data.

Topographic data were obtained from combination of methods as outlined in Table 1.

The overall accuracy of the topographic data with consideration for the combination of the various methods is estimated to be on the order of +/- 1.5 m.

! " # $! %

	!

! " $ & & ' %() & *

Seismic Profile	Start of Line (0+00)		End of Line		Length (m)
	Easting (m)	Northing (m)	Easting (m)	Northing (m)	
	604 651	4 825 251	604 533	4 824 060	1380
	604 172	4 823 994	604 270	4 823 896	140

2.2 Seismic Methods

Seismic methods for geologic mapping involve measuring/recording the response of vibration sensors. Multiple techniques and methodologies are available for analysis of the data depending on the ultimate goal of the investigation. With the exception of the segments of data collected off-road, this particular investigation utilized a streamer arrangement; whereby the geophones and seismic sources are dragged behind a vehicle with records being recorded at set intervals along the alignment. Two essentially independent techniques were used to analysis the resulting data; namely, seismic refraction tomography and 2D MASW.

2.2.1 Seismic Refraction

The seismic refraction method relies on measuring the transit time of the wave that takes the shortest time to travel from the shot-point to each geophone. The fastest seismic waves are the compressional (P) or acoustic waves, where displaced particles oscillate in the direction of wave propagation. The energy that follows this first arrival (including reflected waves, transverse (S) waves and resonance) is not considered under routine seismic refraction interpretation. Figure 3 illustrates the basic operating principle for refraction surveys.

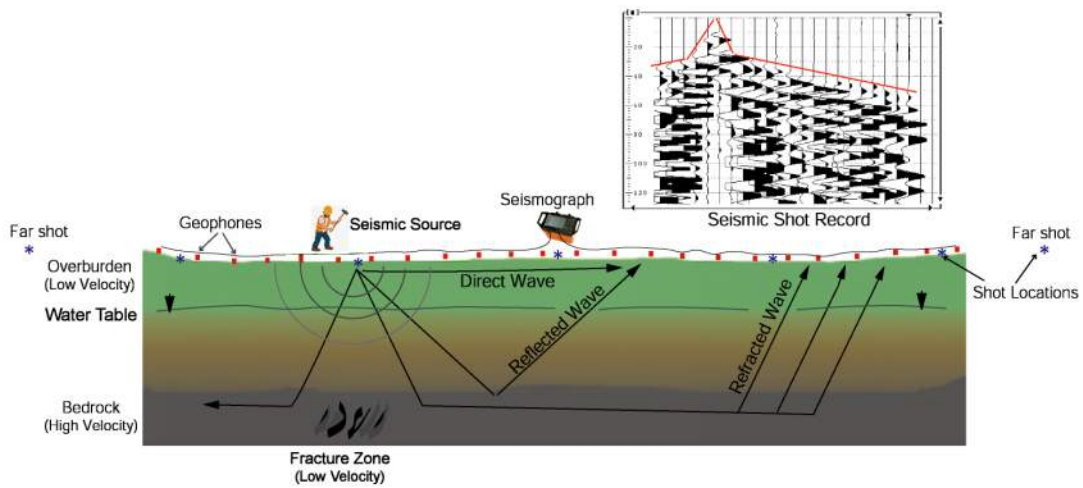
The seismic spread consisted of 24 vibration monitoring devices (geophones) connected in line to a seismograph (ABEM Terraloc Mark 6). Spacing between geophones was set to 3 m. The seismic source was an elastic propelled weight drop. The shot offset was 6 m from one end of the spread. The distance between shots was 12 m for the majority of the profile.

The off-road seismic profiles used a stationary geophone arrays with a geophone spacings of 3m.

The interpretation of the seismic refraction data was based on the refraction tomography and critical distance methods. A full refraction analysis (which gives the “true” material velocity and determines the depth beneath each geophone) would require multiple shot locations for a given spread location and a more thorough data analysis/interpretation.

The refraction tomography processing was done using the SeisImager Plotrefa software package (ver 3.1.0.5). The refraction tomography method involves a computer ray tracing inversion process to fit a velocity model to the interpreted time-distance arrival time data. How well the travel-times computed from the velocity model match the interpreted travel-times from the raw data are reported as an RMS error in milliseconds. This RMS error gives an indication of the accuracy of the model but are not a true measure of the velocities. Noisier data will, in general, give higher RMS error values. Tomographic inversion can provide more accurate models than the standard interpretation method in areas of gradational changes in velocity and in areas of extreme topography.

Typically the accuracy of a full refraction surveys is +/- 1m for depths less than 10m and +/-10% for depths greater than 10m. The estimated error from simple critical distance calculations and the tomography modelling with no reverse shots will be higher.



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2.2.2 Surface Wave Analysis (MASW)

The Multi-channel Analysis of Surface Waves (MASW) is a seismic method used to evaluate the shear-wave velocities of subsurface materials through the analysis of the dispersion properties of Rayleigh surface waves ("ground roll"). The dispersion properties are measured as a change in phase velocity with frequency. Surface wave energy will decay exponentially with depth. Lower frequency surface waves will travel deeper and thus be more influenced by deeper velocity layering than the shallow higher frequency waves. Inversion of the Rayleigh wave dispersion curve yields a shear-wave (Vs) velocity depth profile (sounding). Figure 4 and Figure 5 outline the basic operating procedure for the MASW method. A more detailed description of the method can be found in the paper Multi-channel Analysis of Surface Waves, Park, C.B., Miller, R.D. and Xia, J. Geophysics, Vol. 64, No. 3 (May-June 1999); P. 800–808.

The two dimensional Multi-channel Analysis of Surface Waves (2D-MASW) is an extension of the 1D analysis and the basic theory behind the method is similar. The 2D method involves collecting multiple shot records along a profile. The shot records are compared and combined based on shot/receiver geometry (common-mid-point (CMP)). A multi-channel analysis is then performed on the CMP gathers to generate a phase dispersion curve for calculating the surface wave phase velocities. A non-linear least-squares inversion is run to generate a 2D shear wave velocity model. A more detailed description of the method can be found in the paper CMP Cross-Correlation Analysis of Multi-Channel Surface-Wave Data, Hayashi, K., and Suzuki, H. Exploration Geophysics, (2004) 35, 7-13.

