CITY OF BRAMPTON

LAGERFELD DRIVE EXTENSION TO WEST OF MISSISSAUGA ROAD

PRELIMINARY DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY

ENVIRONMENTAL STUDY REPORT

MARCH 26, 2021 FINAL

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TYPE OF DOCUMENT
FINAL

PROJECT NO.: 141-15409-00
DATE: MARCH 26, 2021

WSP
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON
CANADA L3T 0A1

T: +1 905 882-1100
F: +1 905 882-0055
WSP.COM

March 26, 2021

FINAL

CITY OF BRAMPTON
Public Works & Engineering, City of Brampton
1975 Williams Parkway, Brampton, ON, L6S 6E5

Attention: Mr. Ghazanfar Mohammad, P. Eng., PMP

Dear Mr. Mohammad,

Subject: Environmental Study Report (ESR) for the Proposed Extension of Lagerfeld Drive to West of Mississauga Road, City of Brampton

WSP Canada Inc. (WSP) is pleased to provide City of Brampton with the Final Environmental Study Report (ESR) for the proposed Extension of Lagerfeld Drive to West of Mississauga Road, located in the City of Brampton, Ontario (the "Project").

We trust that this information is sufficient for your current needs. If you have any questions or require further information, please contact us.

Yours truly,

Daniel Nalliah, P. Eng.
Manager, Municipal Roads

WSP ref.: 141-15409-00

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THORNHILL, ON
CANADA LCANADA L3T 0A1

T: +1 905 882-1100
F: +1 905 882-0055
wsp.com

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	FINAL
Remarks	Draft for Review	Draft for Review	Draft for Review	FINAL
Date	July 10, 2020	November 03, 2020	February 3, 2021	March 26, 2021
Prepared by	Vivian Mak	Behnaz Bakhit	Behnaz Bakhit	Behnaz Bakhit
Signature		Behnaz Bakhit	Behnaz Bakhit	Behnaz Bakhit
Checked by	Andrew Roberts	Andrew Roberts	Andrew Roberts	Andrew Roberts
Signature				
Authorised by	Daniel Nalliah	Daniel Nalliah	Daniel Nalliah	Daniel Nalliah
Signature				
Project number	141-15409-00	141-15409-00	141-15409-00	141-15409-00
Report number	141-15409-00 DESR	141-15409-00 DESR	141-15409-00 ESR	141-15409-00 ESR

SIGNATURES

PREPARED BY

Behnaz Bakhit

Behnaz Bakhit
Environmental Planner

PREPARED BY

Vivian Mak
Transportation Designer

APPROVED[1] BY

Daniel Nalliah, P.Eng.
Manager, Municipal Roads

CHECKED BY

Andrew Roberts
Project Manager, Environmental

[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

EXECUTIVE SUMMARY

Background and Introduction

The City of Brampton has completed a Schedule C Municipal Class Environmental Assessment (Class EA) Study for East-West Connection (Lagerfeld Drive) extension to lands west of Mississauga Road. The study area consists of lands located within *Secondary Plan Area 51-1 Mount Pleasant* to the east and lands within *Secondary Plan Area 52 Huttonville North* to the west of Mississauga Road. The boundary roads in the vicinity of the Project Study Area are Creditview Road to the east, approximately 400 m west of Mississauga Road, Bovaird Drive to the south and CN Railway to the north.

The Environmental Study Report documents the background to the study, existing and future conditions within the study area, the need and justification for the project, the planning, design and consultation process leading to the alternative solutions, and alternative alignments and determination of the preferred alternative along with mitigation measures and future commitments.

Municipal Class EA Planning Schedule

This EA Study was conducted in accordance with the requirements of the Municipal Class Environmental Assessment process for Schedule 'C' Projects (October 2000, as amended in 2007, 2011 and 2015). Therefore, it is subject to phases 1 through 4 of the Class EA process, and that an Environmental Study Report (ESR) be prepared and filed for review by the public and review agencies. As the project described in this report involves the extension of Lagerfeld Drive from Creditview Road to west of Mississauga Road, with a construction cost of over $2.4 million, a Schedule 'C' Municipal Class EA (Phases 1 to 4) was completed for this study.

Consultation

Recognizing that public and regulatory agency consultation is a significant and integral part of the Municipal Class EA process, a consultation program was initiated from the outset of the study and continued throughout.

A wide range of stakeholders were identified and contacted at the outset of the study to scope potential issues and areas of interest or concern. Several methods were undertaken to achieve the above stated objectives, including:

- Placements of Notices of Study Commencement, Public information Centres 1 and 2 as well as Study Completion within the *Brampton Guardian*;
- Scheduling of two Public Information Centres during Phases 2 and 3 of the study;
- Distribution of informational mailings (i.e., notices) to regulatory agencies, Indigenous communities and the public during various stages of the study;
- Receiving and responding to written submissions;
- Participation in meetings and telephone discussions with regulatory agencies, utilities, and other stakeholders including development communities and the public; and
- Placement of a digital copy of this ESR on the City of Brampton website and provision of a notice of Study Completion to regulatory agencies and the public during Phase 4 of the study.

Problem/Opportunity Statement

Phase 1 of the five phased Municipal Class EA planning process requires the proponent of an undertaking (the City) to first document factors leading to the conclusion that road improvements are required, and ultimately, develop a clear statement of the identified problem to be investigated and/or opportunity to be realized.

As such, the **Problem/Opportunity** Statement is the principle starting point in the undertaking of a Municipal Class EA and becomes the central theme integrating elements of the project. It also assists in setting the scope of the project.

The Problem/Opportunity Statement for Lagerfeld Drive to west of Mississauga Road Municipal Class EA is defined as follows:

- Approved and planned growth in the study area will contribute to an increase in traffic congestion and deterioration of road conditions over the next 10 to 25 years;
- Alternative solutions to address capacity will consider opportunities to enhance the future community and facilitate sustainable modes of transportation;
- Address transportation/access needs while respecting unique environmental features and functions, including the habitat of Species at Risk, to develop a complete and sustainable community;
- Needs to support the City's endorsed Community Design Principles that include Transit Oriented Development in a strategic node around Mount Pleasant GO Station. Currently there is no direct access from Mount Pleasant GO Station, which can provide an important alternative route for bus transit vehicles and GO patrons accessing the station.
- Needs for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries.

Roadway capacity and intersection operations will deteriorate without improvements therefore:

With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031.

Without an East-West Connection there would be a lack of community connectivity, place-making and sustainable modes of travel.

The existing transportation system of roads, transit, pedestrian linkages and pathways will not adequately accommodate the mobility needs of future residents and workers in a growing community.

In order to address the above problem/opportunity, the City initiated this Municipal Class EA planning process which identifies and evaluates alternative solutions and design concepts and accordingly addresses the above problem/opportunity statement. This ESR has been prepared to determine how the proposed road improvements can be best sited, designed, constructed and operated.

Alternative Solutions to the Problem

The following planning alternatives were developed to represent a full range of options, including those which would decrease automobile demand as well as those which would increase the capacity for transportation.

1. Do Nothing
2. Transportation Demand Management (TDM)
3. Improve Transportation Operations Along Other Roads in the Network
4. Construct a Road West of Mississauga Road Only
5. Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road

The evaluation process including the various discipline's experience, knowledge and input on the alternative solutions concluded that the preferred solution to solve the current congestion, capacity and operational deficiencies should be **Alternative Solution 5** – Extend Lagerfeld Drive to west of Mississauga Road. Although Alternative Solution 4 – Construct road west of Mississauga Road only is not preferred, alternative solution 4 was also recommended by MNRF to carry forward to the next phase for further evaluation.

In accordance with Appendix I, Item 20 of the Municipal Class EA, the preferred solution will result in a Schedule 'C' undertaking because the anticipated construction costs for the extension of Lagerfeld Drive from Creditview Road and west of Mississauga Road are expected to be greater than $2.4M, the appropriate Schedule is 'C' (less than $2.4M would be a Schedule 'B' undertaking). Despite higher capital costs this option best addresses the problem statement.

The Alternative Solution 5 is recommended for the following reasons:

- Improves current and future traffic conditions;
- Provides additional transportation capacity and access;
- Improves traffic operation safety;
- Improves local sustainability;

- Facilitates direct travel for all modes of travel including transit, walking and cycling, and reduce the reliance on vehicles and the associated congestion/pressure placed on Bovaird Drive and Mississauga Road and their intersection;
- Provides connectivity to support more sustainable transportation options/trips and to integrate local neighborhoods creating compact development and active uses along complete streets in the neighbourhood;
- Provides a mid-block crossing and pedestrian-friendly community collector to facilitate multi-modal transportation users (pedestrians, cyclists, local and regional transit users);
- Best responds to the social- cultural criteria as it supports the land use policies and future development plan of the Mount Pleasant and Heritage Heights Community and supports potential commuters from communities north and/or west of Brampton;
- Provides strategic multi-modal connections linking future planned destinations including higher density land uses, employment lands and higher order transit corridors;
- Increases opportunities to fulfill objectives for complete, compact communities and economic growth due to supporting a grid-like road network (proposed as part of Heritage Heights TMP) with intercommunity connections and better direct link to Mount Pleasant GO Station;
- Despite the highest capital costs this option best addresses the problem statement; and
- Technically preferred alternative solution.

Assessment of Alternative Design Concepts

A series of initial design concepts were developed for the preferred solution at a preliminary level of detail to properly assess the potential impacts and benefits associated with each alternative. The alignments were generated along the entire corridor such that the public and property owners can provide meaningful input on the alternatives.

Five alternative design concepts were generated with sub-options for the crossing abutments to beyond or within the 30-metre Redside Dace regulated habitat.

The alternative design concepts that were developed and evaluated are shown in Table below.

Alternative Design Concepts	Description
Alternative 1A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments beyond 30m Redside Dace regulated habitat)
Alternative 1B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments within 30m Redside Dace regulated habitat)
Alternative 2	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at approximately 240m offset from Bovaird Drive centreline.
Alternative 3A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments beyond 30m Redside Dace regulated habitat)
Alternative 3B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments within 30m Redside Dace regulated habitat)
Alternative 4A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments beyond 30m Redside Dace regulated habitat)

Alternative 4B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments within 30m Redside Dace regulated habitat)
Alternative 5	Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west, at 419m offset from Bovaird Drive centreline.

The design concept Alternatives were assessed in more detail using criteria under the following categories:

1. Transportation
2. Engineering Considerations – Constructability
3. Cultural Environment
4. Social/Economic Environment
5. Natural Environmental

The preferred road alignment is **Alternative 1B**. The rationale for this alternative includes the following:

- It meets the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road.
- It will not have a queuing issue (southbound queues along Mississauga Road) as there is sufficient traffic storage distance between Bovaird Drive and the new connection for left turning vehicles onto Bovaird Drive.
- It passes Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the development areas.
- It continues Lagerfeld Drive to west of Mississauga Road which improve traffic operations in the area.
- It connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village.
- This option is expected to involve much lower structural capital costs than Design Alternative 1A.

Major Features of the Preferred Design

The preferred alternative for Lagerfeld Drive extension is to provide a basic 4 lane urban cross-section with auxiliary lanes for turning movements at Mississauga Road. On-street bike lanes are proposed on both sides. There are two structures proposed for Huttonville Creek crossings. The alignment of the East Crossing proposed is on a slight skew. It is a 1-span 38m precast 1.0m girder bridge with abutment centrelines outside of the meander belt. The bridge will impact 142 m^2 of the Redside Dace regulated habitat area.

Another crossing is proposed at Huttonville Creek just east of Mississauga Road. It will be a 2-span precast 1.0m girder bridge with a total length of 47m. It will not impact the bridge proposed at Mississauga Road under Peel Region's Mississauga Road widening project. The west side of creek is already disturbed with Mississauga Road Improvements so the road impacts will not be included. There will only be piers within the Redside Dace regulated habitat area.

Mitigation Measures

The overall conclusion drawn from this ESR is that construction of the Lagerfeld Drive can be achieved with minimal disruption to, and impact upon the natural, physical, socio-economic and cultural environment. The principal negative impacts will include:

- Potential impacts to ESA regulated habitat for endangered Redside Dace;
- Potential impact on terrestrialvegetation (e.g. Huttonville Creek);
- Moderate potential for impacts to known heritage and cultural landscape features;
- Potential impact on private properties to accommodate the new east-west connection;
- Moderate potential to impact existing minor and major services/utilities; and
- High potential to support existing and future City and Regional development plans for North Brampton.

Subject to provincial policies including Guidance for development activities in Redside Dace protected habitat (MNRF, 2016), an Overall Benefit Permit per the Endangered Species Act will be required at the detailed design phase of the project. During the detailed design phase of the project, the City will apply for an Overall Benefit Permit that is expected to be above and beyond the normal requirements.

The significance of these effects can be mitigated through the measures prescribed in this report, along with the use of standard design measures and Best Management Practices (BMP).

Approvals and Permits

To implement the Preferred Design, a number of approvals and permits are required from the provincial, federal, municipal and utility companies. During detail design phase of the work, the City of Brampton will work with relevant authorities to ensure that the proposed works are acceptable and to obtain the required permits.

Preliminary Cost Estimate

The overall preliminary construction cost estimate for the Brampton Lagerfeld Drive extension is $32,287,266. The estimate cost for works affecting Mississauga Road is approximately $1,096,000 and is included in the overall cost estimate.

Future Commitments

Section 10 of the ESR outlines the future commitments to mitigate negative effects that may arise from the proposed works and all aspects that should be considered in detailed design phase.

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1 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

WSP Canada Inc. was retained by the City of Brampton to undertake the Municipal Class Environmental Assessment (MCEA) for East – West Connection (Lagerfeld Drive) extension to lands west of Mississauga Road. The study was initiated following the requirements for Schedule C projects as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment (2000, as amended in 2007, 2011 and 2015).

It should be noted that the East-West Connection is referred to as Lagerfeld Drive throughout the report where E-W connector and/or Station Road is written.

The study area consists of lands located within *Secondary Plan Area 51-1 Mount Pleasant* to the east and lands within *Secondary Plan Area 52 Huttonville North* to the west of Mississauga Road. Part of the study area, the sector known as Heritage Heights is located west of Mississauga Road. This area was designated by the City of Brampton for urban expansion and to accommodate a portion of its future growth. Lands located further west have no secondary plan currently in force, and are subject to policies as set out in the Region of Peel and City Official Plans for the protection of a north-south transportation corridor facility as identified in the City's Transportation Master Plan (TMP), and the Halton Peel Boundary Area Transportation Study. This study area also coincides with the GTA West Corridor Transportation Development Strategy Preliminary Route Planning Study area.

Lagerfeld Drive extension is subject to the MCEA process outlined for Schedule "C" projects, to adequately address the technical and environmental needs of this project. Therefore, it is subject to Phases 1 through 4 of the Class EA process, and that an environmental Study Report (ESR) be prepared and filed for review by the public and review agencies. This Environmental Study Report (ESR) documents Phases 1 through 4 of the Class EA.

The study examines the needs and justification, alternative solutions, and alternative alignments for Lagerfeld Drive to west of Mississauga Road and identifies the effects on the environment for the alternative designs and determination of the preferred alternative along with impacts and mitigation measures. The approximate limits of the study area are shown in **Figure 1-1**. The boundary roads in the vicinity of the Project Study Area are Creditview Road to the east, approximately 400 m west of Mississauga Road, Bovaird Drive to the south and CN Railway to the north.

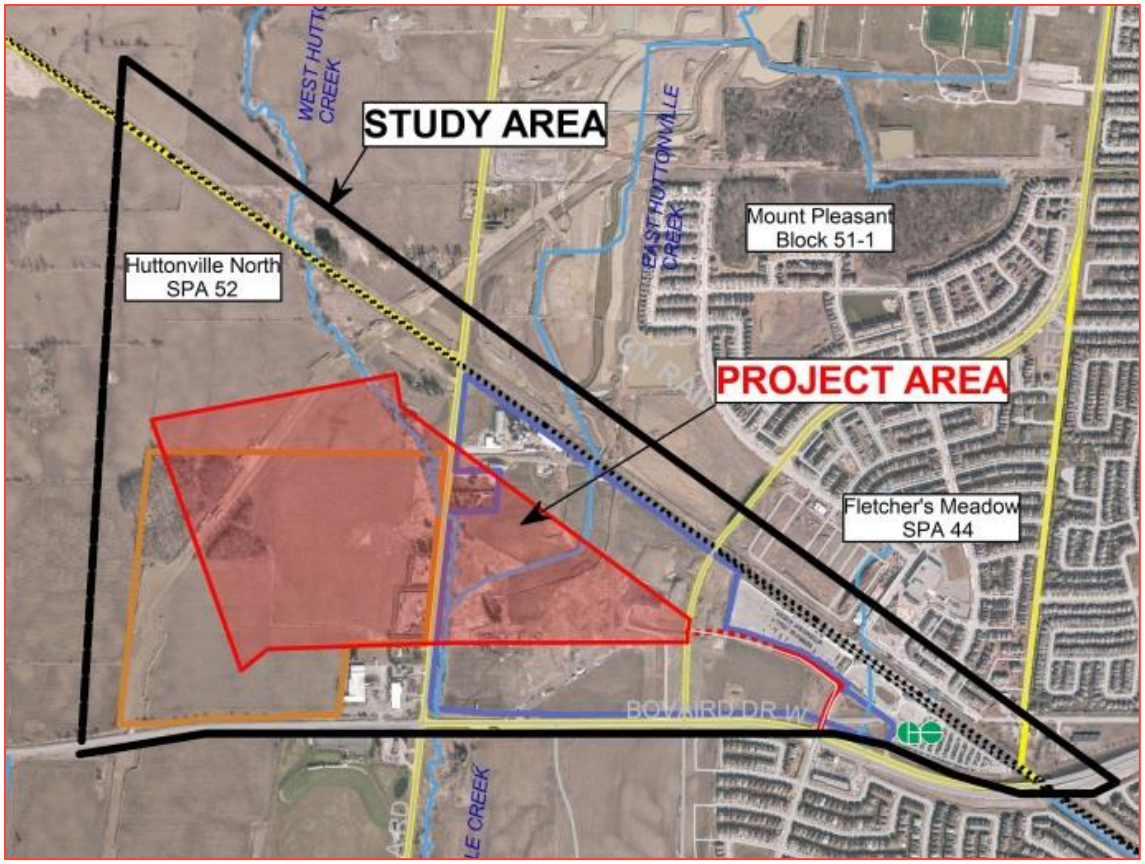


Figure 1-1: Project Study Area

The Environmental Study Report (ESR) documents the background to the study and existing and future conditions within the study area and examines the need and feasibility for implementing an east-west collector road by connecting the existing Mount Pleasant GO Station access road to lands west of Mississauga Road and north of Bovaird Drive to address short and long-term issues related to planned future growth as well as operational and capacity constraints. In order to best address these needs, the study explored a number of alternative solutions, alignment alternatives, as well as the impact of such alignments on social and natural environments. This report chronicles the planning, design and consultation process leading to the preferred alternative, anticipated positive and negative impacts, and proposed mitigation.