The MASW data analysis used the same data set as the seismic refraction survey discussed above.

The main processing sequence involved the use of the SeisimagerSW-2D software package for compiling the common-mid-point gathers, picking of the dispersion curves and 2D inversion of the MASW shot records.

The theoretical maximum depth of investigation is approximately half of the total spread geophone length. In practice, the maximum depth of investigation is controlled by the lowest frequency of the dispersion curve that can be resolved and the material velocity. This in turn is controlled primarily by the geology, background noise and energy source. The model resolution will decrease with depth and will be horizontally smoothed/interpolated.

The main sources of error are generally related to the identification of the fundamental mode of the dispersion curve. Typically, the fundamental mode is the dominant mode; however, it some cases, higher modes can be dominant. An additional source of error is in the modelling/inversion process. As with most inversion problems, the solution is non-unique and must be judged geologically realistic.

The accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The estimated error is higher for shear-wave velocities within rock formations and, in general, the resolution decreases with depth.

The accuracy of the interpreted layer contacts with the MASW method is on the order of +/- 10 % to 15%. The estimated error will be higher for contacts between materials of lower velocity contrast (e.g. dense till over weathered shale).

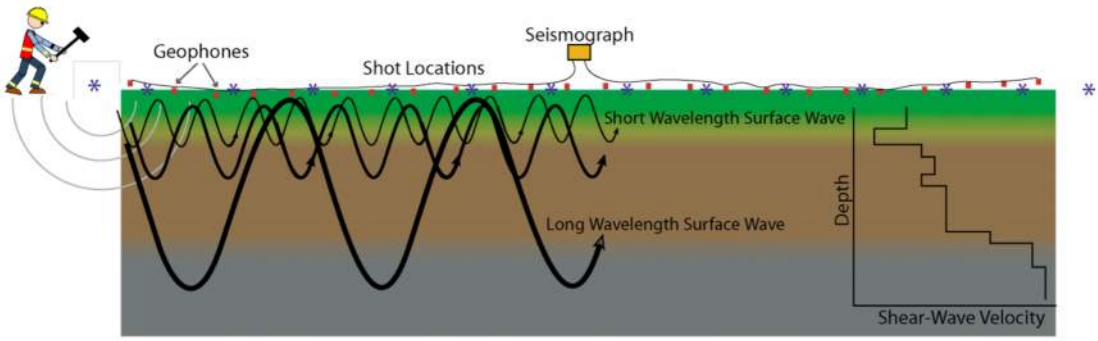
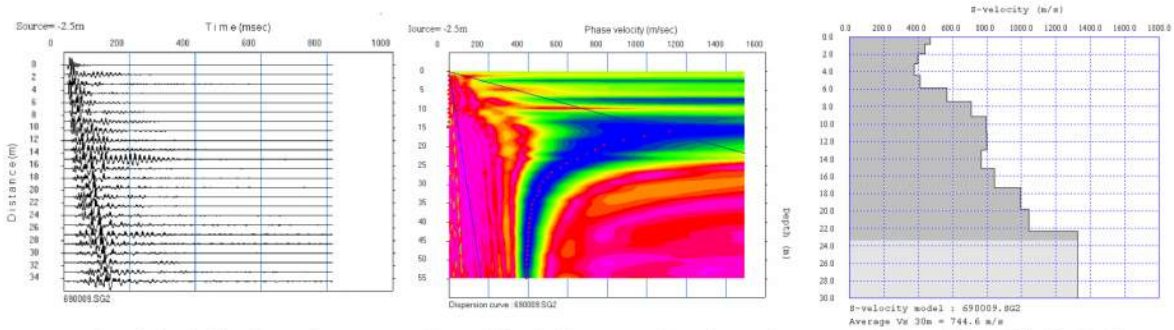


Figure 4: 1-D MASW Operating Principle



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3 RESULTS

The results of the 2D seismic surveys along segments of Erin Centre Blvd and along the north sidewalk of Erin Mills Pkwy, are presented as Drawings in Appendix B.

The plan view plot overlain on earth imagery are provided as Figure 2

The seismic arrival time data were clear for the majority of the survey profile. The quality of the resulting dispersion curves were also well defined for the majority of the shot records.

The following are descriptions of the features presented in the seismic profile drawings:

! - The topography has been extracted from a variety of sources including levelling and DGPS readings. The topography data should be used for reference purposes only.

1 & ! $ & - The interpreted bedrock elevation is based on a combined interpretation of the P-wave and S-wave velocities.

1 & . " & 2 ' !" * – The blue line is derived from the P-wave refraction tomography model and approximately follows the 1500 m/s contour. This layer is interpreted to represent the top of saturated material.

1 & . " & 2 '3 4 566 / * - The green line represents approximately the 400 m/s S-wave velocity contour interpreted from the 2D MASW profiles. S-wave velocities greater than 400 m/s are typical for hard/dense overburden.

7 $ 1 & & - The hatched area along the profiles provide a relative estimate of the potential of bedrock weathering based on a combination of the steepness of the seismic velocity gradients and variation between the compressional and shear-wave models. As such, this zone can also provide a relative indicator of interpretation confidence.

Appendix A contains a tables of seismic velocities for various soil and rock types.

Based on the interpretation of the seismic velocity models, suggested locations for geotechnical boreholes are provide in Table 3.

The following paragraphs provide a summary of the results for each segment

Erin Centre Blvd

The seismic profile along Erin Centre Blvd is presented in Drawing GPR-21-3017_A1 and plan view Figure 2.

The data were collected in the south/west bound driving lane from South of Mississauga Road to Erin Mills Parkway.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of lower shear-wave velocities (Vs < 300 m/s) were modelled suggesting the presence of softer/looser material in these areas; however no zones of very low shear wave velocities (Vs <200 m/s) were detected.

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 575 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface, were in general, good. The upper most layer has an average P-wave velocity of 1100 m/s with a range of 500 to 1800 m/s. This velocity range is typical for unsaturated to saturated moderately compact to dense sediments.