1.2 STUDY OBJECTIVES

This report was prepared to meet the requirements of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Class EA) document (October 2000, as amended in 2007, 2011 and 2015). The report combines all phases of the planning process under one cover and incorporates steps considered essential for compliance with the requirements of the *Environmental Assessment Act (EAA)*.

The purpose of this Municipal Class EA Study is to provide a comprehensive and environmentally sound planning process which is open to public participation to meet the following objectives:

- Accommodate existing and future traffic growth resulting from development and population increases;
- Accommodate pedestrian, cyclist and transit movements through the corridor;
- Improve access delineation and management;

- Accommodate future transportation network improvements such as the Halton-Peel Freeway Option as the preferred North-South Transportation Corridor (NSTC)[2], GTA West, and the Norval By-Pass; and
- Support regional transit system expansion along the corridor.

1.3 STUDY TEAM

WSP: Lead Consultant, responsible for Project Management, Class EA process, Facilitation, Roadway Engineering, Traffic Modelling and Analysis, Traffic Safety, Structural Engineering, Drainage and Stormwater Management, Geotechnical Investigation and Assessment, Landscape Architecture, and factor specific assessments including Natural Sciences (Fisheries, Terrestrial, Wildlife), Hydrogeology, Noise, and Contaminated Soil.

Moon Matz Ltd.: Responsible for the Roadway Electrical/Illumination Design.

Water's Edge: Responsible for the Meander Belt Assessment.

1.4 STUDY PROCESS

The Municipal Class EA planning process approved under the Environmental Assessment Act (EA Act) was followed for this project. The Municipal Class EA allows City of Brampton to meet the requirements of the EA Act for municipal infrastructure projects without having to either undertake an Individual EA or request a specific exemption for the project. Municipal projects addressed by the Municipal Class EA may be implemented without further approval under the EA Act, provided the approved Municipal Class EA planning process was carried out.

1.4.1 MUNICIPAL CLASS EA SCHEDULES

The MCEA provides the framework for environmental assessment planning of municipal infrastructure projects to fulfill the requirements of the EA Act. MCEA projects are generally limited in scale and have a predictable range of environmental effects and applicable mitigation measures.

The MCEA outlines a comprehensive approach to consider the environmental and technical advantages and disadvantages of alternatives in order to determine a preferred alternative for addressing the problem (or opportunity), as well as consultation with agencies, directly affected stakeholders and the public throughout the process.

Key components of EA planning include:

- Consultation early and throughout the process;
- A reasonable range of alternatives;
- Consideration of effects on the environment and ways to avoid/reduce impacts;
- A systematic evaluation of alternatives;
- Clear documentation; and

[2] The Halton-Peel Boundary Area Transportation Study (HPBATS) identified the Halton-Peel Freeway Option as the preferred North-South Transportation Corridor (NSTC). Please refer to section 4.1.6 for further details

- Traceable decision-making.

Since projects undertaken by municipalities vary in their potential environmental effects, the MCEA classifies the projects into four schedules according to their potential environmental significance:

- **Schedule 'A':** projects that are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved and may proceed directly to Phase 5 for implementation without following the full MCEA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities.
- **Schedule 'A+':** projects are similar to Schedule 'A' projects, however, have the requirement for the public to be advised prior to project implementation. These projects are pre-approved and may proceed directly to Phase 5 for implementation without following the full MCEA planning process.
- **Schedule 'B':** projects that have the potential for some adverse environmental effects including improvements and minor expansions of existing facilities. Schedule B projects require proponents to undertake a screening process (Phases 1 and 2), which includes mandatory contact with directly affected public and relevant review agencies to ensure that they are aware of the project and that their concerns are addressed. Schedule 'B' projects require that a Project File be prepared and submitted for review by the public and review agencies. If there are no outstanding concerns, then the municipality may proceed to Phase 5 for implementation.
- **Schedule 'C':** projects that have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the MCEA Document (Phases 1 to 4). Schedule 'C' projects require that an Environmental Study Report (ESR) be prepared and submitted for review by the public and review agencies. If there are no outstanding concerns, then the municipality may proceed to Phase 5 for implementation.

1.4.1.1 *SCHEDULE C CLASSIFICATION*

This project is classified as a Schedule 'C' undertaking according to the Municipal Class EA (October 2000 and amended in 2007, 2011 and 2015). A Schedule 'C' undertaking must fulfill the first four phases of the MEA Class EA process before moving on to the fifth phase, implementation. The Class EA planning phases undertaken for this study are listed below.

Phase 1: Identify the Problem / Opportunity

This phase involves not only identifying the problem/opportunity, but also describing it in sufficient detail to formulate a clear problem/opportunity statement.

Phase 2: Identify and Evaluate Alternative Solutions to the Problem/Opportunity

This phase involves undertaking the following six steps:

- Identify reasonable alternative solutions to the problem/opportunity;
- Prepare a general inventory of the existing natural, social and economic environments in which the project is to occur;
- Identify the net positive and negative effects of each alternative solution including mitigating measures, where possible;
- Evaluate the alternative solutions and identify a recommended solution;
- Consult with review agencies and the public to solicit comment and input; and
- Select/confirm the preferred solution.

Phase 3: Identification/Evaluation of the Design Alternatives for Implementing the Preferred Solution

This phase involves undertaking the following six steps:

- Identify alternative design concepts for implementing the preferred solution;

- Prepare a detailed inventory of the existing natural, social and economic environments;
- Identify the net positive and negative effects of each alternative solution including mitigating measures, where possible;
- Evaluate the alternative design concepts and identify a recommended design;
- Consult with review agencies and the public to solicit comment and input; and
- Select/confirm the preferred design concept.

Phase 4: Prepare and Submit an Environmental Study Report for Review by the Public and Review Agencies

Following completion of Phase 3, an Environmental Study Report (ESR) is prepared and placed on public record for a mandatory review period of at least 30 calendar days to allow for review by agencies, stakeholders and the public.

During this review period, concerned individuals have the right to request a Part II Order under the EA Act before the project may proceed to implementation. A Part II Order would elevate a Schedule C project and require that an Individual EA be carried out, documented, and submitted to the Minister of the Environment for review and approval. The decision on whether the project should be subject to a Part II Order rests with the Minister of the Environment. In addition, the Minister of the Environment may deny the Part II Order but attach a condition to the denial.

Once the public review period has expired and if there are no outstanding Part II Order requests, the City of Brampton may proceed to the final phase of the planning and design process, Phase 5, Implementation.

Phase 5: Complete Contract Drawings and Documents and Proceed to Construct, Operate, and Monitor the Project

This phase involves completing contract drawings and tender documents, incorporating the recommended solution and mitigating measures identified during the previous phases of the process. Once contracts are awarded, construction can take place and the project is implemented. Any monitoring programs identified during the Class EA shall be undertaken to ensure that the environmental provisions and commitments made during the process are fulfilled and effective.

MANDATORY PRINCIPLES

The planning process followed not only adheres to the guidelines outlined by the Municipal Class EA document but reflects the following five mandatory principles of Class EA planning under the EA Act:

- Consultation with affected parties early on and throughout the process, such that the planning process is a co-operative venture;
- Consideration of a reasonable range of alternatives, both the functionally different alternatives to the project (known as alternative solutions) and the alternative methods of implementing the preferred solution;
- Identification and consideration of the effects of each alternative on all aspects of the environment;
- Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and
- Provision of clear and complete documentation of the planning process followed, to allow ‘traceability’ of decision-making with respect to the project.

Following these five principles ensures that the Class EA process is devoted to the prevention of problems and environmental damage through planning and decision-making, recognizing that research and evaluation of possible impacts have been considered prior to implementation of the project. **Figure 1-2** provides an overview of the MCEA process, including the Lagerfeld Drive Class EA study.

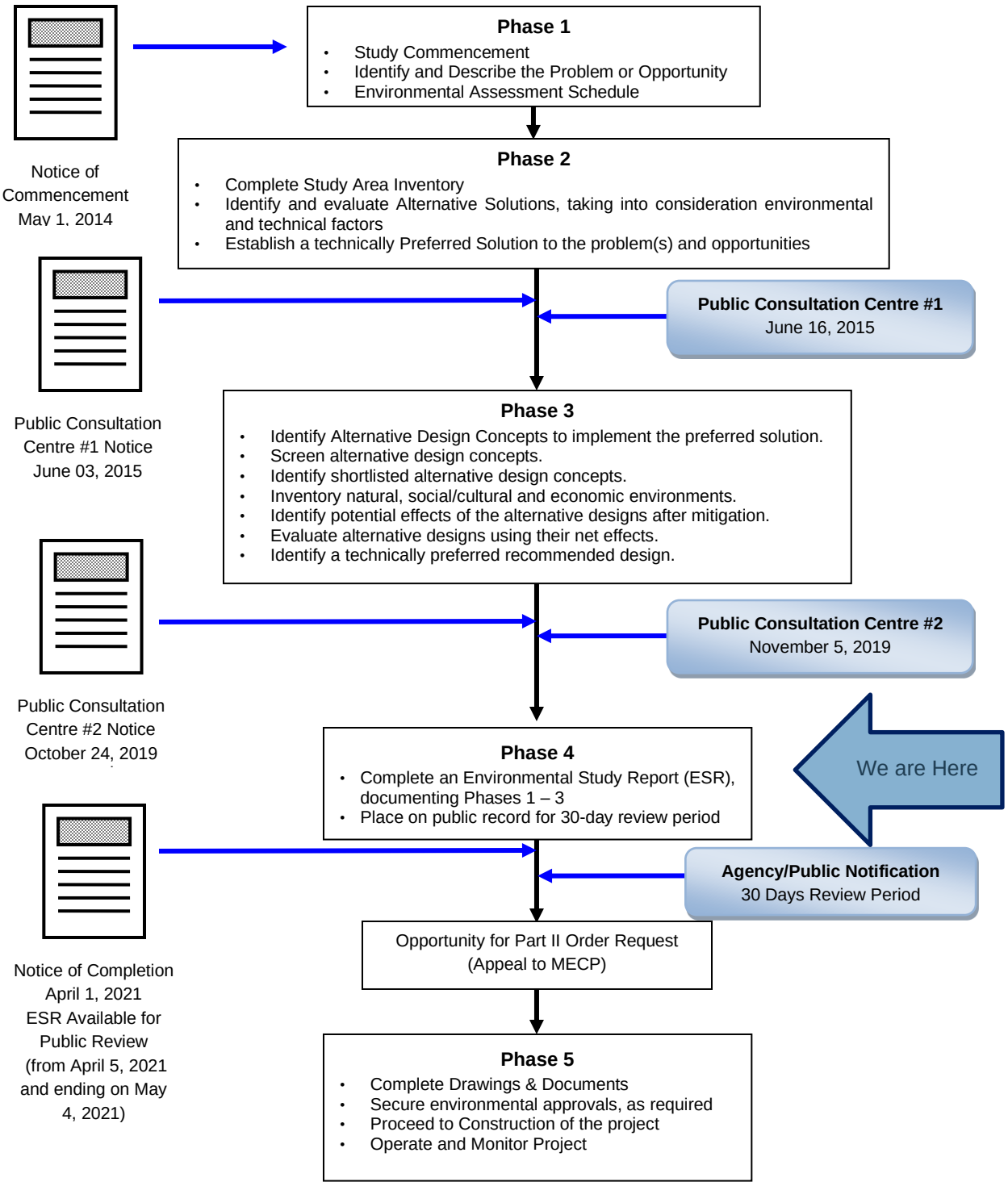


Figure 1-2: Class EA Overview

1.4.1.2 *COMMUNICIATIONS AND CONSULTATION PROGRAM*

Consultation was an integral part of the study process. Throughout the course of the study, opportunities for public, municipal, agency and Indigenous community input were provided at key project milestones, as the Project Team recognized the important role that input from all stakeholders plays in the successful completion of any transportation study.

One of the primary objectives of this study was to promote, from the earliest planning stages, the making of decisions only after considering the potential environmental impacts. Consultation with affected parties played an important role in this regard, in terms of identifying potential environmental impacts, and providing a medium to communicate the Project Team's findings to stakeholders.

There are five key features, which translate into a successful planning study. They are:

- Early consultation with affected parties;
- Consideration of all reasonable alternatives;
- Consideration of all aspects of the environment (i.e. natural, social, economic, and cultural) as well as transportation considerations and cost;
- Systematic evaluation of net environmental effects; and
- Clear and complete documentation of the planning process.

The consultation process developed for this study assisted in achieving each of these key features. The study was organized such that affected parties were:

- Involved throughout the study at appropriate times;
- Provided access to information;
- Provided sufficient time to respond to questions and data requests; and
- Encouraged to participate in an issue identification/resolution process.

During this study, members of the public, municipalities, various government agencies and other stakeholders were provided the opportunity to review and comment on the alternatives, the evaluation methodology, the recommended design and to identify concerns and comment on the proposed mitigation measures.

A mailing list of interested individuals was established and continuously updated throughout the study. The purpose of this list was to ensure that individuals who had an interest in the study were kept informed of upcoming events and the progress of the project. The list included all property owners within the study area, individuals who signed the visitor's register at the two Public Information Centres (PICs), or who contacted the Project Team directly by phone, fax or email.

The public was formally involved in the decision-making process through two PICs, which were held at project milestones. The PICs were informal drop-in centres. Project Team members were available to meet with the attendees and respond to their questions and concerns during the session.

1.4.1.3 *PUBLIC REVIEW OF THIS REPORT AND NEXT STEPS*

The documentation for this Schedule C project consists of an Environmental Study Report (ESR), which is presented as this document. Placement of the ESR for public review completes the planning and preliminary design stages of the project.

This ESR is available for public review and comment for a period of 30 calendar days starting on April 5, 2021 and ending on May 4, 2021. A public notice (Notice of Study Completion) was published on April 1, 2021 to announce commencement of the review period. To facilitate public review of this document, a digital copy of this ESR is available online on the City of Brampton website.

If, after reviewing this report, you have questions or concerns, please follow this procedure:

1. Interested persons may provide written comments to our project team by May 4, 2021. All comments and concerns should be directly sent to Ghazanfar Mohammad P.Eng., Senior Project Engineer, Infrastructure Planning Capital Works at the address below:

   Corporation of the City of Brampton
   1975 Williams Parkway
   Brampton, ON L6S 6E5
   Tel: 905 874 2130; Fax: (905) 874 2505
   Email: Ghazanfar.Mohammad@brampton.ca

2. Arrange a meeting with the above if you have significant concerns that may require more detailed explanations.

3. If you raise major concerns, the City of Brampton will attempt to resolve the issue(s). A mutually acceptable time period for this meeting will be set. If the issues remain unresolved, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

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

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

   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

   and

   Director, Environmental Assessment Branch
   Ministry of Environment, Conservation and Parks
   135 St. Clair Ave. W, 1st Floor
   Toronto ON, M4V 1P5
   EABDirector@ontario.ca

   A copy of the request must also be forwarded to the attention of Ghazanfar Mohammad at the City of Brampton at the address provided above.

Minister's Decision

With the new appeal process implemented by the amendments to the EA Act, instead of concerns being filed with the Ministry, concerns will be addressed to the proponent. The Part II Order process will only apply if the objection deals with aboriginal or treaty rights.

For all other concerns, the Part II Order process has been replaced with an additional 30-day window for the Ministry to decide if the Minister should take any action. During the additional 30 days the Minister will decide if the project will be elevated (Part II Order granted) or if it will be approved with conditions. If the Minister

advises the proponent that the project will be approved but with conditions, the Minister has more time to draft these conditions. If there is no response from the Minister within the additional 30-days the proponent may proceed with the project.

For greater certainty, the amended EA Act further advises that any undecided request for the Minister to elevate a project subject to a class EA for an order under section 16 of Part II.1 is now terminated unless the request "may prevent, mitigate or remedy adverse impacts on the existing aboriginal and treaty rights of the aboriginal peoples of Canada as recognized and affirmed in section 35 of the Constitution Act, 1982."

Two other EA Act amendments are also relevant to indigenous communities:

Non-Derogation Provision:

The amended EA Act now includes a "non-derogation provision", which states that nothing in the EA Act is intended to affect constitutionally protected aboriginal and treaty rights.

Consultation Exemption:

The amended EA Act also exempts the proposed changes to the EA Act from the minimum 30-day posting requirement and public participation process under the Environmental Bill of Rights, stating that this will ensure that these proposed changes can be implemented expeditiously in order to support economic recovery efforts. Despite this exemption, the government has stated that it intends to consult with the public, Indigenous communities and stakeholders on new regulations to implement the amended EA Act.

In sum, in the course of approving projects, the Government of Ontario has an obligation to consult and accommodate Indigenous communities in accordance with section 35 of the Constitution Act, 1982. Since the environmental impacts of projects often also affect Indigenous rights to lands and resources, the government's approval of projects with potentially adverse environmental impacts often engages Indigenous consultation rights regardless of what the EA Act does or does not prescribe.

While the full practical implications of these amendments to the EA Act remain to be seen, constitutional obligations to consult Indigenous peoples loom large over all of the Government of Ontario's recent proposed legislative and policy amendments.

If no Part II Order requests are outstanding by the end of the 30-calendar-day review period, the project is considered to have met the requirements of the EAA, and the City may proceed to subsequent phases of design and construction subject to meeting any commitments documented in this ESR and obtaining the necessary environmental approvals.

Information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. All comments, with the exception of personal information, will become part of the public record.

For further information regarding Part II Order requests, including the process and criteria, please go to:

https://www.ontario.ca/environment-and-energy/class-environmental-assessments-part-ii-order.

2 PUBLIC AND AGENCY CONSULTATION

2.1 GENERAL

Throughout the planning process, a variety of communications and consultation methods were undertaken with numerous stakeholders, including the Region of Peel, City of Brampton, Ministry of Natural Resources and Forestry (MNRF), Ministry of Environment, Conservation and Parks (MECP), Credit Valley Conservation (CVC), The Region of Peel, Alectra Utilities, CN Rail, GO Transit, Ministry of Indigenous Relations and Reconciliation, various Indigenous communities, external government review agencies, property owners including developers, consultants and other interested members of the public.

A project contact list was developed at the outset of the study consisting of external agencies, utility companies, area businesses, residents, Indigenous communities and other stakeholders. Through the consultation program, additional contacts were added, and were removed from the list. Letters and project notifications were distributed to this list by mail or e-mail to advise of the key points of contact.

Several steps were undertaken to inform the affected stakeholders about this Municipal Class EA Study, obtain their input, and address their comments or concerns as much as possible, as they arose. This was accomplished throughout the study beginning with the notification of study commencement, continuing through two Public Information Centres (PICs), and meetings with stakeholder groups (e.g. land developers).

The following means of communication was used in this study to ensure that all potentially affected and interested stakeholders were notified of the project.

- **Notices** – Notices appeared in the Brampton Guardian to announce the Study Commencement, Public Information Centre (PIC) No. 1, PIC No. 2, as well as Study Completion. These notices were also attached to the letters issued to those on the contact lists;
- **Letters** – An initial contact letter and an invitation letter to the PICs were delivered by mail to those on the master contact list including agencies, fronting landowners including residents in the study area, as well as other public stakeholders;
- **PIC Materials** – Display boards, handouts and comment sheets were produced for use during the PICs;
- **Webpage** – The City's main website was the host webpage for this project providing background information, relevant documents and contact information. The web page was updated at key milestones during the span of the project. The link for the webpage was noted on all communication materials; and
- **Environmental Study Report (ESR)** – All forms of communication and consultation with agencies and the public are included in the ESR.

Refer to **Appendices A** and **B** for copies of the letters, newspaper notices, PIC materials and correspondence.

2.1.1 STUDY COMMENCEMENT

A "Notice of Study Commencement" inviting initial input was published in the *Brampton Guardian* on April 17, 2014. The Notice of Study Commencement can be found in **Appendix A**. In addition, an initial notification letter advising of study commencement was distributed to stakeholders (e.g. the public, Indigenous Communities, municipalities, agencies, etc.) on the Project Team's mailing list.

The purpose of this notice was to:

- Identify and confirm the nature and/or extent of the study;
- Outline the planning process required under the Class EA (Schedule C); and
- Request comments from public and review agencies related to any issues, and/or concerns they had, which should be considered and/or addressed as part the work to be completed.

2.1.2 PUBLIC INFORMATION CENTRE NO. 1

The first Public Information Centre (PIC) No. 1 was held on June 16, 2015 from 6:00 pm to 8:00 pm at Peel Regional Police Association Banquet Hall located at 10675 Mississauga Road, City of Brampton, Ontario. The PIC No. 1 presentation slides can be found in **Appendix A**.

The purpose of PIC No. 1 was to provide an opportunity for review agencies, special interest groups, potentially affected property owners and the public to review the background information, problem and opportunity statement, significant study features, evaluation of alternative planning solutions, the preliminary recommended planning solution, and to meet and discuss their concerns with the project team.

In advance of PIC No. 1, a notice was mailed/e-mailed to stakeholders/agencies and mailed to all residents/property owners within 200m radius of the study area. Invitation letters were mailed to the agencies and property owners on the contact list on Tuesday, June 2, 2015. The notice of PIC No. 1 (see **Appendix A**) was placed in the Brampton Guardian (June 04 and June 11, 2015).

The venue for PIC No. 1 followed an informal open house ("drop-in" format) with display panels for the public to review. City of Brampton Staff and WSP subject matter experts were available to answer questions as needed.

In total seven (7) individuals registered (signed) as having attended the PIC No. 1 including residents, area developer representatives, and consultants that work for the area developers. Approximately 2 to 3 individuals attended PIC without registering. Individuals were offered a comment sheet, however there were no written comments provided.

In this PIC, City and WSP staff provided information about this study, the Municipal Class Environmental Assessment (EA) Process, a summary of existing conditions inventories, the needs and opportunities, the assessment criteria for evaluation and selection of the planning alternative solutions, and the next steps. The following information was presented:

- Purpose of PIC;
- Study Area and Overview;
- Roadway Characteristics;
- Study Objectives;
- Overview of the Municipal Class EA Planning Process;
- The Problem/Opportunity Statement;
- The Need for East-West Connection;
- Planning for North-West Brampton: Policy Context;
- Mount Pleasant;
- Heritage Heights;
- Policy Context;
- Existing Transit Network;
- Existing Active Transportation Network;
- Heritage Heights Proposed Networks;
- Archaeological Potential;

- Existing Natural Heritage Features;
- Traffic Analysis (Existing Conditions);
- Traffic Analysis 2021 Future Conditions (Do-Nothing);
- Traffic Analysis 2031 Future Conditions (Do-Nothing);
- Traffic Analysis 2021 Future Conditions;
- Traffic Analysis 2031 Future Conditions;
- Traffic Analysis Conclusion;
- Alternative Evaluation Criteria; and
- Next Steps and Study Contacts.

2.1.2.1 *KEY FINDINGS*

The following summarizes the common themes of the questions, comments and discussion which occurred at the PIC:

- What is the overall process and schedule for completing the EA study?
- Is Heritage Heights Secondary Plan study/project completed and what is the status?
- When are the Mississauga Road improvements/construction north of Bovaird Drive planned?
- Is the GTA West (a new transportation corridor) confirmed and will the East-West Connection road be extended west of the future GTA West Corridor?
- What are the plans (time periods) for the East-West connection road to be extended to Winston Churchill Boulevard?
- How the East-West Connection from Mount Pleasant GO Station extending west will improve capacity operations/issues along Bovaird Drive?
- Has the alignment of the East-West Connection from Mount Pleasant GO Station extending west been confirmed and will it follow what is shown on the Heritage Heights Secondary Plan maps?
- Which archaeological work has been done in the EA study?
- What are the habitat limits are for Reside Dace?
- What are the next study steps and when the second PIC will be scheduled?

2.1.3 PUBLIC INFORMATION CENTRE NO. 2

Public Information Centre No. 2 was held on November 5, 2019 from 6:00 pm to 8:00 pm at the Mount Pleasant Village Public Library (Paul Hunt Room) located at 100 Commuter Drive, Brampton, ON. The PIC No. 2 presentation slides can be found in **Appendix A**.

The purpose of PIC No. 2 was to provide an opportunity for review agencies, special interest groups, potentially affected property owners and the public to review comments received from PIC No. 1, work completed since then, evaluation of alternative design concepts including the preliminary recommended design, and to meet and discuss their concerns with the project team.

The notice of PIC No. 2 was placed in the Brampton Guardian on October 24, 2019. Invitation letters were mailed to the agencies and property owners on the contact list on October 14, 2019. Notices are shown in **Appendix A.**

The format for PIC No. 2 followed an informal “drop-in” format with display panels for the public to review. City of Brampton Staff and WSP subject matter experts were available to answer questions as needed. The following information was presented:

- Purpose of PIC No. 2;

- Study Area and Overview;
- Municipal Class EA Study Phases;
- Policy Context - Transportation Master Plan Update (2015);
- Alternative Solutions;
- Alternative Solutions – Evaluation Framework and Criteria;
- Evaluation of Alternative Solutions;
- Summary of Alternative Solutions;
- Alternative Design Concepts;
- Evaluation Criteria for Alternative Designs;
- Evaluation of Alternative Solutions;
- Evaluation of Preferred Preliminary Alternative Design Concept;
- Alternative Design Concepts – Alignment 1;
- Proposed Typical Cross Section;
- Preliminary Preferred Alternative Design; and
- Next Steps and Study Contacts.

A total of ten (10) participants signed in at the PIC with most of the attendees being property owners, or representatives from the development community. Other attendees included three (3) attendees from the City of Brampton, three (3) attendees from WSP and two (2) attendees that did not sign in. No written comments were received at the PIC.

Following the PIC No. 2, two (2) letters were received that expressed concerns regarding the alignment on the Preliminary Preferred Plan, and the necessary approaches with respect to potential impacts to built heritage resources and cultural heritage landscapes. Correspondence can be found in **Appendix B**.

2.1.3.1 *KEY FINDINGS*

The key themes and points from the verbal and written comments received included:

- No written comments were received during the PIC;
- Most of the attendees appeared to be representing the Stakeholders (e.g. land developers) in the Project Area;
- Attendees were less interested in the process as to how the Preliminary Preferred Design Alternative was selected and placed more focus on the specific impacts to their land interests and development applications. The roll plan provided was the basis for these discussions;
- Verbal comments were generally positive regarding progress on the study;
- Comments were received regarding the timeline for completion of the EA, and the anticipated schedule for construction;
- Verbal comments were received regarding the following non-Project related concerns;
  - Lack of parking and issues at the Mt Pleasant GO Station;
  - Status of the Region of Peel's Mississauga Road EA and construction schedule of the railway overpass;
  - The alignment west of Mississauga Road was commented including timing for the presumed additional extension.

2.1.4 STUDY COMPLETION

The Notice of Study Completion was published on the City of Brampton at www.brampton.ca/LagerfeldDriveEA and Brampton Guardian newspaper on April 1, 2021. Letters along with a Notice were sent to agencies, Indigenous communities, and property owners on the mailing list advising them of the location and dates that this ESR will be on public review. A Notice of Study Completion can be found in **Appendix A**.

Comments received during the 30-day review period will be collected by the City and accordingly addressed and documented. All correspondence received during the 30-day review period; including any Part II Order Requests will be appended to this ESR.

2.1.5 AGENCY CONSULTATION

External agencies (including regulatory/review agencies, community interest groups, utilities and emergency service providers) were first notified of this study through written correspondence at the key milestones. These agencies included:

Utilities:

Enbridge

Brampton Hydro (Alectra Utilities) and Hydro One Networks

Provincial Government Agencies:

Ministry of Environment, Conservation and Parks

Ministry of Natural Resources and Forestry

Credit Valley Conservation Authority

Federal Government Agencies:

CNR and Go Transit

TransCanada Pipelines

District School Boards:

Peel District School Board

Municipalities:

Region of Peel

In addition to the study notification, the Project Team consulted with the Ministry of Natural Resources and Forestry (MNRF), Ministry of Environment, Conservation and Parks (MECP), Credit Valley Conservation (CVC), Region of Peel and City of Brampton. A summary of meetings held with different agencies is outlined in **Table 2-1**. Minutes of meetings can be found in **Appendix B**.

Table 2-1: Agency Minutes of Meetings

DATE	AGENCY	PURPOSE
5 September 2014	Peel Region	City of Brampton and WSP met with the Region of Peel to go through the project team, roles, Study background and project details, project work plan and Municipal Class EA process and study schedule.

19 March 2014	City of Brampton	City of Brampton met with WSP and MNRF to discuss a project understanding and approach, cost schedules, transportation and traffic analysis, and communications. Next step, WSP will prepare and issue Notice of Study Commencement and also prepare a project contact (stakeholders, agencies, utilities) list.
11 September 2015	Peel Region	City of Brampton met with the Region of Peel and their consultant (R.V. Anderson Associates Ltd.) and WSP. The purpose of this meeting was to discuss WSP's traffic report and address Regional and City comments, and secondly to meet the Region's consultant (R.V. Anderson Associates Ltd.) recently appointed for Mississauga Road detail design and discusses opportunities for cooperation for these 2 ongoing projects including WSP's conceptual alignments for east-west road crossing Mississauga Road.
10 December 2015	Peel Region	City of Brampton met with the Region of Peel and WSP to go through the four conceptual design alternatives prepared by WSP as well as review the evaluation criteria for the EA. Also, the objective was to receive input from the Region of Peel on their ongoing detailed design of the Mississauga Road project and coordination / timing with east-west connection EA.
11 February 2016	MNRF - CVC	City of Brampton, Region of Peel, Water's Edge and WSP met with the CVC and MNRF to go through four conceptual design alternatives. The objective was to receive input from the MNRF and CVC. Four (4) alternatives were presented by WSP project team. Most notable comment received is that CVC and MNR want more work to be documented around the needs and justification of this road i.e. addressing factors around place-making, walkability, complete streets, synergies between transportation planning and land use planning, planning for mobility hubs etc.
9 June 2016	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to review comments. CVC commented that flooding and erosion should be added to natural criteria. MNRF commented to look at the regulated habitat description and the March 2016 Guidance for Development Activities in Redside Dace Protected Habitat. General opinion was that the alternative solutions would need to be re-evaluated based on CVC and MNRF comments. In the opinion of CVC, if we revisited the solutions with a more environmental focus, then the outcome would be different.
10 November 2016	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to review the comments received for Alternative Planning Solutions and Alternative Design Concepts.
12 December 2016	Region of Peel	Region of Peel met with WSP and the Region for confirmation on assumptions for Mississauga Road, whether it is the EA drawings, or most recent detailed drawings. Appears some land may be required from Mattamy Homes. A follow-up with Trans Canada Pipelines as a stakeholder was recommended, see if they have any input on the alignments. An MNRF workshop with the Region, City, and landowners is needed, so that a land use concept can be presented and bring everyone in to play, need to build buy in for all

		stakeholders here as well as decide which landowners should be involved.
9 March 2017	MNRF - CVC	City of Brampton, CVC, Peel Region, MNRF, MOECC, R.V. Andersen Associated (Peel Region), and WSP met to provide an update of the project including addressing comments from both MNRF and CVC on the alternative planning solutions. Noted, Official Plan amendment for regional retail centre development was passed and these lands are now incorporated into the Mount Pleasant Secondary Plan.
18 May 2017	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to review the best alternative solutions. Reasonable alternatives, solution 4 (Extend road west of Mississauga Road only) & solution 5 (Extend Mount Pleasant GO Station access road to west of Mississauga Road) have been considered, including alternatives that would not adversely affect the species, and the best alternative has been adopted. MNRF needs to understand Redside Dace habitat impact magnitude for alternative designs (alignments) between these planning solutions in order to move from the evaluation of solutions phase.
1 June 2017	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to review the scoring and sensitivity analysis of Alternative Planning Solutions.
13 July 2017	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to review the 5 (five) alignments options and evaluation matrix. Alignments have been shown with structure options (bridges) to evaluate Redside Dace habitat impact at each of the crossings of Huttonville Creek.
10 August 2017	MNRF - CVC	City of Brampton and WSP met with CVC and MNRF to discuss alternative design concepts of the Preferred Solution, including structural options and to present evaluation of alternative designs in order to identify recommended design. Based on the evaluation and completed studies on the project the Alternative Solution 5 (Extend Mount Pleasant GO Station access road (Lagerfeld Road) to west of Mississauga Road) is recommended as preferred solution.
8 September 2017	MNRF - CVC	City of Brampton, Region of Peel and WSP met with CVC and MNRF to review the alternative solutions and alternative design concepts of the preferred solution. CVC requested a floodplain assessment to support the evaluation process. Confirm with Region of Peel that Design Alternative 1 is recommended and will be supported as preferred in order that Region of Peel move forward and complete their ongoing Detail Design of Mississauga Road.
11 December 2017	MNRF - CVC	City of Brampton, Region of Peel and WSP met with CVC and MNRF to review the flooding assessment and to review the alignment options. CVC is interested in the erosion hazard area, while MNRF is interested in the meander belt plus 30 m for Redside Dace habitat
22 May 2018	MNRF - CVC	City of Brampton, Region of Peel and WSP met with CVC and MNRF to review Public Information Centre (PIC) display boards.

19 July 2019	MECP	City of Brampton met with MECP to present the preliminary preferred design concept and received approval in principle from MECP to proceed to the next phase of project implementation as per the preliminary preferred design concept.