The median apparent P-wave velocity of the interpreted bedrock layer was on the order of 3500 m/s, with a range of 2700 m/s to 4500 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The interpreted bedrock elevation ranges from approximately 141 m at the northeast end to approximately 163 m at the southwest end of the alignment. The depth to interpreted bedrock ranged from approximately 8.5 m to 20 m below grade.

An interpreted dip in the bedrock surface is noted between chainages 1+000 to 1+200. Boreholes are recommended to better define the maximum depth and slopes of the interpreted bedrock valley at the south-west end of the seismic profile.

Areas of potentially increased bedrock weathering (based on lower seismic modelled velocities) are indicated on the drawing. Boreholes are recommended to better define the extent of weathering along the alignment.

Erin Mills Parkway – North Sidewalk

Three stationary seismic spreads with overlap were collected along the north sidewalk of Erin Mills Parkway south east of the intersection with Erin Centre Blvd.

The seismic profiles are presented in Drawing GPR-21-3017_A2 and plan view Figure 2.

The topography has been approximated and assumed flat.

The seismic shear-wave velocities suggest three layers. The uppermost layer, with velocities less than approximately 400 m/s, is interpreted as compact to dense sediments. Isolated zones of lower shear-wave velocities (Vs < 250 m/s) were modelled suggesting the presence of softer/looser material in these areas; however no zones of very low shear wave velocities (Vs <180m/s) were detected.

The second overburden layer, with s-wave velocities greater than 400 m/s, is interpreted as a dense to very dense till and/or heavily weathered bedrock.

The top of bedrock has been interpreted along the steepest gradient of the s-wave velocity model. This corresponds to a velocity contour of approximately 600 m/s.

The model shear-wave velocities at depth have not been constrained with compressional wave or borehole data.

The quality of the compressional (P) wave arrivals for the bedrock surface were good. The upper most layer has an average P-wave velocity of 360 m/s with a range of 330 to 480 m/s. This velocity range is typical for unsaturated compact sediments. A second overburden layer, with a velocity of approximately 1100 to 1300 m/s is interpreted as water saturated sediments or a denser till material.

The P-wave velocity of the interpreted bedrock layer was on the order of 3400 m/s to 3600 m/s. This velocity is typical for moderately weathered to competent shale bedrock. An inherent limitation of the seismic refraction method is that velocity inversions (low velocity material deeper than higher velocity material) will not be detected. As such, the P-wave velocity data is essentially limited to mapping the top of the densest material near surface.

The depth below grade to interpreted bedrock ranged from approximately 10 m to 7.5 m near the central area. The elevation was assumed flat.

Boreholes are recommended to better define the degree of potential weathering.

!") & 8

Alignment	BH ID	Chainage	Easting	Northing	Comments
Erin Centre Blvd	BH-EC1	0+360	604412	4824996	Potential Increased Bedrock Weathering
Erin Centre Blvd	BH-EC2	0+470	604376	4824892	Potential Dip in Bedrock
Erin Centre Blvd	BH-EC3	0+805	604399	4824559	Potential Dip in Bedrock
Erin Centre Blvd	BH-EC4	0+975	604361	4824395	Suspected Bedrock Valley
Erin Centre Blvd	BH-EC5	1+035	604335	4824342	Suspected Bedrock Valley
Erin Centre Blvd	BH-EC6	1+085	604315	4824296	Suspected Bedrock Valley
Erin Centre Blvd	BH-EC7	1+135	604293	4824255	Suspected Bedrock Valley
Erin Centre Blvd	BH-EC8	1+220	604257	4824180	Suspected Bedrock Valley
Erin Centre Blvd	BH-EC9	-0+095	604738	4825288	Gap in Data
Erin Centre Blvd	BH-EC10	-0+010	604662	4825253	Existing Creek/surficial valley
Erin Mills Pkwy	BH-EM1	0+005	604172	4823994	Potential Increased Bedrock Weathering

4 CONCLUSIONS & RECOMMENDATIONS

Seismic refraction and MASW interpretation techniques were performed on common data sets along segments of Erin Centre Blvd and along the north sidewalk of Erin Mills Pkwy as a component of the West Trunk Diversions Project, City of Mississauga, ON.

Seismic data were collected over a total length of approximately 1.5 km. The chainages are relative to the starting point of the seismic data. If a standardized project chainage is established, the seismic chainages can be converted.

The newly acquired data does not extend fully to Mississauga Rd. primarily due to logistical reasons, namely, the permit requirement to maintain parking lot access and not working within the intersection of Mississauga Rd. Methodologically, the seismic streamer extends approximately 74m (-0+75m) before the 0+00 chainage indicated in Figure 2 with the first readings from the MASW data set being approximately at -0+35m. The data prior to this chainage has been interpolated with respect to depths to the data collected previously along Mississauga Rd. (2019 survey).

The results of the 2D MASW and refraction tomography modelling are presented in Drawings GPR-21-3017_A2 and GPR-21-3017_A2. The corresponding plan view plots are presented as in Figure 2. The base maps (Google Earth images) are presented for references purposes only. The topography/elevations is based on DGPS readings and is estimated to be accurate to +/- 1.5m

The MASW results are presented as colour contoured plots of S-wave velocities. The accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The accuracy of the modelled shear-wave velocities within the bedrock are typically higher. The resolution decreases with depth and will be horizontally smoothed/interpolated. The accuracy of the interpreted layer contacts with the MASW method is on the order of +/- 10 % to 15%. The estimated error will be higher for contacts between materials of lower velocity contrast (e.g. dense till over weathered shale).

The seismic refraction data are presented as colour contoured plots of the refraction tomography models. The refraction models are based on apparent velocities as opposed to true velocities as data were collected in one direction only.

The interpreted geological profile is based on the combined S-wave and P-wave velocity models.

Project specific borehole data were not available at the time of interpretation. When additional borehole data becomes available it can be used to further refine the interpreted bedrock profile based on the seismic velocities. In particular, the slopes of the interpreted valley features along Erin Centre Blvd. This interpreted valley corresponds well with a similar feature noted along Eglinton Ave W during a previous phase seismic survey.