2.2 INDIGENOUS CONSULTATION

Consultation with Indigenous Communities is an integral component in the consultation process for planning projects. At the outset of this study all relevant and directly affiliated Indigenous Communities and government representatives were contacted by the initial Study Commencement letter dated May 6, 2014.

In a letter dated June 4, 2014, the Ministry of Aboriginal Affairs noted that the project appears to be in an area where an Indigenous Community may have existing or asserted rights or claims that could be impacted by this project. As such they suggested that Six Nations of the Grand River Territory, Haudenosaunee Confederacy and Mississaugas of the Credit Communities be contacted.

Any requests for information and/or opportunities to meet with the Indigenous community was encouraged by the project team throughout the course of the study, however no requests were brought forward.

Indigenous community correspondence can be found in **Appendix B.**

3 IDENTIFICATION/DESCRIPTION OF THE PROBLEM/OPPORTUNITY

Provincially, regionally and at the City level, policymakers are planning for complete communities that are linked by transit, are walkable, and provide residents with access to their daily needs near where they can live, work and play. The Lagerfeld Drive study area, and alignment area is in a very rapidly growing, changing and evolving neighbourhood.

Outlined below are the key transportation, land use, and urban design policies and programs which provide momentum, highlighting the need and justification for this critical road link. The policies cascade from provincial and regional significance, to those contributing to the City's strategic goals and objectives.

3.1 PROVINCE OF ONTARIO

3.1.1 PLACES TO GROW, 2005 AND 2019

In 2005, Places to Grow became a Provincial Act and is Ontario's government plan for growth and development that supports economic prosperity, protects the environment and helps to achieve a high quality of life across the Province. The plan guides development, and the accommodation of population and employment growth into urban areas, and encourages higher intensity development in key urban centres, strategic nodes, such as major transit station areas, and intensification corridors planned for high-order transit. The 2019 plan reinforces the principles and goals of the 2005 plan and encourages higher densities and rates of growth in built up areas. A major emphasis is on more compact development patterns, a greater variety of housing options, more mixed-use development in *urban growth centres* and other *strategic growth areas*, and greater integration of transit and land use planning. A focus is to build more compact greenfield communities to reduce the rate in which future land resources are consumed, and to grow at transit-supportive densities, with walkable streets, emphasizing effective transit and connected active transportation networks.

All major transit station areas will be planned and designed to be *transit-supportive* and to achieve multimodal access to stations and connections to nearby major trip generators by providing, where appropriate, and not limited to:

- Infrastructure to support active transportation, including sidewalks, bike lanes and secure bicycle parking;
- Prohibiting land uses and built form that would adversely affect the achievement of transit-supportive densities;
- Lands adjacent to or near existing and planned frequent transit should be planned to be transit-supportive and supportive of active transportation and a range and mix of uses and activities; and
- In planning lands adjacent to or near higher order transit corridors and facilities, municipalities will identify and protect lands that may be needed for future enhancement or expansion of transit infrastructure, in consultation with Metrolinx, as appropriate.

Transit is the first priority for transportation planning and investment. The transit network will support and facilitate improved linkages between *strategic growth areas* and other areas planned for a mix of uses and *transit-supportive* densities.

3.1.2 PROVINCIAL POLICY STATEMENT

The Provincial Policy Statement (PPS) (Ontario Ministry of Municipal Affairs and Housing [OMMAH], 2014) is a planning document that provides a framework for, and governs development within, the Province of Ontario. To preserve various ecological resources deemed significant in the Province, development lands must be assessed for the presence of Natural Heritage Features (NHFs) prior to construction. Generally, NHFs within 120 m area of influence of development lands must be assessed. Analysis of records is required to determine if the project location is within 50 m of an areas of natural and scientific interest (ANSI). These NHFs (listed below) are both defined and afforded protections under the PPS. Linkages between NHFs, surface water and groundwater features are also recognized and afforded similar protections under the policy. Section 2.1.2 of the PPS also requires that the diversity and connectivity of all NHFs and the long-term ecological function of natural heritage systems be maintained, restored or improved where possible.

Under the PPS (OMMAH, 2014), development or site alteration is prohibited within significant wetlands in Ecoregions 5E, 6E and 7E and in significant coastal wetlands, but may be allowed adjacent to these features provided the adjacent lands have been evaluated and it has been demonstrated that there will be no negative impacts to these features or their ecological functions. Development may be permitted in or adjacent to significant wetlands north of Ecoregions 5E, 6E and 7E, significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River), significant wildlife habitat, and significant areas of natural and scientific interest (ANSI), provided there will be no negative impacts to these features or their ecological function due to the proposed undertaking. In addition, development and site alteration is not permitted in fish habitat unless in accordance with provincial and federal legislation.

Natural Heritage Features as defined by the PPS (OMMAH, 2014) include:

- Fish Habitat;
- Habitats of Endangered and Threatened Species;
- Significant Areas of Natural and Scientific Interest (ANSI);
- Significant Wetlands;
- Significant Coastal Wetlands;
- Significant Wildlife Habitat;
- Other Coastal Wetlands in Ecoregions 5E, 6E and 7E;
- Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River); and
- Significant Valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River).

The natural heritage system's features and areas that are included in the study area according to Schedule D of the City of Brampton are: "Valleylands and Watercourses Corridors"; "Woodlands"; "Lakes and Ponds"; and "Other Wetlands", "provincially Significant wetlands".

3.1.3 THE BIG MOVE

The Metrolinx Regional Transportation Plan (RTP) known as "The Big Move" guides the work being done to transform the transportation work in the Greater Toronto Hamilton Area. The Big Move provides the vision, goals, and objectives for the transportation system, developed with Metrolinx's diverse partners and stakeholders from across the region, and articulates and plans how the transportation network contributes to a high quality of life and prosperous economy. The Big Move outlines objectives band actions to increase transit use, and active transportation across the region. The primary aim of the plan is to grow, invest in, and build the transit network to support the growth and intensification outlined and directed in the Places to Grow Plan.

The Plan has been updated to reflect on the objectives, actions and investments made to date and prepare to reinvest and refocus as the GTHA continue to rapidly grow and evolve. The GO Regional Express Rail (RER)

and Two-way, All-day Go rail service on the GO rail network is one of the major moves out of The Big Move plan.

Metrolinx 2041 RTP recommends the implementation of a Frequent Rapid Transit Network, which identifies 75 new or in development rapid transit projects in the GTHA. The Big Move has identified eight mobility hubs in the Region of Peel. They are particularly significant because of their combination of existing or planned frequent rapid transit service with an elevated development potential. The Region of Peel's Official Plan policies encourage the concentration of high-density employment uses and intensification in proximity to these mobility hubs. The Region of Peel is committed to support Metrolinx and the local municipalities on development within these hubs and the integration of modes at these hubs.

Dramatically, the GO Regional Express Rail (RER) program represents a fundamental transformation of the GO rail system from commuter rail to all-day regional transit service. The GO RER running every 15 minutes throughout the day in both directions over the core segments of the GO network, with all-day, two-way service at lower frequencies extending beyond these segments to cover much of the remaining network. New GO stations on both new line extensions and at strategic infill locations will expand access to the regional rail system. The GTHA is currently run about 600 transit routes served by a network of 11 transit service providers, and the remaining two service providers, GO Transit and UP Express, are under the direct authority of Metrolinx and are focused on regional travel. New GO stations, service Frequently Improvements and new Airport rail link service are the recent GO Transit and UP Express service enhancements. The current regional and rapid transit consists of Frequent All-day GO train and GO bus at headways of 15 minutes or better, All-day GO train and GO bus in both directions at headways of 20-60 minutes, commuter GO train and GO bus during peak periods and directions, and Airport rail link operates all day in both direction with service hours aligned to airport demand.

The expansion of service along the Kitchener Line became available due to the agreement between Metrolinx and CN Rail. The long-term strategy is to transform GO Transit into a comprehensive all-day rapid transit system with service every 15 minutes on core components of the network, making Mount Pleasant GO Transit a more significant regional mobility hub and provide an integral east-west connection to the GO station and the westerly edge of the City limits. **Figure 3-1** provides an overview of the Rapid Transit Network.

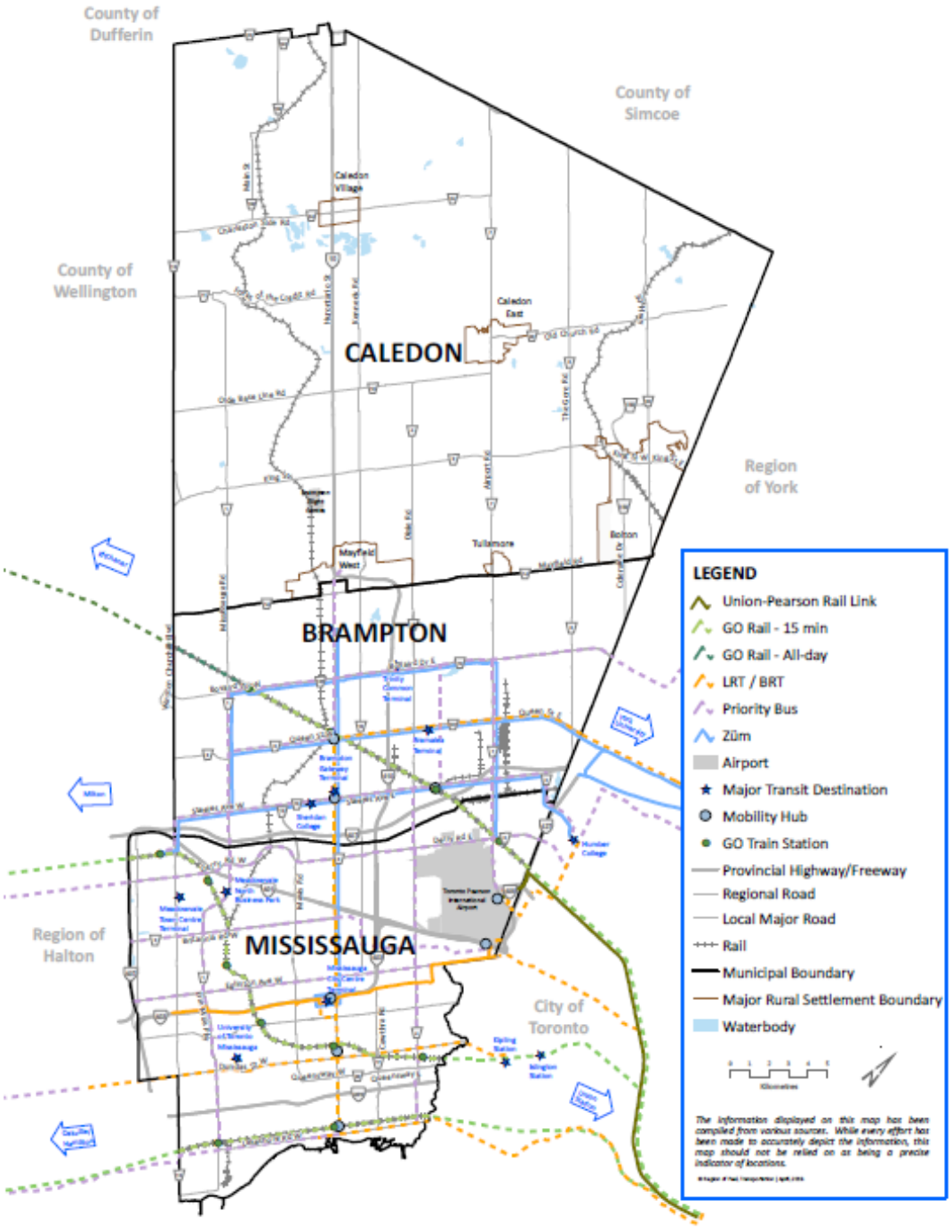


Figure 3-1: Rapid Transit Network

3.1.4 METROLINX – REGIONAL EXPRESS RAIL

The GO rail network has largely been rush-hour, peak period, commuter service, and Regional Express Rail is a program to update the Go rail network to a comprehensive two-way all- day rapid transit network. Brampton has three stations on the Kitchener Line; Bramalea, Downtown Brampton and Mount Pleasant. Since 2012, the Province has continued to announce additional services on the Kitchener Line, and made commitments to increase service level. Electrification of the corridor, enabling 15 minutes, two-way, all day service, is currently being planned to Bramalea GO, with 30 min all day service to Kitchener. This level of service improvement has been a major game-changer for the Mount Pleasant station, making it a more significant regional mobility hub that was originally anticipated in the Mount Pleasant Secondary Plan.

3.1.4.1 METROLINX'S STATION ACCESS PLAN (SAP)

The SAP sets Metrolinx's strategy for achieving the Regional Express Rail (RER)/GO Expansion project without substantially increasing the number of parking spaces at GO stations. As you will read, this generally requires the modal split for access to the station to be rebalanced away from park-and-ride and towards other modes (walking, active-transit, micro-transit, etc.). Much of the information that we spoke about on the phone is included in the SAP as is Metrolinx's wants for the future east-west connector at Lagerfeld Drive. Generally:

1. The SAP views the new pedestrian and cycling infrastructure proposed in the future east-west connector as an important feature for station access – it will be important for this infrastructure to continue along Lagerfeld Drive and integrate it into the station area and any future TOD seamlessly.
2. The SAP also supposes the future east-west connector as important to creating better bus service connections to link with new urban area development to the west.

In terms of forecast ridership at the station, the SAP also outlines Metrolinx's 2031 forecast for passenger boardings and alightings.

a. Current riders' home station: 2,575
b. Future: Very High (8,001 or more)*
c. Current riders' destination station: 0
d. Future: Average (251-1,000)*

*Note: these ridership figures do not anticipate frequent 2-way service as RER enhanced service is not yet planned for this station. If that changes the forecast ridership may also change. **Table 3-1** provides an overview of Metrolinx's Station Access Plan (SAP).

Table 3-1: Metrolinx's Station Access Plan (SAP)

Kitchener Line

Mount Pleasant GO			
Station Area Characteristics			
Development Potential	Moderate		
GO Rail Ridership	**Current (2016)**		**Forecast (2031)**
Daily Riders' Home Station	2,575		Very High (8,001 or more)
Daily Riders' Destination Station	0		Average (251-1,000)
Facility Type and Capacity	**Current (2016)**		**Recommended Target (2031)**
Bus Facilities	North: 9 bay bus loops with shared access on Commuter Dr. South: 9 bay bus loops with dedicated access to Lagerfeld Dr.		(CONDITIONAL) North: Add 16 on-street vehicle waiting area spaces to the north for potential on-demand micro-transit service.
Bike Parking	South: 16 covered spaces.		North: Add 64 covered and 24 secure spaces. South: Add 48 covered spaces. Total: 152 spaces.
Pick up/drop off Facilities	South-east: 24 vehicle waiting area in 8 lanes with 4 vehicle passenger loading area. South-west: 46 vehicle waiting area in 12 lanes with 7 vehicle passenger loading area.		North: Add 6 vehicle on-street waiting area.
Vehicular Parking	North: 222 surface spaces. South: 1,265 surface spaces. Total: 1,497 spaces with a 71-80% utilization.		South: Add 400 surface parking spaces. (CONDITIONAL) South: Add 950 spaces via alternative parking solutions or a structure. Total: 1,897-2,847 spaces.
Station Access Mode	**Current Modal Split (2015) %**	**Target Modal Split (2031) %**	**Recommended Improvements**
	15	16-18	• Short-term: Encourage the Region of Peel and the City of Brampton to

 Walking			consider designing the intersection between the proposed East-West Connector and Mississauga Road. to support pedestrians and cyclists from future development to the southwest of the rail corridor connecting to the GO station site via Lagerfeld Dr. • Short-term: Encourage the City of Brampton to identify improvements to wayfinding and signage along Ashby Field Rd. to better connect pedestrians and cyclists to the GO station site. • • Medium-term: Consider improving pedestrian and cycling connection between Lagerfeld Dr. and the GO station platform that reduces conflicts with vehicular traffic. • Medium-term: Encourage City of Brampton to explore the feasibility of providing a pedestrian and cycling link between the intersection of Salvation Rd. and Commuter Drive, and Rowland Street to the north. Additionally, consider a similar link between the north end of Leagrove Street and Salvation Road to the west. These linkages will provide quicker connections for pedestrians and cyclists from northeast of the station. • Long-term: Encourage the Region of Peel and the City of Brampton to consider options to enhance the pedestrian environment at the intersection of Ashby Field Rd. and Bovaird Drive This could include the use of landscaping to enhance the pedestrian environment and narrowing of the pedestrian crossing distance by removing/revising right turn Channel Islands.
 Local Transit	4	14-16	• Medium-term: Encourage Brampton Transit to explore options to deliver micro-transit service in the 4-5km radius of the station. When considering micro-transit options evaluate modifications to conventional transit routes to ensure that fixed and dynamic service options are delivered in an integrated manner. Additionally, work with the City of Brampton to assess the feasibility of using on-street parking spaces along Commuter Dr. and
 Micro-Transit	Not Applicable	10-12	