Table 3 provides a list of suggested borehole locations based on interpretation of the modelled seismic velocities. These boreholes would be in addition to, or provide a focus to, a standard drilling program. Note that the proposed borehole coordinates are provided without consideration for factors that must be considered prior to drilling including utilities, infrastructure and other logistical issues.

Areas where bedrock weathering may extend to deeper than typical depths are indicated in the drawings.

Cross-hole and down-hole seismic methods provide direct measurements of the shear-wave velocity (as opposed to modelled velocities obtained through the MASW method) and will have better resolution at depth. If more accurate wave velocities are required, it is recommended that down-hole seismic tests are performed as a component of an intrusive drilling program. Borehole geophysical tools, including optical and acoustic televiewers, can be used to provide additional insights in to the bedrock geology.

This report has been written by Ben McClement, P.Eng.

Ben McClement, P.Eng.
Geophysicist

LICENSED PROFESSIONAL ENGINEER
R.B. McCLEMENT
PROVINCE OF ONTARIO

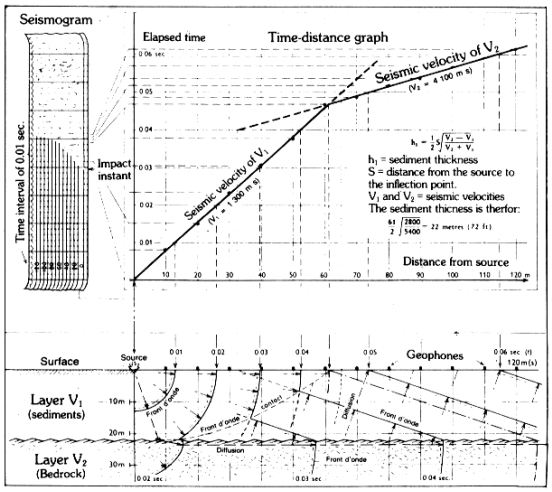
APPENDIX A

Seismic Methodology Fact Sheets

SEISMIC REFRACTION

Seismic refraction consists of recording the length of time taken for an artificially provoked surface vibration to propagate through the earth. By processing the data, the seismic velocities and depths of the underlying rock layers can be determined. These velocities are characteristic of the nature and quality of the bedrock; a fissured, fractured or sheared rock will be characterized by reduced seismic velocities.

The method is generally used to obtain a better geological analysis of the sub-surface and to determine the following characteristics: the quality, profile and depth of bedrock, its nature, degree of alteration and any other physical contrasts. Seismic refraction ensures that maximum information may be gained from geological field work, and that direct investment costs (drilling, excavation), will be reduced.



PRINCIPLE OF SEISMIC REFRACTION

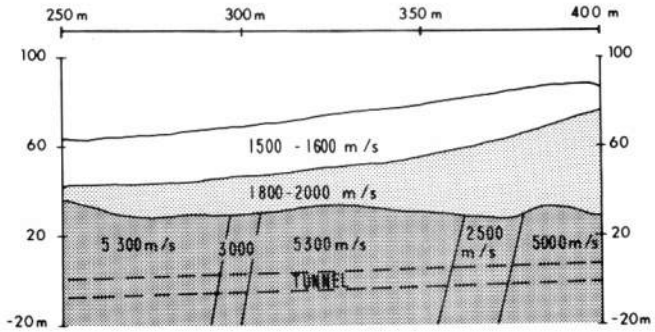
FEATURES

- Precise determination of soil thickness .
- Precise determination of the seismic velocities (rock type and quality).
- Localization and identification of geological units.
- Detailed analysis of soil.
- Year-round use.
- Sea and land surveys (above and below ground).
- Great accessibility possible to rough terrain and remote regions.

AREAS OF APPLICATION

Civil Engineering/Mining Exploration - Exploitation/Petroleum and Gas Sectors/ Geotechnology/Geology/ Hydrology.

- Identification of faults, fractures, shear zones.
- Detection of rock differences (veins, dykes, cavities, etc.).
- Determination of rock topography.
- Evaluation of volume of soil present or to be excavated.
- Excellent complement to geological mapping.
- Recognition of geophysical anomalies such as VLF, gravimetry, etc.
- Drill site selection, better target identification.
- Evaluation of the size, thickness and condition of surface shafts (mining exploitation).
- Mass Rock Quality Determination (MRQD).
- Detection of rock irregularities and breaks.
- Hydrogeology (detection of water tables, veins, reservoirs).
- Excellent complement to any geological analysis.



Interpretation results of a seismic profile

ADDITIONAL REMARKS

Geophysics GPR International Inc. has been recognized for the past fifteen years as a leader in both the application and the development of seismic methods. Seismic refraction is currently used in both civil and mining engineering; the use of lighter high-performance equipment and better tomographical interpretation of the results have contributed to its growing popularity.

GEOPHYSICS G P R INTERNATIONAL INC.