			Salvation Rd. to support the delivery of micro-transit. • Medium-term: Encourage Brampton Transit to consider modifying the service loop of the bus route servicing the Elbern Markell Drive community to include the community north of Queen Street W. • Medium-term: Encourage Brampton Transit to consider modifying the bus route servicing the Edenbrook Hill Drive and Queen Mary Drive communities to connect to the Mount Pleasant GO Station. This will provide a direct transit connection to the residential areas north-east of the GO Station that have a high concentration of GO rail customers. • Medium-term: Encourage Brampton Transit to enhance the frequencies on bus routes servicing the communities of Mount Pleasant, and the Elbern Markell Drive/Bonnie Braes Drive and Mississauga Rd. corridors to align with future GO rail service levels. • Long-term: Encourage Brampton Transit to develop local transit service expansion routes needed to link the new urban areas to the west of the station.
 Cycling	1	2-4	• Short-term: Consider installing additional bike shelters and secure bike parking adjacent to the north and south station entrance. • Short-term: Encourage the City of Brampton to consider incorporating cycling infrastructure and boulevard separated sidewalks from Heritage Rd. to the west to the station site to the east design of the East-West Connector road. • Medium-term: Encourage the City of Brampton to enhance the wayfinding and signage along the multi-use path along Bovaird Drive W to Chinguacousy Rd. • Medium-term: Encourage the City of Brampton to consider implementing planned cycling infrastructure along Creditview Road and James Potter Rd. west of the GO Station are connected to the station site via cycling infrastructure along Lagerfeld Drive Additionally, consider extending such infrastructure west in tandem

			with future development of these areas. • Medium-term: Encourage the City of Brampton to prioritize the feasibility review and implementation of planned cycling infrastructure along Ganton Heights, from Creditview Road to the west to Commuter Dr. to the east and further along Commuter Dr. to Salvation Rd. to the east. • Medium-term: Encourage the City of Brampton to consider prioritizing the feasibility review and implementation of planned cycling infrastructure along Brisdale Drive Wanless Drive to the north to Groverwood Drive to the south and further west along Groverwood Drive to Salvation Rd. These improvements will provide enhanced cycling connections for the high concentration of GO rail customers that reside in this area.
 Pick up/drop off	14	20-22	• Medium-term: Consider restricting access from the southwest pick up/drop off area to the parking to the west to provide dedicated access to Lagerfeld Drive • Medium-term: Work with City of Brampton to explore the feasibility of developing an on-street vehicle waiting area along Commuter Drive
 Drive & Park	63	34-36	• Short-term: Consider implementing the modified reserved, carpool, and EV parking program on the eastern half of the south surface parking lot (appx. 550 spaces). • Medium-term: Consider expanding surface parking by 400 spaces adjacent to the south parking lot. • (CONDITIONAL) Medium-term: If frequent two-way rail service levels are confirmed at this station, consider opportunities to expand parking by 950 spaces using alternative parking solutions (e.g. modular parking spaces on the south parking lot). If alternative parking solutions are deemed unfeasible, consider developing a parking structure on the south parking lot.
 Carpool Passengers	2	4-6	

3.1.5 METROLINX – MOBILITY HUB GUIDELINES

Metrolinx and the City of Brampton want to see the Mount Pleasant GO continue to evolve from a GO station and transit terminal to an integrated Mobility Hub. The Metrolinx Mobility Hub Guidelines provide a framework and principles for developing mobility hubs in the GTHA. Major elements of successful mobility hubs include transit and station design, and multi-modal integration, integrating transit and active transportation networks, feeding the mobility hub in a connected and logical manner. The principles also promote enhanced connectivity of the transit stations, with the communities they serve, with good road access, and multi-modal circulation, pedestrian priority with a mix of land uses adjacent to stations, and high-quality urban design to make an attractive and walkable environment and a strong sense of place, that meet multiple needs for commuters and residents.

Lagerfeld Drive provides an excellent example of a municipal initiative that helps to invest in the success of a mobility hub. The predominant role is to serve as a complete street with multi-modal capacity to serve as a transit and active transportation spine connecting to GO station and new development in North-west Brampton. According to Brampton's 2040 Vision, in the short term, this street will provide a local link to a future commercial/town centre development on the west side of Mississauga road, and will provide connectivity and access to the mobility hub which will assist to bring people in efficiently by car, transit, bike or walking. This will help the land parcels being planned, to develop to their fullest potential. In the longer term, Lagerfeld Drive will continue to provide an integral east-west connection to the GO station, to connect to the westerly edge of the City limits.

3.2 CITY OF BRAMPTON

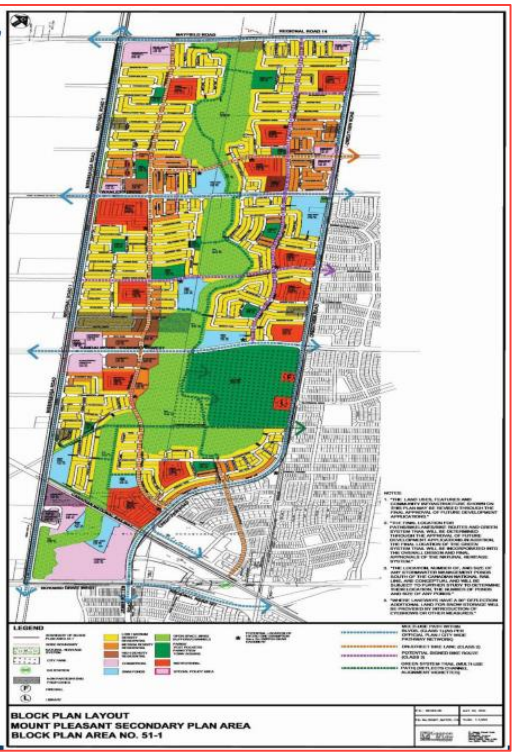
3.2.1 MOUNT PLEASANT SECONDARY PLAN, 2011

The Mount Pleasant Secondary Plan was approved in 2011, with the goals of developing healthier suburban form with a transit-oriented village/community, a mix of uses, tighter grid road networks, and the protection of ecological systems and functions. The plan was centred around the Mount Peasant GO Station as a Mobility Hub, anchoring transit service and a mix of uses around the station area. At the time when the Go Station was planned, the City did not have the two-way, all-day GO service improvements which are being planned today. During the development of the plan, the market and planning framework had not fully adapted to a transit-oriented community and District Retail, suburban and auto-oriented commercial, which was designated for the lands south side of the CN Rail line, adjacent to the GO station.

In the discussions for the Mount Pleasant Secondary Plan transportation network, the Mount Pleasant Secondary Plan transportation master plan recommended an east-west road, south of the CN rail line. However, The Ministry of Natural Resources and Forestry (MNRF) had concerns, and through the Subwatershed planning studies for Mount Pleasant, MNRF wanted all road crossings of the Huttonville Creek to maintain an approximately 1 km spacing to protect the Redside Dace habitat. With that, the Lagerfeld Drive connection was negotiated out of the network.

Mount Pleasant Secondary Plan, 2011

- Mount Pleasant Mobility Hub
  - Transit-Oriented Development
  - mixed uses
  - tighter grid networks
  - protection of environmental systems functions through protection and enhancement of a Natural Heritage System
- Mount Pleasant Secondary Plan OPA Policy 5.3.2.5 Road network and access required to accommodate travel demand in and associated with the "District Retail" designation shall be explored and confirmed, with respect to demonstrating and not precluding the ability of achieving future road network connectivity



City staff recognized the importance of the link and continued to advocate to protect for a future alignment. Staff integrated a policy in the Mount Pleasant Secondary Plan Official Plan Amendment Policy 5.3.2.5 noting that, road network and access required to accommodate travel demand in and associated with the "District Retail" designation shall be explored and confirmed, with respect to demonstrating and not precluding the ability of achieving future road network connectivity. The District Retail designation has since been updated through an OMB settlement.

3.2.2 ADDENDUM TO THE MOUNT PLEASANT BLOCK PLAN 51-1 COMMUNITY DESIGN GUIDELINES

Planning for the Mount Pleasant Community and Mount Pleasant Village, also referred to as Fletcher's Meadow Secondary Plan, Sub-Area 44-1, began in 2004 as a collaborative process involving the consultant team, the landowners group and City of Brampton staff. The product of this process had, until recently, been the development and approval of the Mount Pleasant Village Community Design Guidelines – Open Space and Architectural Design Guidelines and the Mount Pleasant Block Plan 51-1 Community Design Guidelines. The addendum was created to deal with Ontario Municipal Board files associated with the North American parcel of land, designated district retail, located east of Huttonville Creek, south of Lagerfeld, North of Bovaird and west of Ashby Field Road.

The Addendum to the Mount Pleasant Block Plan 51-1 Community Design Guidelines provides a scoped overview of the Conceptual Land Use Plan, phasing strategy and general character, guidelines and standards as a basis for delivering a complete mixed-use community that is anchored by the Mount Pleasant GO Station transit hub. As development in Mount Pleasant continues to occur in the south side of the transit village, the addendum to the Community Design Guidelines provides directions and principles for building out the community.

Existing bus transit facilities and the adjacent Mount Pleasant Village residential community are to the north, with direct access to the Mount Pleasant GO Transit station situated to the south. As a component of the overall vision of Mount Pleasant as a transit-oriented development, Mount Pleasant Village South will benefit extensively from its proximity and direct linkage to the Mount Pleasant GO Station, providing efficient and convenient transportation options for area residents, consumers and employees.

Lagerfeld Drive is identified as the primary east-west link which connects all blocks of Mount Pleasant Village South with Mississauga Road, Creditview Road and the Mount Pleasant GO Station. It is intended to be designed as a main street and character avenue for the community. The ultimate build-out of Lagerfeld Drive will reflect a 'complete street', one that emphasizes comfortable pedestrian and cycling connections balanced with vehicular and bus transit functions. It is anticipated that Lagerfeld Drive will function as a 4-lane road with left turn lanes at the intersections with Creditview Road and Ashby Field Road. To encourage cycling connections, dedicated bikeways will be provided in the form of curbside on-street bike lanes (both sides) or curbside off-street bike lanes (both sides), directly linking with the GO Station. Direct, convenient pedestrian connections to bus pads / shelters and the Mount Pleasant GO Transit facility should be provided to encourage the use of public transit.

There have been current planning initiatives which also highlight moving towards a more transit and active transportation-oriented community. Those initiatives will be discussed in more detail later in this Report.

3.2.3 HERITAGE HEIGHTS SECONDARY PLANNING PROCESS

In December 2009, Brampton Council authorized City staff to initiate secondary planning for Secondary Plan Areas 52 & 53, the Heritage Heights Community. This effort resulted in the June 2014 Proposed Land Use Plan, which was approved "in-principle" by Council at the time for the purpose of moving forward with public consultation. In April 2015 Council passed a resolution directing staff to revisit the 2014 Proposed Land Use Plan due to the uncertainty of many ongoing studies in the Heritage Heights Community and the need to engage with all landowners within the Secondary Plan Areas 52 &52.

In 2019, as part of the re-engagement process for Heritage Heights, staff conducted a series of charrettes to establish the vision and guideline principles, transportation structure and land use plan for the area.

The Vision Statements for Heritage Heights

Heritage Heights is intended to be….

- A place that supports the health and well-being of residents;
- A place that celebrates its natural setting and will be a net contributor to climate mitigation and adaptation;
- A place where people, business, arts and culture thrive and will become a choice destination in the city of Brampton. Heritage Heights will attract and retain talent with diverse employment options;
- It will foster inclusivity through the provision of diverse housing options for residents in all phases of life; and
- Heritage heights will leave no one behind!

The following are the guiding principles that will provide a foundation for policies, design, and growth in Heritage Heights:

1. Create walkable communities for people to gather, recreate, work and live;
2. Development should be compact and diverse to achieve walkable and affordable active neighbourhoods;
3. Implement sustainable and resilient plans, technologies, and design approaches;
4. Include arts and cultural uses that will leverage Brampton's diversity and attract investment;

5. Conserve the natural and cultural heritage of the area, creating a destination for local and regional visitors;
6. Foster a competitive environment for employment and economic development;
7. Plan for well-being – physical, mental, social – through design of people-centric spaces that are safe and age friendly; and
8. Integrate and connect green and open spaces into the design of neighbourhoods while being sensitive to exiting ecological systems.

In 2020, a series of subsequent charrettes were held with stakeholders to inform a conceptual framework for land use, transportation and community structure. The figure below shows the most recent concept plan after consolidated input from various groups. The proposed plan is expected to accommodate a population between 94,861 to 209,565, and between 33,201 and 91,541 jobs. Preliminary conservative analysis is targeting a population of 124,000 and 47,000 jobs.

A number of technical studies will be required to advance the plan, building on works that has been done over the last few years. Lagerfeld continues to play an important role as the land in Heritage Heights develop as a transit, oriented, walkable, cyclable, complete community. Lagerfeld will be the main east-west multi-modal, spine road connecting blocks communities in Mount Pleasant to development blocks south of the CN rail line. This road plays a key feature to provide connectivity and access to the Mount Pleasant GO station from lands west of Mississauga Road. **Figure 3-2** shows the Heritage Heights Current Concept Plan.

Figure 3-2: Heritage Heights Current Concept Plan

3.2.4 TRANSPORTATION MASTER PLAN, 2015

The City of Brampton Transportation Master Plan Update makes a recommendation for a 2041 road network, to support the City's transportation needs associated with anticipated rapid growth and development in the next few decades. The City is projected to reach a population of an estimated 899,500 with 325,500 jobs in 2041.

The 2015 master plan makes recommendations for a balanced and sustainable transportation system to 2041, with improvements in transit, and active transportation. The Transportation master plan recommend the full build out of Lagerfeld Drive (East-West Connector), to 2041 to accommodate anticipated development and new growth in north-west Brampton and the Heritage Heights Secondary Planning Area. The Transportation Master Plan Update is presented in **Figure 3-3**.

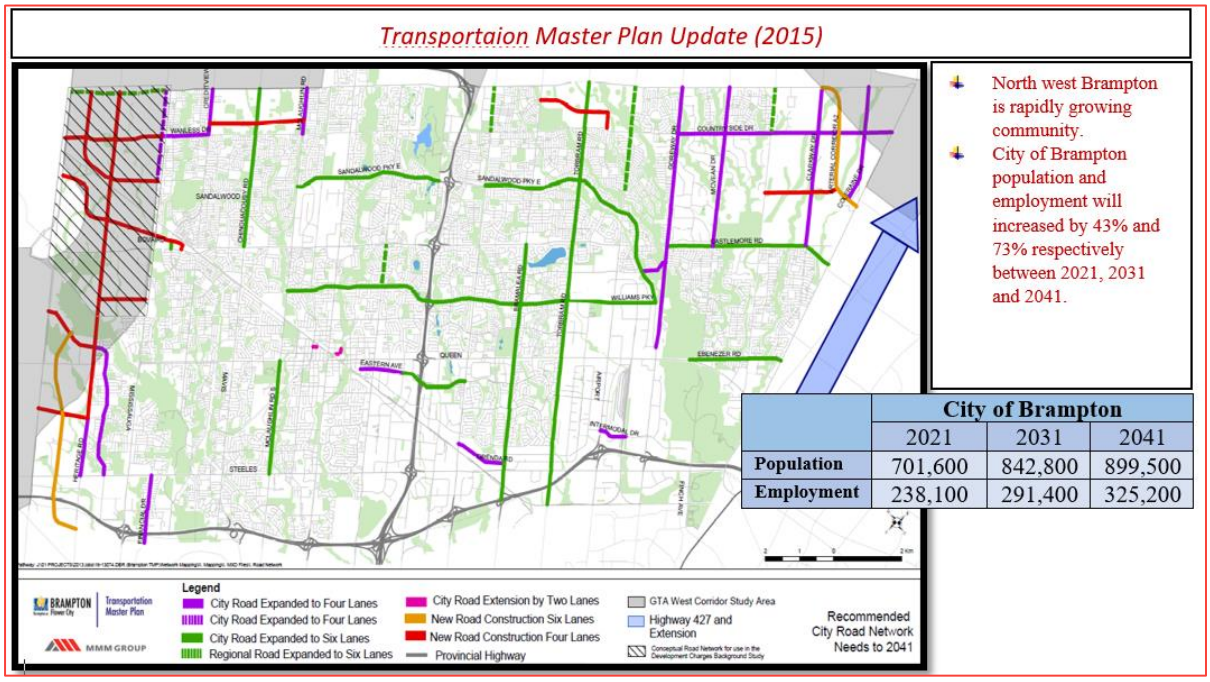


Figure 3-3: Transportation Master Plan Updates (2015)

3.2.5 MISSISSAUGA ROAD ENVIRONMENTAL ASSESSMENT AND DETAILED DESIGN (REGION OF PEEL)

The Region of Peel has completed the Schedule "C" Environmental Assessment (EA) for improvements on Mississauga Road from Bovaird Drive to Mayfield Road in the City of Brampton. The EA study examined the need and feasibility for widening and improvements on Mississauga Road to address short and long-term issues related to planned future growth, operational and service deficiencies for vehicular traffic, intersection improvements and storm drainage deficiencies. Opportunities for cycling and walking and the need and feasibility of a grade separation at the CNR crossing were also reviewed. The Mississauga Road EA explored providing access to many of the developers in the Mount Pleasant Community, including a discussion of Lagerfeld Drive. The final EA recommended a slip road to provide access to the east side of Mississauga Road, south of two hold out properties, with a continuation of the road under the Mississauga Road grade separated overpass of CN, to access development lands to the west side of Mississauga Road. Before the EA was filed, at a project team meeting was held with Region, City, MNRF, CVC staff and others, on October 26, 2011. City staff raised issues of "Station Road" (Lagerfeld Drive), and the city proposed to address concerns about the road. The meeting members agreed to enter into a planning process to explore a road link to understand the land use components, the alignment options and the impacts to the Huttonville Creek and the impacts to Redside Dace.

The detailed design project for Mississauga Road is currently in progress, from the section of Bovaird to Mayfield Road. As development continues to progress in north Brampton, towards Mayfield Road, there is mounting pressure to deliver the detailed design and construction of the widened Mississauga Road and the need for the Lagerfeld connection is increasingly becoming vital to address developmental needs outlined below.