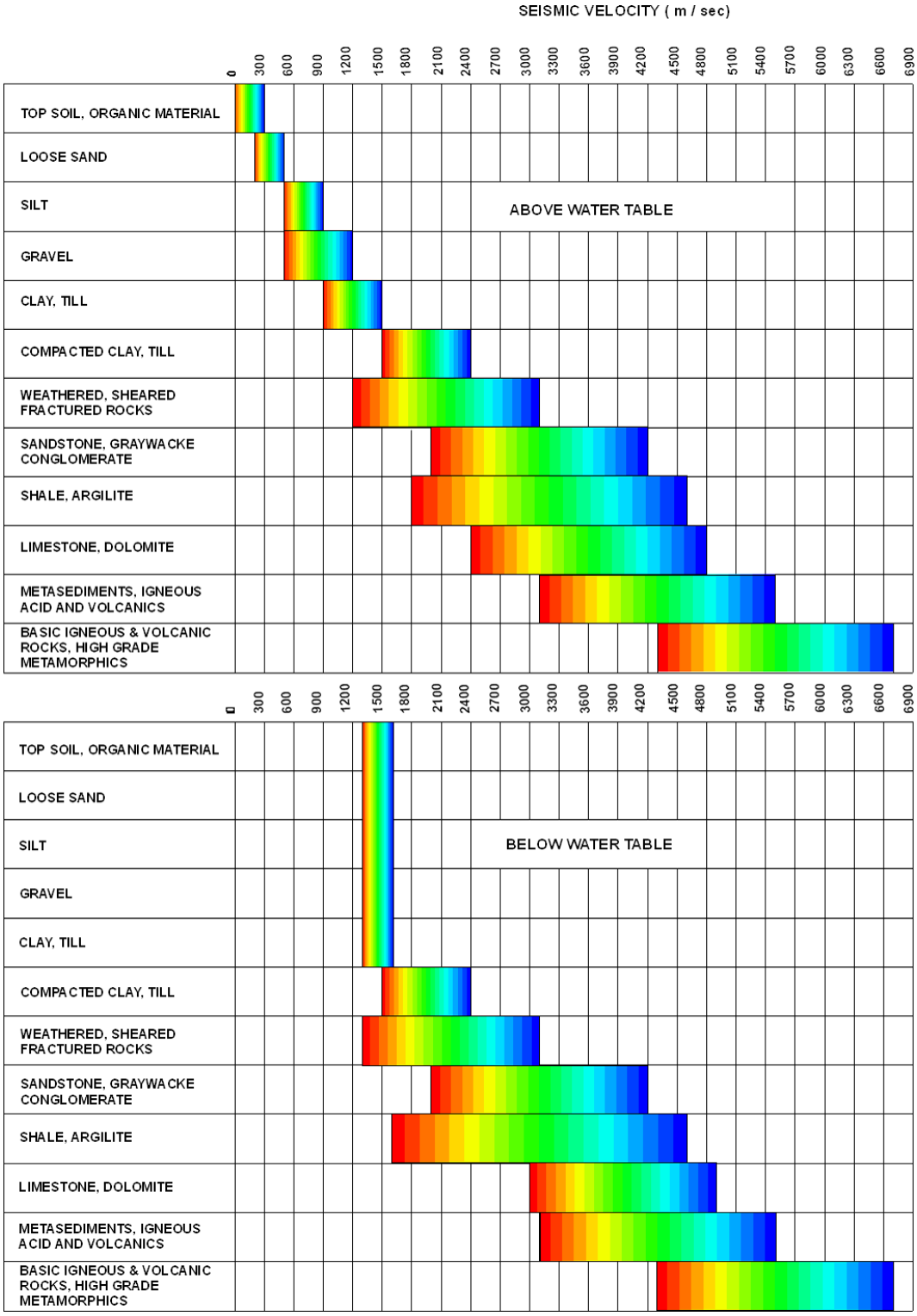
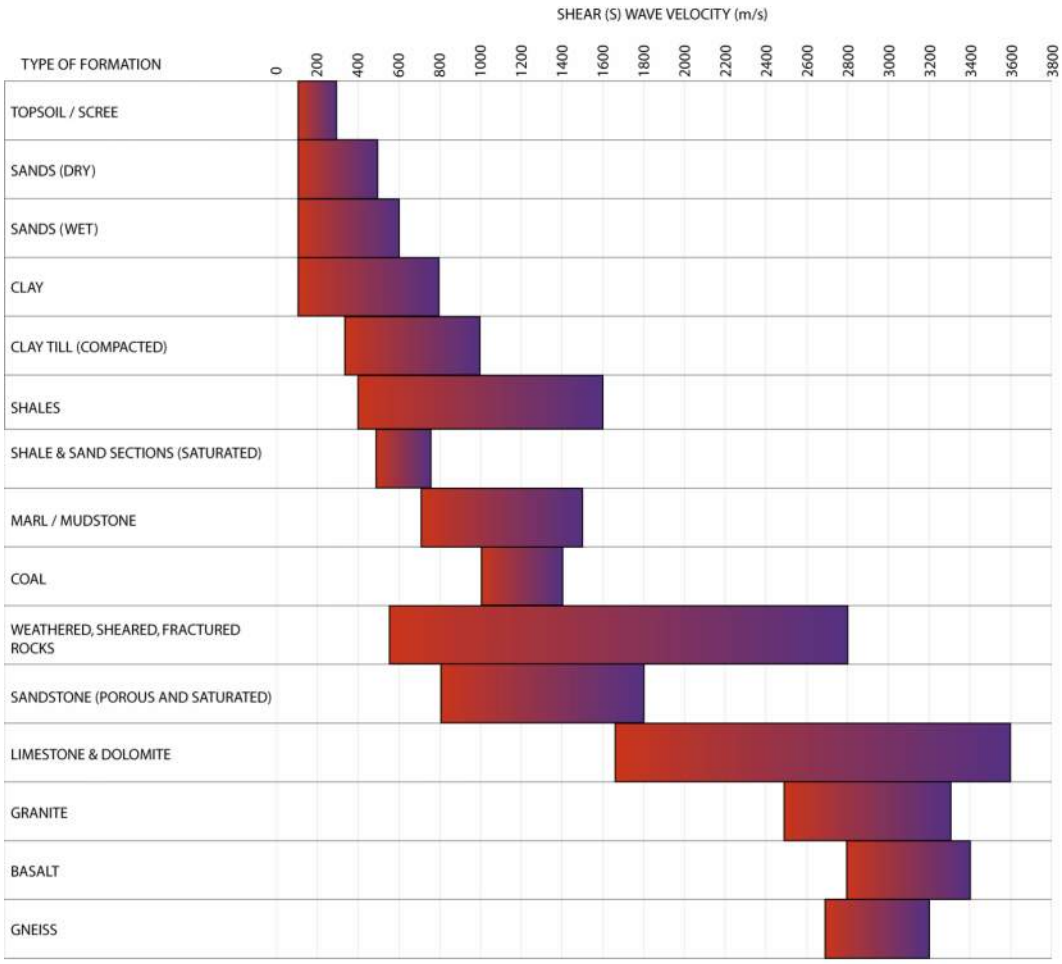


Table of P-wave velocities for given materials



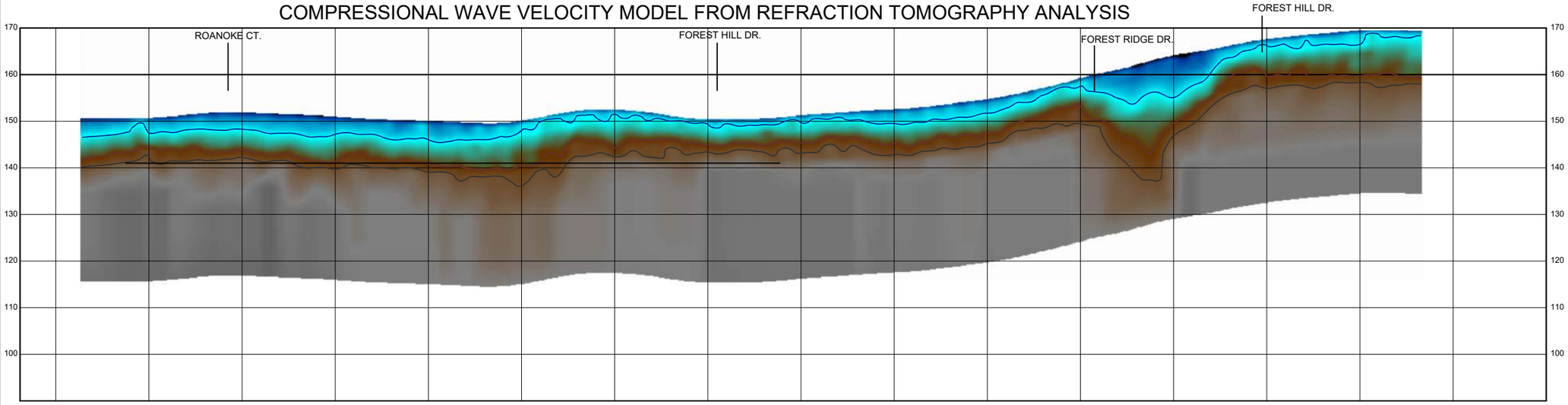
Typical rock velocities, Based on Bourbie, Coussy and Zinszner, Acoustics of Porous Media, 1987
with modifications by Geophysics GPR. Rev A.1 July 2011

Table of S-wave velocities for given materials

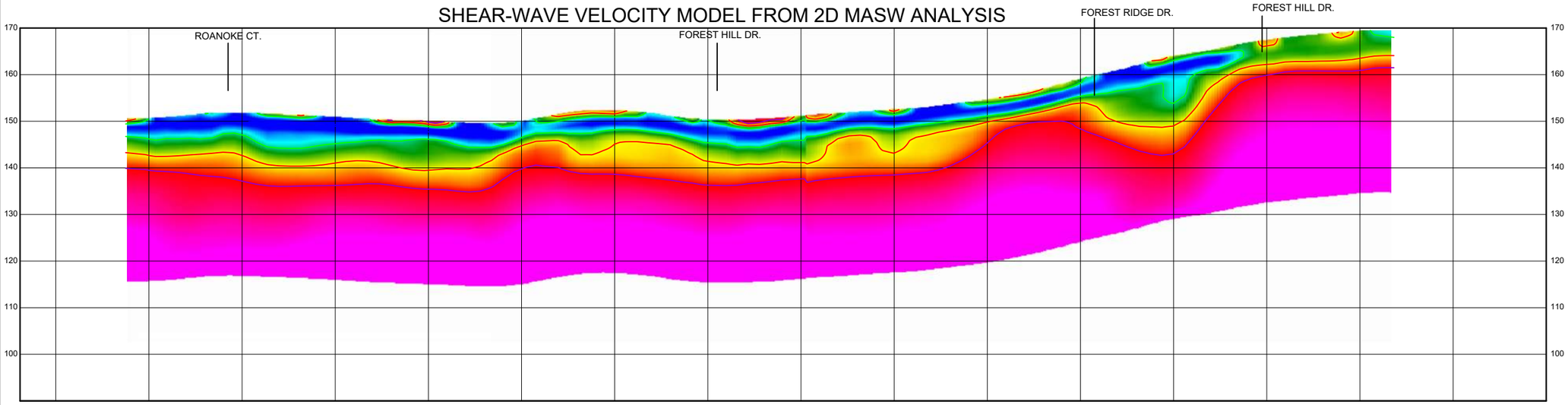
APPENDIX B

Drawings
GPR-213017_A1 (Erin Centre Blvd)
GPR-213017_A2(Erin Mills Pkwy – North Sidewalk)

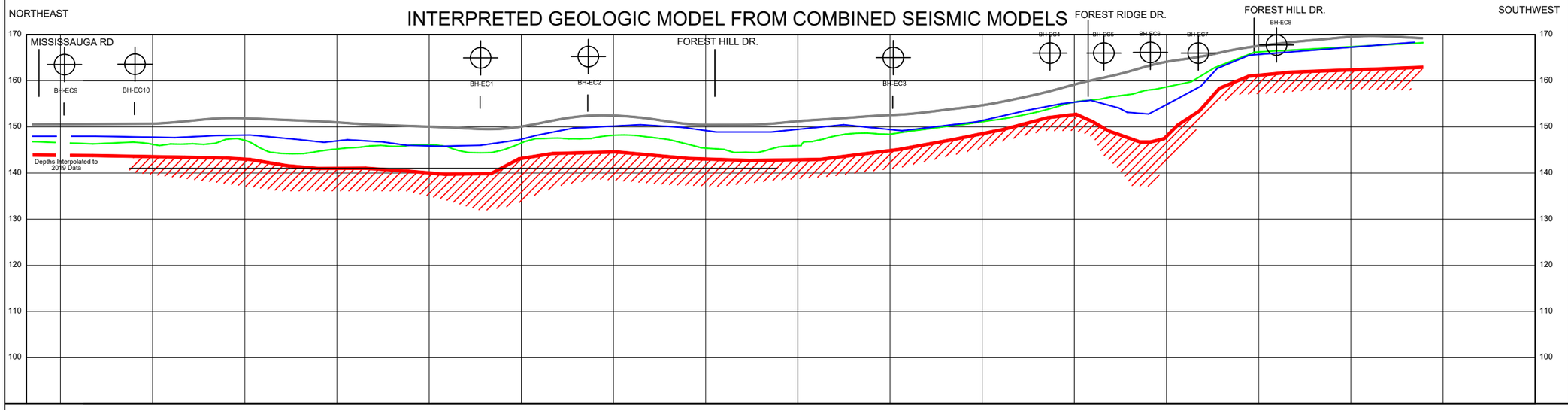
COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