3.3 CURRENT PLANNING

The study area for Lagerfeld Drive EA, is rapidly changing and the City has received a number of development applications in the study area. Highlighted below are a number of the significant factors influencing the evolving need for Lagerfeld to connect to west of Mississauga Road.

The Schedule G Secondary Plan Areas (**Figure 3-4**) shows the newer secondary plan areas or portions thereof subject to the new housing and density categories of the Official Plan in the Study area, areas that are appealed to OMB/LPAT, and also shows the Brampton Mobility Hub secondary plan areas that are under appeal.

The City of Brampton is currently undertaking a secondary plan review. The goal is to reduce the number of secondary plans and to make the remaining plans more consistent with the Official Plan and easier to understand. While some areas of Brampton are still developing, others are now built up and not expected to experience major change. Many of these plans date back to the mid-1970s and have become outdated as communities develop. Some of them also reference old versions of the Official Plan, which leads to policies being interpreted inconsistently.

The plans for these older areas are the ones being reviewed. The secondary plan review won't look at new development areas. It also won't change existing land uses or density targets.

The first phase of the secondary plan review has finalized with the adoption of 5 new secondary plan areas that replaced existing smaller secondary plans. All secondary plan areas are now in full force and effect. Schedule G of the Official Plan has been updated to reflect the boundaries of the new secondary plans.

The draft Official Plan Amendments for the Airport Intermodal Secondary Plan Area 4 and Fletcher's Meadow Area 8 that were presented at the public meeting in March 2018 will be revised and presented for Council's adoption as part of the second phase of the secondary plan review to be completed in 2021.

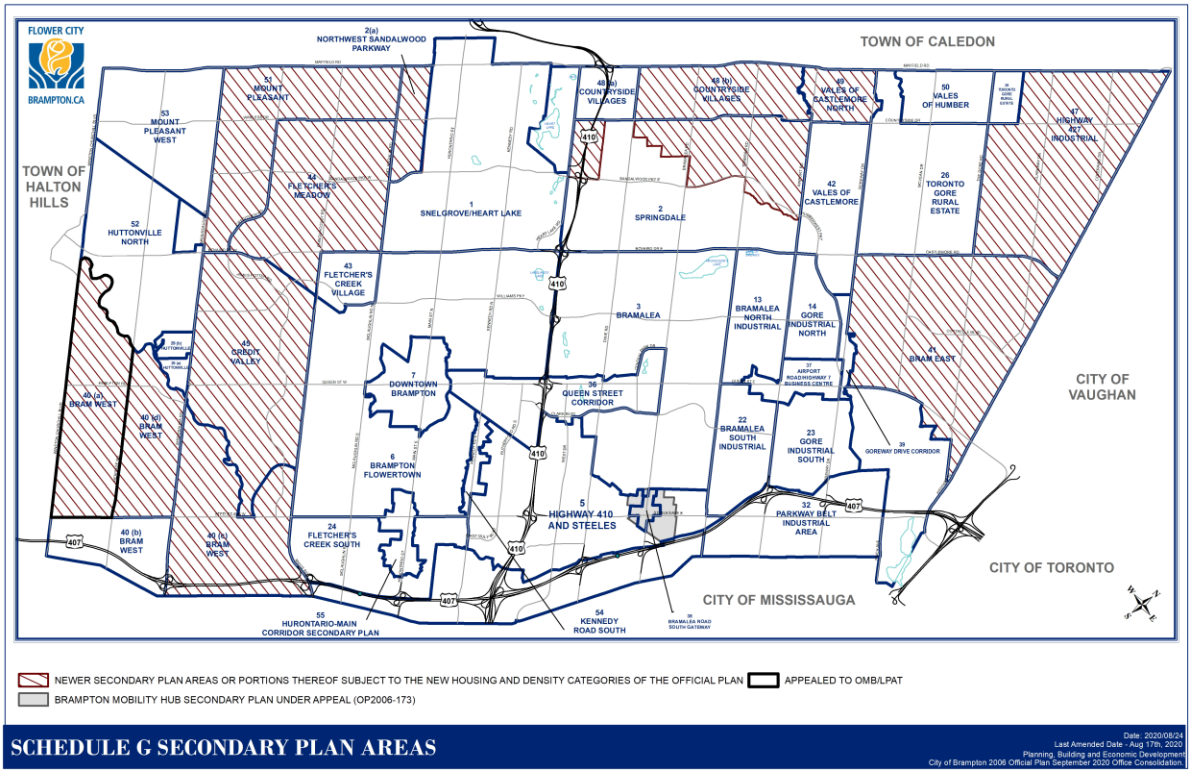


Figure 3-4: Secondary Plan Areas

3.3.1 OFFICIAL PLAN AMENDMENT 101 – MIXED-USE RETAIL CENTRE

Official Plan Amendment (OPA) 101 was approved by the Ontario Municipal Board in Fall of September 2016. In March 2010, and application was made by the property owner to amend the City of Brampton Official Plan and zoning by-law, to allow the lands at the north-west corner of Bovaird Drive and Mississauga Road from the Heritage Heights Secondary Plan to be integrated into Mount Pleasant Secondary Plan Area, and to be further developed as a Regional Commercial Centre without being on hold due to the issues that need to be sorted out before Heritage Heights can be moved forward such as GTA West Highway Corridor and Shale policies. The application was appealed by developers for a lack of decision by the City.

The Official Plan Amendment was approved by the Ontario Municipal Board in Fall of 2016. The updated boundary for Mount Pleasant was also updated to include additional official plan amendments made for residential developers. The City is now planning a tertiary plan to knit the study area around Lagerfeld Drive alignment together. For these development applications to move forward, the City needs to identify a route for Lagerfeld. And with the retail, commercial and residential uses identified through the Official Plan amendments, it is very reasonable to move forward with the East-West connection (Lagerfeld Drive) road to connect these uses to the GO stations and Mount Pleasant mixed-use village. The East-West connector was negotiated out of the Mount Pleasant Secondary Plan Area during the plan's development ion 2008-2010. However, if the lands west of Mississauga road were originally proposed with such large anchors and major destinations, it would have been much more difficult to dismiss the significance of the link from a community building, transit, urban design, and active transportation perspective.

3.3.2 AUTO-ORIENTED DISTRICT RETAIL

In 2015, an application for an auto-oriented district retail in the form of big box commercial outlets, and large surface parking lots was submitted in area located south of Mount Pleasant, south of Lagerfeld, west of Ashby Field Road, north of Bovaird, and west of the Natural Heritage System/Huttonville Creek, adjacent to Mississauga Road. The application went to the Ontario Municipal Board for a non-decision from the City. Based on the rapidly changing context of the area, City staff began to work together with the applicant to achieve a different land use concept than the one that were originally approved as part of the Secondary Plan. With that, an addendum to the Mount Pleasant Community Design Guidelines were developed as part of the OMB settlement, in order to provide principles to guide future development.

The outcome of the OMB settlement was a phased approach to building out the site, in a way that adjusts to market changes, and to major investments such as two-way, all-day go service improvements, and ZUM express bus service on Bovaird and Mississauga roads. The updated site outcome is 4 blocks of mixed-use communities, comprising of commercial at the base of mid-rise and high-rise apartment towers, with a mix of housing types. The updated concept has 4 phases of development, with a mix of townhouse, retail with office and mid-rise apartments, with higher intensity residential uses being built in later phases as market demand grows.

The addendum to the Mount Pleasant Community Design Guidelines provide flexibility in the build out, depending on the alignment options for Lagerfeld. The Development agreement from the settlement place a hold on Block 1 of the development until the alignment for Lagerfeld is completed. For example, the applicant provided a development scenario based on the alignment not impacting Block 1, which is the large parcel immediately adjacent to the Huttonville Creek, north of Bovaird, and abutting Creditview Road on the eastern edge. Alternatively, there is a scenario for how the site will be built out, if an alignment needs to run directing through the parcel and bisect Block 1. However, the development process cannot continue until there is an alignment in place so that the development application can respond to the correct alignment and build out scenario.

3.3.3 OTHER DEVELOPMENT APPLICATIONS

In addition to the applications noted in this section, there are other applications including an application for Mattamy (mid-rise apartment and stacked townhouse), east of Mississauga Road, just south of the CN rail line, and north-west of the Huttonville Creek, which are relying on an alignment for Lagerfeld in order to move their development process forward. All the applications noted in this section, are impacted significantly by the alignment for Lagerfeld. Firstly, each application needs to acknowledge and integrate a final alignment in order to be able to move forward with access recommendation for their site build out and circulation. Secondly, all sites benefit from a full east-west alignment for the road, in which ties and stitches these developments together into a choose community anchored to the GO station, and transit village at Mount Pleasant. This road will provide a link, but also a physical connection and motivator to walk, cycle and take transit to local destinations.

3.4 TRANSPORTATION NETWORK

Within the study area, Bovaird Drive West (running east to west) and Mississauga Road and Heritage Road (running north to south) provide the major transportation access to northwestern Brampton. Mississauga Road links with Highways 401 and 407 ETR to the south. Bovaird Drive West is bisected by the Canadian National (CN) Rail Halton Subdivision.

GO Transit operates its Georgetown service on the CNR line with the Mount Pleasant GO Station located on the north side of Bovaird Drive West, east of Mississauga Road.

3.5 TRAFFIC ANALYSIS

The existing transportation system of roads, transit, pedestrian linkages and pathways will not adequately accommodate the mobility needs of future population and employment in the expanding Mount Pleasant community. The results of the traffic analysis have suggested at/over capacity operations along Bovaird Drive. A connection from Mount Pleasant GO Station extending west will be necessary. The connection will contribute to the connected, grid network, linking major destinations.

The modelled 2031 traffic volumes were used to estimate peak hour traffic volumes across the screenlines established for the Study Area. A "Do Nothing" analysis was completed to establish baseline conditions based on planned growth to 2031, but assuming only the committed roadway network improvements. This analysis provides a basis for assessing alternative transportation network improvements and additions and serves as a reference point for comparisons.

The estimated future volume-to-capacity ratios indicate that some screenlines and roadways crossing the identified screenlines will likely experience additional capacity requirements in the future, even with programmed improvements to the existing roadway network. Individual roadway segments that are projected to be at or near capacity in 2031 include Bovaird Drive from Creditview Road to Mississauga Road, Bovaird Drive from Mississauga Road to Heritage Road and Bovaird Road from Heritage Road to Winston Churchill Boulevard.

In order to accommodate moderate volumes of short to medium distance traffic travelling between residential or business and employment areas, or to and from the arterial road system, including transit services, through traffic will generally be discouraged from using these roadways. Direct access from abutting residential properties will not be permitted near intersections with arterials and should be appropriately managed elsewhere along residential sections of collector roads. Multiple and continuous road connections will encourage direct travel and reduce the reliance and pressure placed on individual road intersections. An additional east-west connector road can also attract and will be supported by future transit users. It will reflect the City's endorsed Community Design Principles that include transit-oriented development in an urban core around Mount Pleasant GO Station. It also aligned with City endorsed Framework Concept which provide connection to the Mount Pleasant GO Station, which in turn provide GO Transit, Brampton Transit and Bus Rapid Transit (BRT) connections to the rest of Brampton and beyond.

By 2031, 1,500 "new" transit trips would be generated that would otherwise be expected to use private automobiles for travel if enhanced transit and transit-supportive land use planning was not implemented. This represents 10% for population-based trips and approaches 25% for employment-based trips.

The Lagerfeld Drive extension can provide needed roadway capacity, continuity and connectivity, as well as accommodate proposed transit services. It can reduce vehicle queues and delays to motorists at intersections and contributes to potential reductions in overall travel distances and times for motorists. Additional transit routes reduce the need for more and wider roads so that quality of life in the Mount Pleasant Community may be maintained. The link will also provide an important, local, lower speed, transit and active transportation link between major land uses on the west and east sides of Mississauga road, north of Bovaird.

3.6 NEED AND JUSTIFICATION

Through the Mount Pleasant Secondary Plan, the draft Heritage Heights Secondary Plan, the City Transportation Master Plan, and the City's 2040 Vision there is an ongoing theme for noting a local and city-wide function for Lagerfeld Drive to connect to the Mount Pleasant GO Station. The TMP established the need and justification for proposed arterial and collector roads in compliance with the Phases 1 and 2 of the Municipal Class EA. Amongst the proposed road improvements identified is an east-west collector road connection from Mount Pleasant GO Station to lands west of Mississauga Road.

City of Brampton staff recognize that the East-West connection between the Mount Pleasant GO station was not originally deemed vital for the internal Mount Pleasant road network connectivity and was negotiated out of the plan when the Mount Pleasant Secondary Plan was finalized in 2009. The multi-modal significance of the Mount Pleasant GO station and the newly anticipated regional express rail levels of service were not anticipated during the development of the Mount Pleasant Secondary Plan. However, in thinking from a City-wide perspective, the 2015 Transportation Master Plan considered and recommended the need to have a local connection for north-west Brampton via Mount Pleasant lands, to the Mount Pleasant GO station. This area is rapidly changing, and with new information, inter-disciplinary planning needs to adapt to new information. Official Plan Amendment 101 has been approved and provides a significant opportunity to complement and enhance the Mount Pleasant Village Community by connecting neighbourhoods through a multi-modal connection to the Mount Pleasant GO station. Bovaird Drive also provides a connection. However, it is the City's opinion that due to the inter-regional, major arterial and goods movement function of Bovaird Drive, a local, transit/active transportation/people oriented main street is needed to realize the vision and true potential of Mount Pleasant.

The City of Brampton highlighted the City-wide significance of Lagerfeld Drive as a people-mover, south of the CN rail line, linking Heritage Heights to the Mount Pleasant GO Station and Mobility Hub. In 2006, Heritage Heights lands were added into the urban boundary of the Region of Peel's and City of Brampton's Official Plans. While planning for Heritage Heights is currently on hold, these lands are designated for future development, and there needs to be a local connection to the Mount Pleasant Mobility Hub. With the settlement of Official Plan Amendment 101 for the Mixed-use Retail Centre, the lands north-west of Mississauga Road and Bovaird Drive intersection will be added to the Mount Pleasant Secondary Plan. The City and community would benefit from having a logical spine/road connection to the higher density, mix of uses and regional Mobility Hub to the east of Mississauga Road.

Lagerfeld Drive provides the needed roadway connectivity with multi-modal capacity. It also facilitates direct travel for all modes and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road. It supports the City of Brampton's endorsed Community Design Principles including Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station. Currently there is no direct access from the Mount Pleasant GO Station, which can provide an important alternative route for bus transit vehicles and GO patrons accessing the station. Lagerfeld Drive can provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users). It will enable the east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries.

Roadway capacity and intersection operations will deteriorate without improvements. With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031.

With continuation of Lagerfeld Drive, the City's objective is to achieve a balance between the land use and transportation needs by incorporating recommendations made in Mount Pleasant Secondary Plan, Heritage Heights Secondary Plan, Metrolinx Mobility Hub Guiding Principles and considering the traffic conditions at the major collector roads.

3.7 PROBLEM/OPPORTUNITY STATEMENT

Phase 1 of the five phased Municipal Class EA planning process requires the proponent of an undertaking (the City) to first document factors leading to the conclusion that road improvements are required, and ultimately, develop a clear statement of the identified problem to be investigated and/or opportunity to be realized.

As such, the **Problem/Opportunity Statement** is the principle starting point in the undertaking of a Municipal Class EA and becomes the central theme integrating elements of the project. It also assists in setting the scope of the project.

The Problem/Opportunity Statement for Lagerfeld Drive to west of Mississauga Road Municipal Class EA is defined as follows:

- Approved and planned growth in the study area will contribute to an increase in traffic congestion and deterioration of road conditions over the next 10 to 25 years;
- Alternative solutions to address capacity will consider opportunities to enhance the future community, and facilitate sustainable modes of transportation;
- Address transportation/access needs while respecting unique environmental features and functions, including the habitat of Species at Risk, to develop a complete and sustainable community;
- Needs to support the City's endorsed Community Design Principles that include Transit Oriented Development in a strategic node around Mount Pleasant GO Station. Currently there is no direct access from Mount Pleasant GO Station, which can provide an important alternative route for bus transit vehicles and GO patrons accessing the station.
- Needs for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries.

Roadway capacity and intersection operations will deteriorate without improvements therefore:

With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031.

Without an East-West Connection there would be a lack of community connectivity, place-making and sustainable modes of travel.

Existing transportation system of roads, transit, pedestrian linkages and pathways will not adequately accommodate the mobility needs of future residents and workers in a growing community.

In order to address the above problem/opportunity, the City initiated this Municipal Class EA planning process which identifies and evaluates alternative solutions and design concepts and accordingly addresses the above problem/opportunity statement. This ESR has been prepared to determine how the proposed road improvements can be best sited, designed, constructed and operated.

4 STUDY AREA EXISTING AND FUTURE CONDITIONS

4.1 TRAFFIC ANALYSIS

A traffic analysis (**Appendix C)** was conducted for this study in June 2015, including an assessment of traffic volumes in the study area under existing and future conditions, for the horizon years 2011, 2021 and 2031. These volumes were used to identify if there is any need for additional road improvements required within the study area to accommodate anticipated future traffic volumes associated with growth in the area.

4.1.1 ROAD NETWORK

The study area road network is characterized as follows.

Mississauga Road is a major north-south arterial road under the jurisdiction of the Region of Peel. It is currently two-lane road with a rural cross-section and has a posted speed limit of 70 km/hour. A separate EA for improvements within the Mississauga Road has been completed in April 2013.