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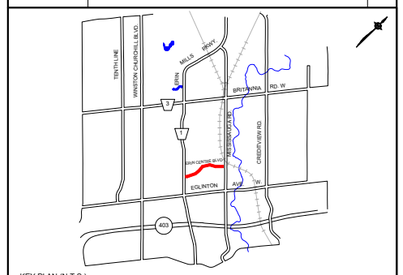
000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	EX. ROAD ELEV.
-0+100	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400		ROAD CHAINAGE

SERVICE DATA

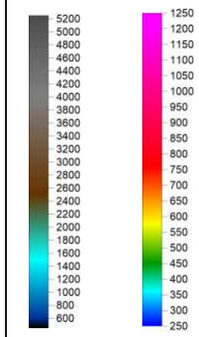
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

DATE	DETAILS	INIT.
July 20 2021	ISSUED AS DRAFT	R.B.M.
Oct 27 2021	ISSUED AS FINAL	R.B.M.



KEY PLAN (N.T.S.)



COMPRESSIONAL (P) WAVE VELOCITY (m/s)

SHEAR (S) WAVE VELOCITY (m/s)

P-wave Velocity (m/s)	General Interpreted Lithology
< 500	Soft/Loose Overburden/Fill
500 to 800	Stiff/Compact Overburden/Fill
800 to 1350	Stiff/Compact Overburden/Till or Partially Saturated Overburden
1350 to 1650	Water Saturated Overburden or Stiff/Compact Overburden/Till
1650 to 2500	Hard/Dense Overburden/Till
2500 to 3000	Very Hard/Dense Till or Weathered Bedrock
> 3000	Interpreted Bedrock

S-wave Velocity (m/s)	General Interpreted Lithology
< 200	Soft/Loose Overburden/Fill
200 to 360	Stiff/Compact Overburden/Till
360 to 560	Hard/Dense Overburden/Till
560 to 760	Very Hard/Dense Till or Weathered Bedrock
> 760	Interpreted Bedrock or Very Hard/Dense Till

NOTES

1. THE SEISMIC SURVEY WAS EXECUTED BY GEOPHYSICS GPR INTERNATIONAL INC. June 2021
2. COORDINATE SYSTEM: NAD83 UTM z 17
3. TOPOGRAPHY DATA BASED ON DGPS MEASUREMENTS PRESENTED FOR REFERENCE PURPOSES ONLY.
4. BOREHOLE DATA PROVIDED BY THE CLIENT AND PRESENTED FOR REFERENCE PURPOSES ONLY
5. BASE IMAGES PROVIDED BY THE CLIENT AND PRESENTED FOR REFERENCE PURPOSES ONLY
6. REFER TO FULL REPORT FOR DISCUSSION OF METHODOLGIES, RESULTS AND LIMITATIONS

NOT VALID FOR CONSTRUCTION

Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp=1450m/s)
- Interpreted Overburden Contact (approx. Vs=400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

ERIN CENTRE BLVD

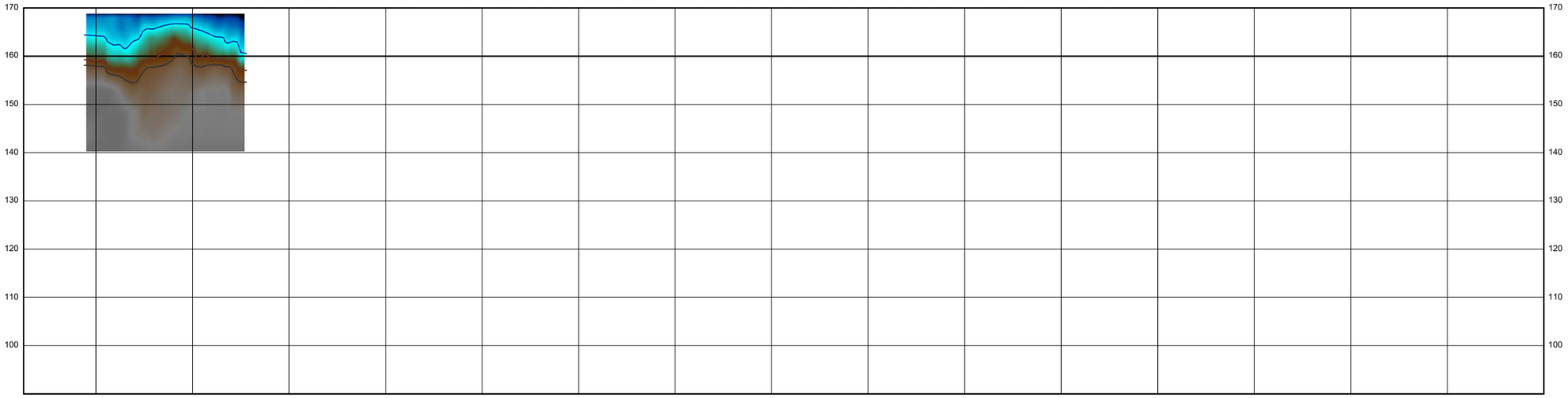
(FROM MISSISSAUGA ROAD TO ERIN MILLS PARKWAY)