Bovaird Drive West is a major east-west arterial roadway in the Region of Peel. East of Ashby Field Road, it has three eastbound lanes and two westbound lanes and an urban cross-section. West of Ashby Field Road, the cross section is rural. From Ashby Field Road to Mississauga Road, there are two eastbound lanes and one westbound lane. The section west of Mississauga Road has two lanes. The posted speed limit is 60 km/hour. It is signal controlled at the intersections with Heritage Road, Mississauga Road and Ashby Field Road. A separate EA for improvements within the Bovaird Drive West corridor has been completed in April 2013.

Ashby Field Road is a local street under the jurisdiction of the City of Brampton leading into the Mount Pleasant GO Station to the north and a residential area to the south. The speed limit is 50 km/hour.

Heritage Road is a minor Arterial Road under the jurisdiction of the City of Brampton. It is currently a two-lane road with a rural cross-section. The speed limit is 60 km/h south of Bovaird Drive and 70 km/h north of Bovaird Drive. The City's TMP has identified to widen this road to four lanes, subject to a future EA study.

Creditview Road is a major north-south collector road under the jurisdiction of City of Brampton and it is designated to accommodate moderate volumes of traffic. Creditview Road in the north and James Potter Road in the south intersect the Bovaird Drive West. Creditview Road has 4 -6 lanes with an urban cross-section and has a posted speed limit of 60 km/hour.

Lagerfeld Drive is a collector road under the jurisdiction of the City of Brampton leading into the Mount Pleasant Go Station on the east of Creditview Road North of Bovaird Drive, Ashby Field Road intersects the Lagerfeld Drive.

4.1.2 EXISTING TRANSIT NETWORK

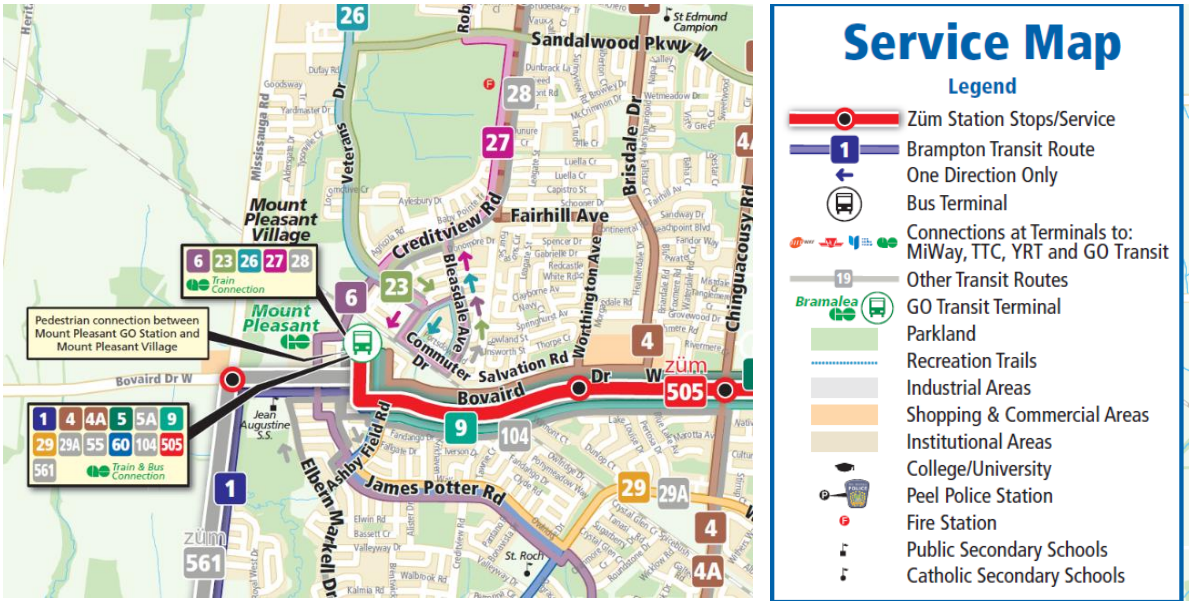
4.1.2.1 *BRAMPTON TRANSIT*

Currently, the study area is served by Brampton Transit routes. Brampton Transit buses provide connectivity to the Mount Pleasant GO Station and Mount Pleasant Village. The list of transit services available in the vicinity of the study area are summarised in **Error! Reference source not found. Table 4-1** and presented in **Figure 4-1**.

Table 4-1: Existing Transit Routes

Route No. and Name	Direction
Route 1 - Queen	Mount Pleasant GO Station via Downtown Terminal and Bramalea Terminal to Queen Street/Highway 50
Routes 4 and 4A - Chinguacousy	Mount Pleasant GO Station via Brisdale Drive, Wanless Drive, Chinguacousy Road and Steeles Avenue to Brampton Gateway Terminal
Routes 5 and 5A - Bovaird	Mount Pleasant GO Station via Bovaird Drive and Goreway Drive (Route 5) or Airport Road (Route 5A) to Westwood Mall Terminal
Route 6 - James Potter	Mount Pleasant Village via James Potter and Hwy 407 Park & Ride
Route 9 - Vodden	Mount Pleasant GO Station via Vodden Street to Edvac Drive
Route 29 and 29A - Williams	Mount Pleasant GO Station via Williams Parkway and Goreway Drive to Kennedy Street
Route 23 - Sandalwood	Mount Pleasant Village via Sandalwood Parkway to Queen Street at Highway 50
Route 26 – Mount Pleasant	Mount Pleasant Village via Mississauga Road, Sandalwood Parkway and Creditview Road to Mount Pleasant Village
Route 27 - Robert Parkinson	Mount Pleasant Village via Robert Parkinson Drive and Remembrance Road
Route 28 - Wanless	Mount Pleasant Village via Creditview Road, Remembrance Rd, Wanless Dr and Sandalwood Loop
Route 55 - Elbern Markell	Mount Pleasant GO Station via Elbern Markell Drive and Bonnie Braes Drive
Route 60 - Mississauga Road	Mount Pleasant GO Station via Mississauga Rd and Derry Rd W
Route 104 - Chinguacousy Express	Mount Pleasant GO Station via Chinguacousy Road and Brampton Gateway Terminal
Route 505 – Züm Bovaird	Mount Pleasant GO Station via Bovaird Drive to Queen Street and Goreway Drive
Route 561 - Züm Queen West	Mount Pleasant GO Station via Mississauga Road and Queen Street West to Downtown Brampton Terminal

Source: Brampton Transit Website

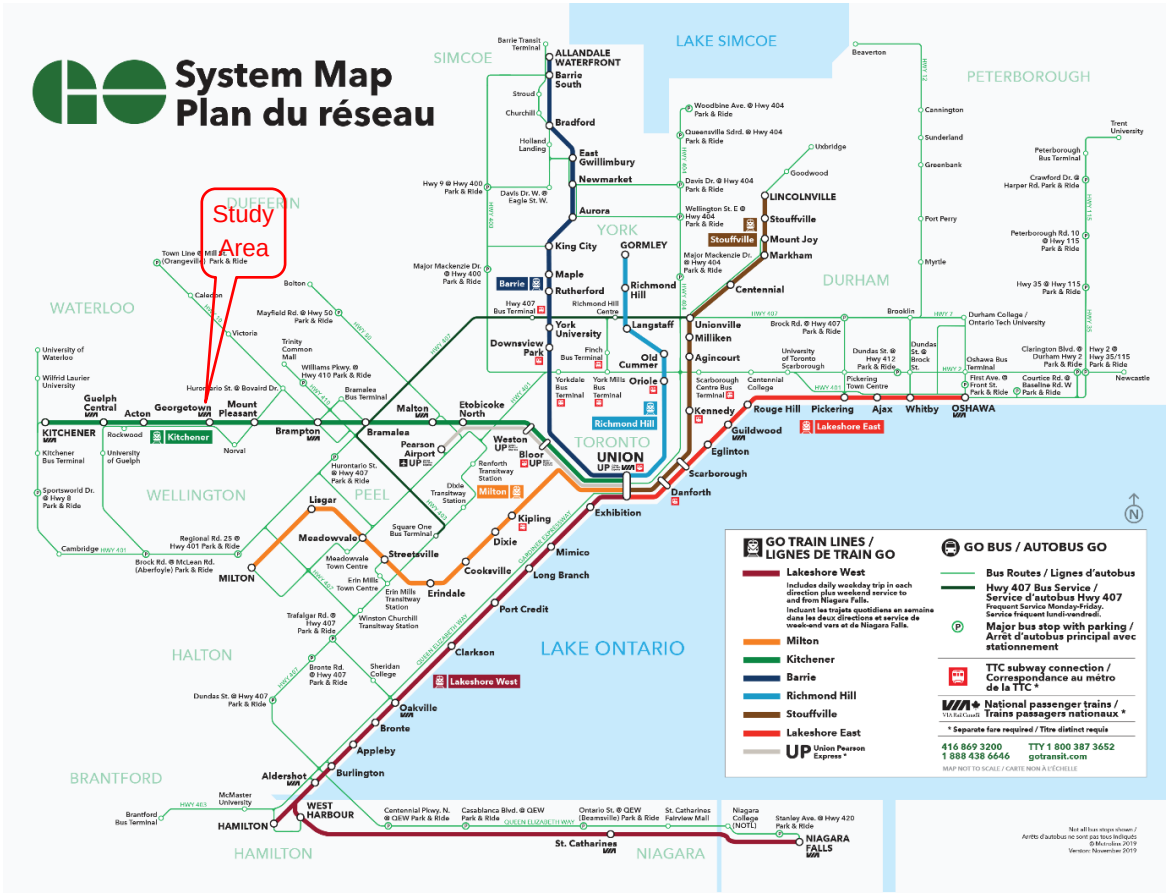


Source: Brampton Transit Web site

Figure 4-1: Existing Transit Services

4.1.2.2 *GO TRANSIT*

GO Transit operates the Kitchener Rail line close to the study area, with the Mount Pleasant GO Station located north of Bovaird Drive, east of Mississauga Road. The GO Transit Kitchener or KI train (Direction # I Mount Pleasant Go) has 8 stations departing from Union Station and ending in Mount Pleasant GO and operates on weekdays only. KI train starts operating at 8:34 AM and ends at 9:34 PM. The Region of Peel and City are advocating for two-way, all-day, 15-minute GO service along the Kitchener Line from Union Station to Mount Pleasant GO Station. The GO Transit system map is presented in **Figure 4-2**.



Source: GO Transit website

Figure 4-2: Go Transit System Map

In addition to the train service, GO Transit operates three bus routes that stop at Mount Pleasant GO Station:

- Route 30: Kitchener – Bramalea
- Route 31: Georgetown
- Route 33: Guelph – North York

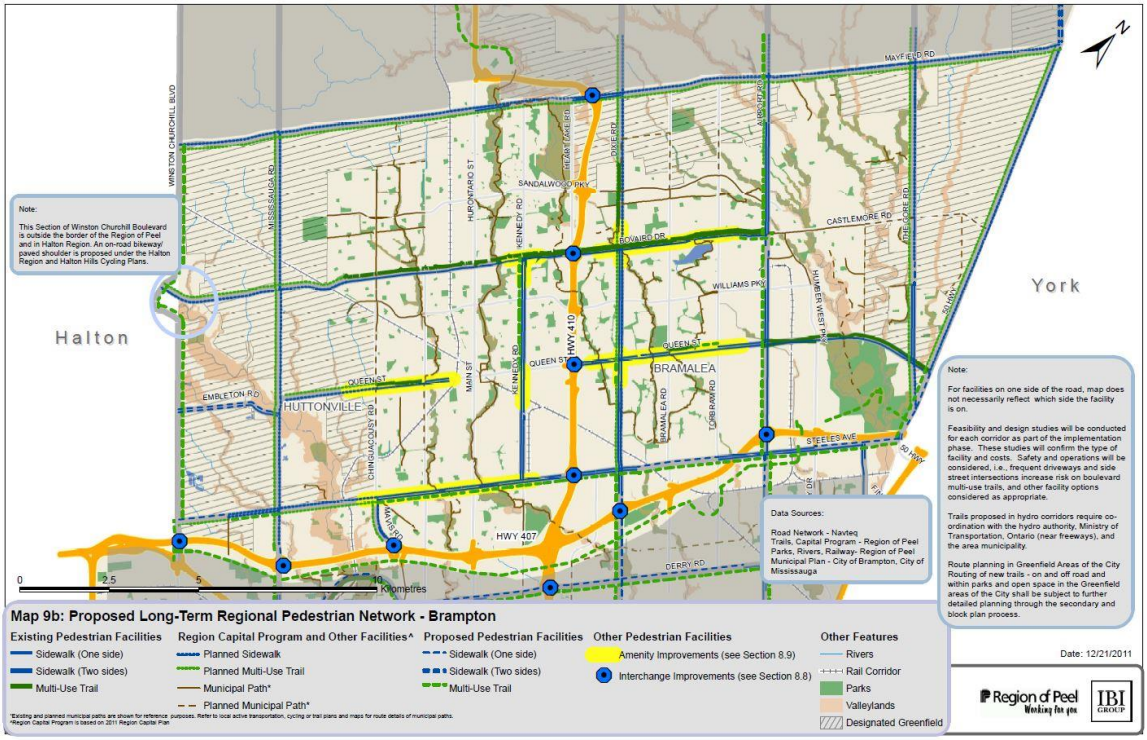
4.1.3 PLANNED ACTIVE TRANSPORTATION NETWORK

The City of Brampton's Active Transportation Master Plan (ATMP) is an evolution from Vision 2040, providing supporting policies and strategies to build a large network plan to support the vision and that is also more sustainable, accessible, affordable, convenient, safe, and more enjoyable. Common active transportation methods include walking and cycling, in-line skating and travel with the use of mobility aids and other power assisted devices moving at comparable speeds. ATMP aims to plan a transportation network that accommodates all modes of travel and to encourage cycling and walking as a real transportation option for both recreational and utilitarian purposes. The City of Brampton, through the 2002 Pathways Master Plan established a wide range of recreational trail access links to the City which provided a solid foundation for active transportation. Supporting east-west links to connect to these trails can significantly expand access to the City's facilities. The Region of Peel (2016) provides long term land use policy in keeping with provincial policy directions to encourage prioritizing transit, carpooling, active transportation and goods movement in planning for the development and expansion of new or existing Regional transportation corridors. The City of Brampton has a

large pathway system that connects parks and valleys and provides convenient pedestrian and cycling routes across Brampton. Brampton's existing bicycle facilities include:

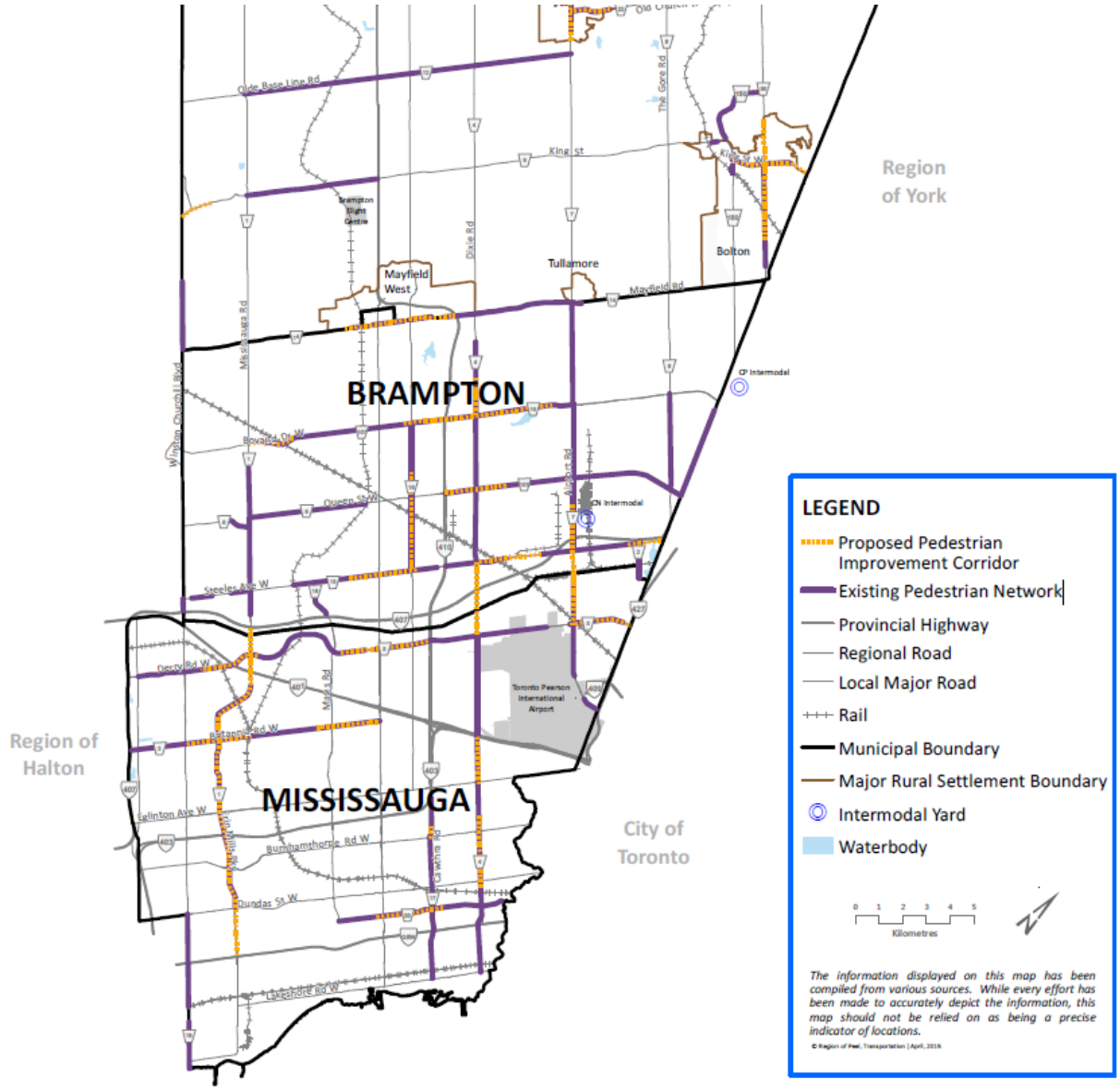
- Bicycle lanes
- Multi-use paths and trails
- Bicycle detectors at traffic signals

The proposed pedestrian network system is shown in **Figure 4-3**. **Figure 4-4** illustrates the Existing Pedestrian Network and Proposed Improvements. The proposed cycling network is shown in **Figure 4-5**, and further improvements are identified in the Brampton Pathways Master Plan which is discussed under future condition sections of this report.