GEOPHYSICAL SEISMIC SURVEY

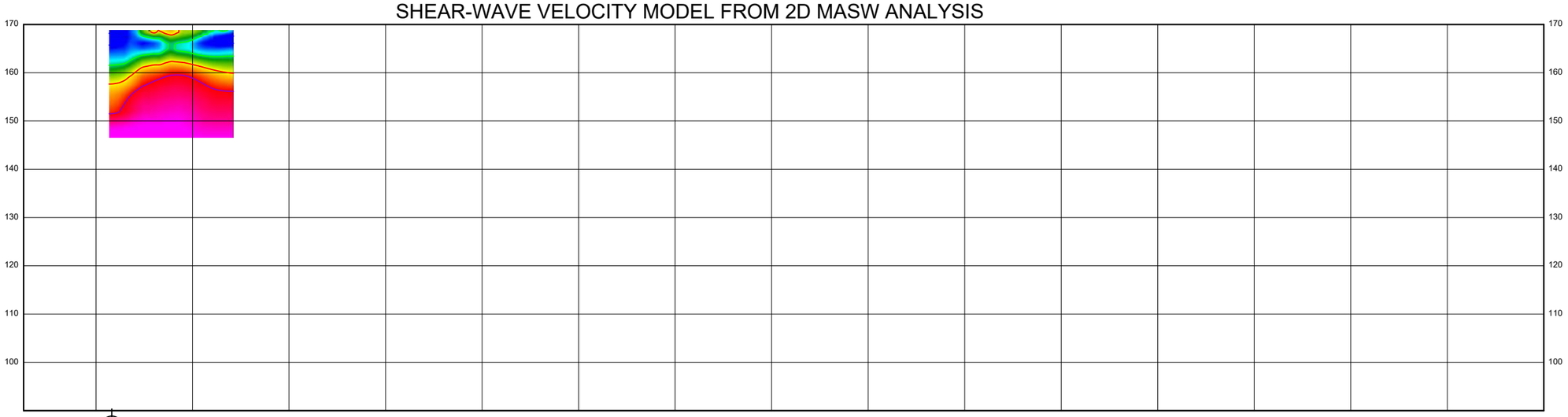
STA. 0+000 TO STA. 1+350

CAD Area	Area	Project No.	T213017
Checked by	Drawn by B.H.		
Date July 2021	Sheet 1 of 1	DRAWING:	GPR-213017_A1

COMPRESSIONAL WAVE VELOCITY MODEL FROM REFRACTION TOMOGRAPHY ANALYSIS



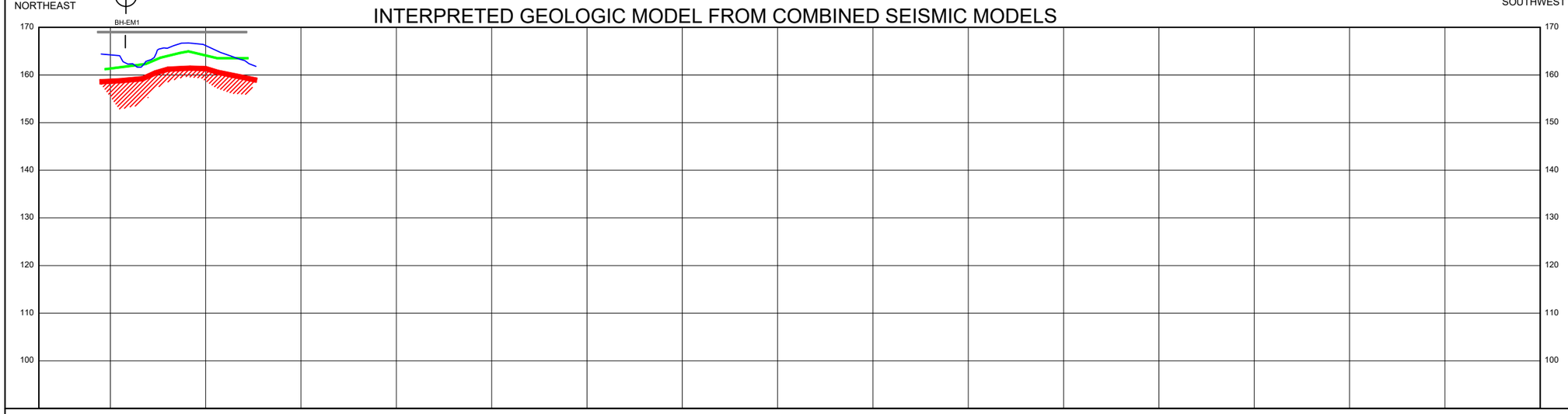
SHEAR-WAVE VELOCITY MODEL FROM 2D MASW ANALYSIS



NORTHEAST

SOUTHWEST

INTERPRETED GEOLOGIC MODEL FROM COMBINED SEISMIC MODELS



000.00	100.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	BOT.EL. OF WM.
000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	000.00	EX. ROAD ELEV.
0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700	0+800	0+900	1+000	1+100	1+200	1+300	1+400	ROAD CHAINAGE

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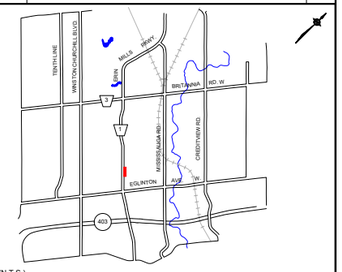
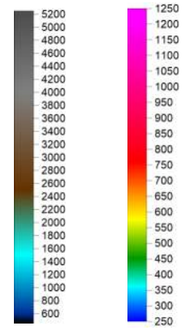


KEY PLAN (N.T.S.)



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SHEAR (S) WAVE VELOCITY (m/s)

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Sheave Velocity (m/s)	General Interpreted Lithology
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360 to 560	Hard/Dense Overburden/Till
560 to 760	Very Hard/Dense Till or Weathered Bedrock
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NOT VALID FOR CONSTRUCTION

Designed by ____ Approved by ____

Chkd. ____

LEGEND

- Topography (Approximate)
- Interpreted Top of Bedrock
- Interpreted Overburden Contact (Potential Water Table Vp=1450m/)
- Interpreted Overburden Contact (approx. Vs=400m/s)
- Potential Zone of Increased Bedrock Weathering
- Proposed/Recommended Borehole Location

50m 0 50 100 150m HORIZONTAL SCALE

10m 0 10 20 30m VERTICAL SCALE

Region of Peel
working with you

ERIN MILLS PKWY

(FROM ERIN CENTRE BLVD TO 150m EAST)

GEOPHYSICAL SEISMIC SURVEY

STA. 0+000 TO STA. 0+150

CAD Area	Area	Project No.	T213017
Checked by	Drawn by B.H.		
Date July 2021	Sheet 1 of 1	DRAWING:	GPR-213017_A2