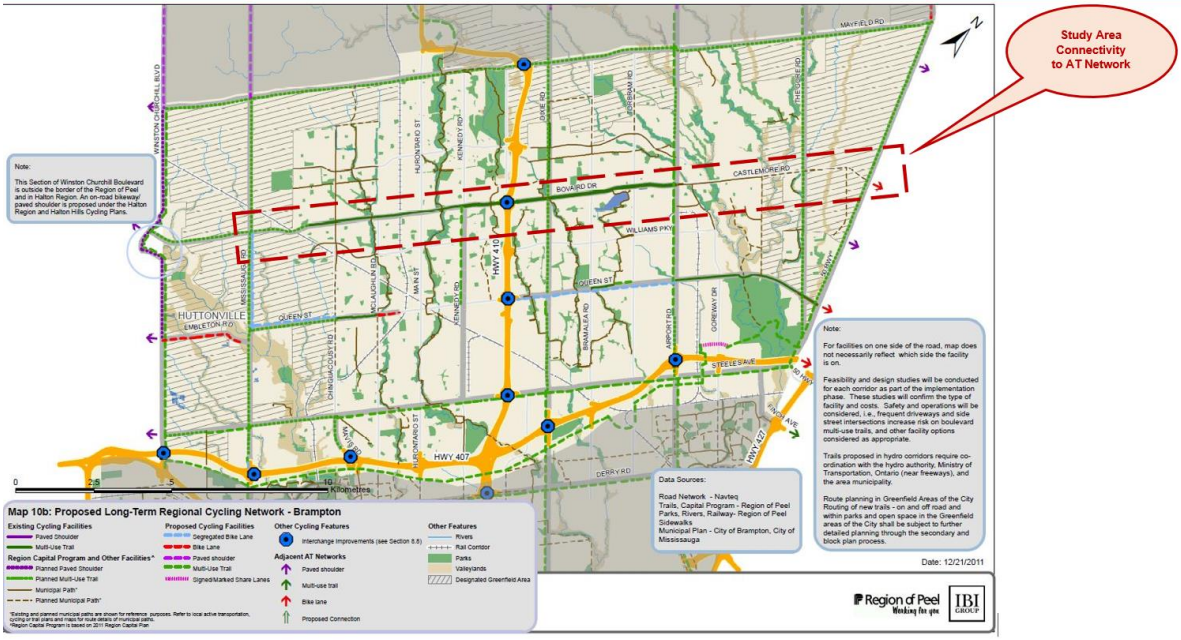
Source: Peel Active Transportation Study Map 9b – Brampton Pedestrian Network

Figure 4-3: Proposed Pedestrian Network in the Study Area



Source: Long Range Transportation plan 2019

Figure 4-4: Existing Pedestrian Network and Proposed Improvements



Source: Peel Active Transportation Study Map 10b – Brampton Cycling Network

Figure 4-5: Proposed Cycling Network

4.1.4 EXISTING 2014 TRAFFIC CONDITIONS

The existing traffic AM and PM peak hour turning movement count (TMC) data for the study area intersections were obtained from the Region of Peel. The TMC data collected for the study area intersections are from 2012 and 2013 and are provided in Appendix A of the Traffic Report (see **Appendix C**). The intersections are operating at capacity and therefore no adjustments were made to the existing counts. The existing AM and PM peak hours traffic volumes are shown in **Figure 4-6** and **Figure 4-7**.

The study area intersections considered for the intersection capacity analysis are:

- Bovaird Drive at Heritage Road (signalized)
- Bovaird Drive at Mississauga Road (signalized)
- Bovaird Drive at Ashby Field Road (signalized)

Examination of the existing volumes reveals the approximate range of two-way traffic volumes along Bovaird Drive is:

- About 1,400 vehicles per hour west of Heritage Road to 2,170 vehicles per hour east of Ashby Field Road in the AM peak hour
- About 1,620 vehicles per hour west of Heritage Road to 2,340 vehicles per hour east of Ashby Field Road in the PM peak hour

Mississauga Road at Bovaird Drive will operate over capacity, with long delays and several critical movements in the AM and PM peak hours. The delays for the critical movements would be long and vehicles would need to wait for more than one cycle to clear the intersection. The intersection would operate near capacity in the Saturday peak hour. The results are similar to those reported in the traffic report for the Mississauga Road EA.

Bovaird Drive at Creditview Road / James Potter Road would operate over capacity in the PM and Saturday peak hours and at capacity in the AM peak hour. The delays for the critical movements would be long and

vehicles would need to wait for more than one cycle to clear the intersection. The alternative scenario with dual eastbound left turn lane would improve the operation of the intersection and the intersection would operate with an overall V/C of 0.92 (LOS C) in the AM peak hour, 0.95 (LOS D) in the PM peak hour and 0.87 (LOS D) in the Saturday peak hour.

Bovaird Drive will operate at acceptable levels at the remaining study intersections with overall LOS C or better. The 2031 intersection capacity analysis results show that the East-West Connection intersections will operate with overall LOS C or better and no critical movements.

4.1.5 EXISTING TRAFFIC ANALYSIS

Intersection capacity analyses for the study intersections for existing traffic conditions for the AM and PM peak hours was analyzed using Highway Capacity Manual (HCM) methodology and Synchro 8 software.

Traffic signal timing and phasing for the signalized intersections in the study area were obtained from the Region of Peel and are provide in Appendix B of the Traffic Report (See Traffic Report in **Appendix C**). The analysis assumes the existing lane configuration and speed limits at the intersections.

This section documents the overall level of service (LOS), overall volume-to-capacity (V/C) ratios plus criterial movements for all signalized intersections. For this study, critical movements are those where the individual movement V/C ratio exceeds 1.0 (exclusive lanes) or 0.85 (shared lanes) as required in Peel Region's Guidelines for Traffic Impact Studies.

Six levels of LOS are defined using the letters "A" to "F". **Table 4-2** describes the LOS for signalized intersections considering the average delay in seconds per vehicle.

A summary of the capacity analysis is provided in **Table 4-3**. A more detailed summary of the intersection capacity analysis and queuing analysis results are presented in Appendix D of the Traffic Report (see Traffic Report in **Appendix C**).

Figure 4-6: Existing Traffic Volumes - AM Peak Hour

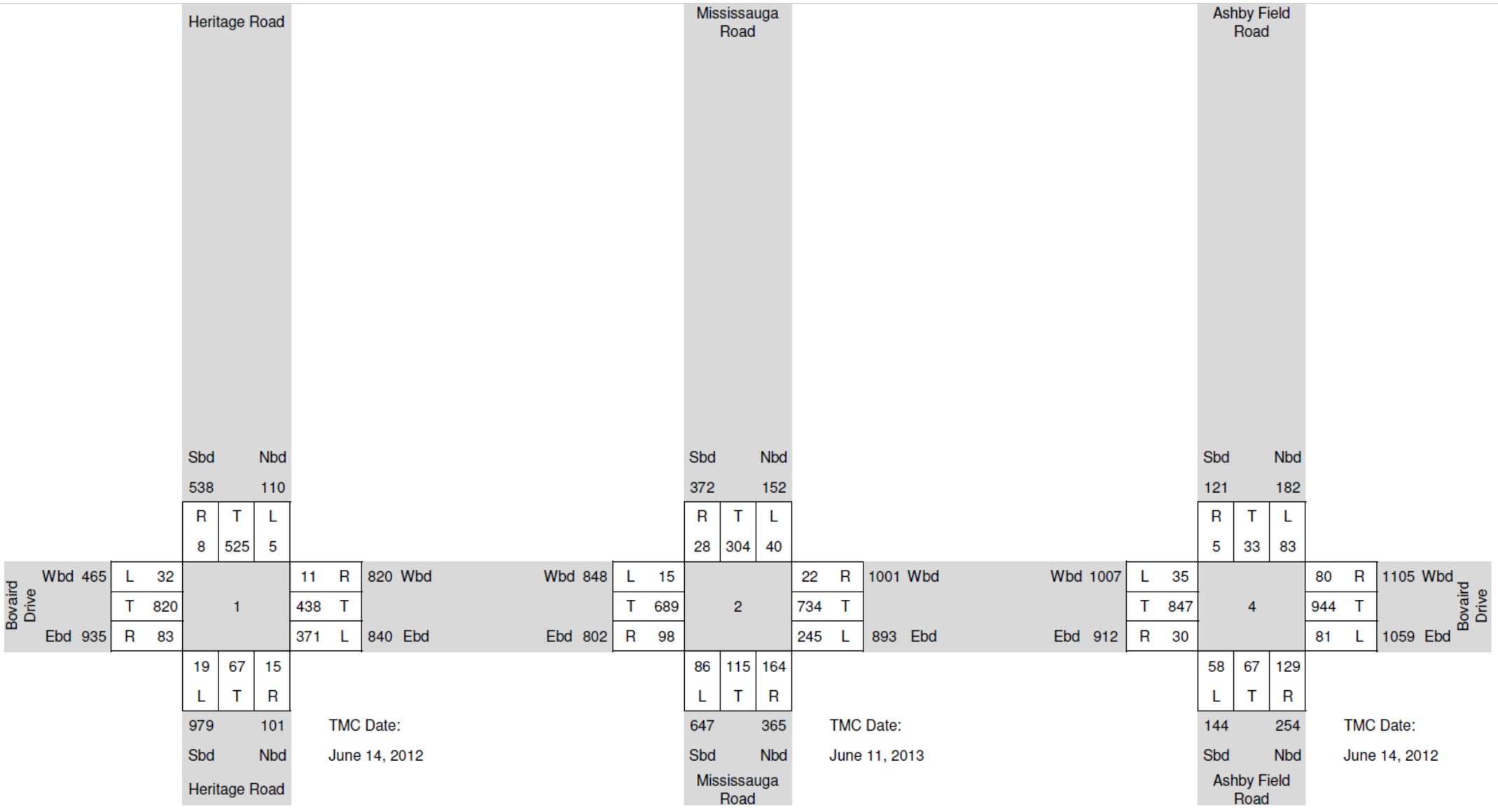


Figure 4-7: Existing Traffic Volumes - PM Peak Hour

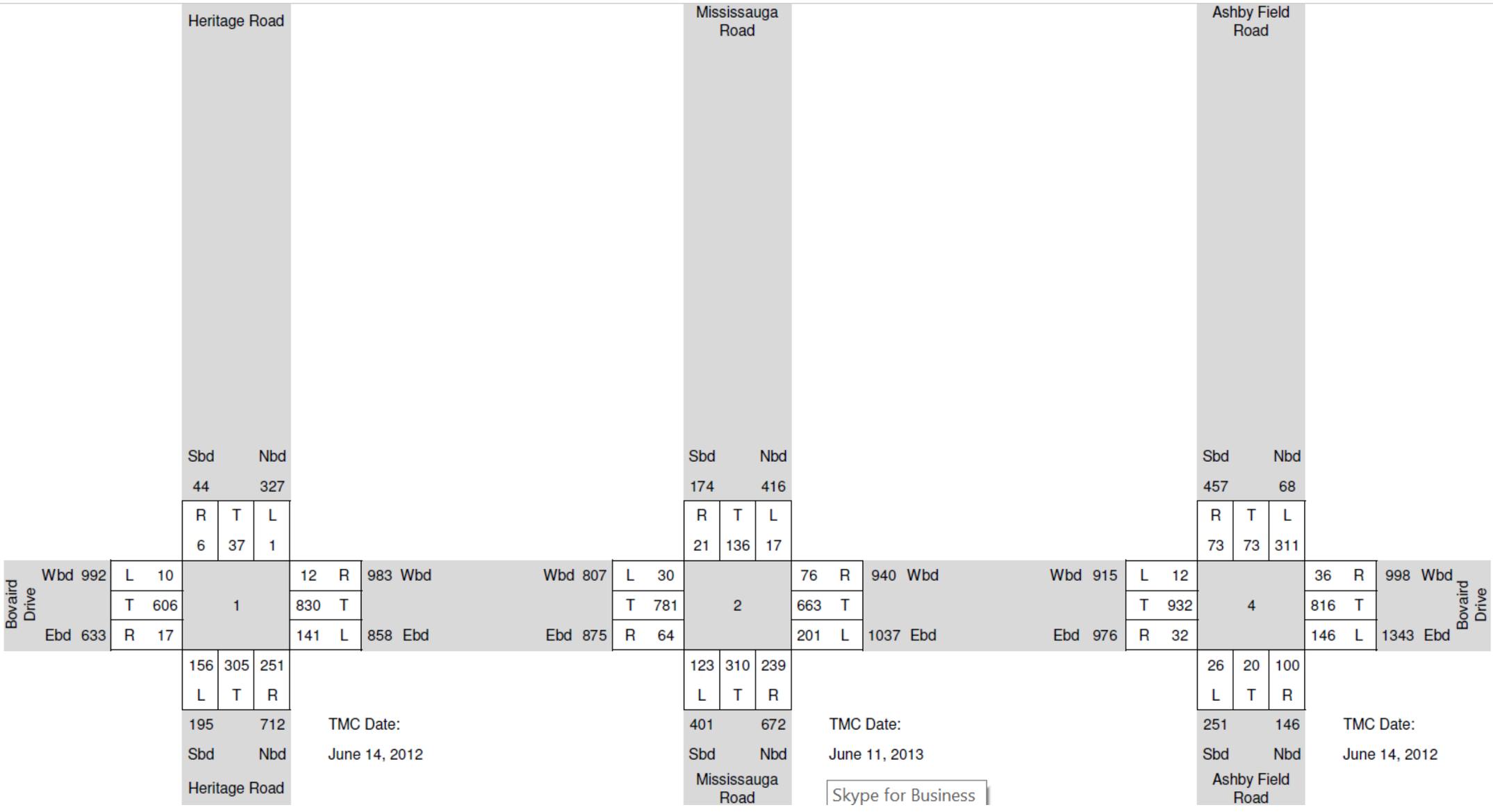


Table 4-2: Level of Service Description

LOS Description		Signalized Intersection – Average Delay per Vehicle (s/veh)
A	Vehicles rarely need to stop. Excellent conditions.	≤10
B	Some traffic stopped. Very good conditions.	>10-20
C	Greater percentage of traffic is stopped. An occasional signal cycle "fails". Good conditions.	>20-35
D	Most vehicles breakdown in operation. Long vehicular queues. Greater number of signal cycle "failures". Fair Conditions.	>35-55
E	Noticeable breakdown in operation. Long vehicular queues. Poor conditions.	>55-80
F	Traffic arrivals exceed capacity. Severe congestion. Extremely poor conditions.	>80

Table 4-3: Intersection Level of Services, 2014 Existing Traffic Volumes

Intersection	AM Peak Hour			PM Peak Hour		
Movement	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
Heritage Rd. and Bovaird Dr.	**1.45**	**139**	**F**	**1.12**	**76**	**E**
Eastbound Through	0.99	50	D	0.91	48	D
Westbound Left	1.33	212	F	0.92	73	E
Westbound Through	0.38	7	A	1.06	78	E
Northbound Through	0.85	80	E	1.11	103	F
Southbound Through	1.76	401	F	0.06	20	C
Mississauga Rd. and Bovaird Dr.	**0.90**	**43**	**D**	**1.05**	**62**	**E**
Eastbound Through	0.98	63	E	1.16	123	F
Westbound Through	0.78	13	B	0.91	53	D
Southbound Through	0.85	59	E	0.39	39	D
Ashby Field Rd. and Bovaird Dr.	**0.53**	**30**	**C**	**0.64**	**33**	**C**

The analysis of existing conditions identifies that at the assessed intersections (except Bovaird Drive at Ashby Field Road), the V/C ratio reported by Synchro 8 for at least one turning movement during one of the peak hours is over capacity. This implies more traffic may travel through an intersection than is considered physically feasible when using typical default Synchro parameters. Once traffic volumes reach the theoretical capacity of a lane, drivers tend to change their driving behaviour and become more aggressive, which may result in increased saturation flow rates at intersections, which are higher than those used in the study.

Under these conditions, it is customary for the intersection results to be calibrated to reflect actual roadway conditions and travel patterns; however, this was not completed for the EA study. Signal timing adjustments at study intersections can improve LOS and queuing at study intersections and will be reviewed under future conditions.

4.1.6 FUTURE TRAFFIC CONDITIONS

4.1.6.1 ROADWAY NETWORK IMPROVEMENTS

There are a number of roadway improvements anticipated in the study area. These roadway improvements are outlined below.

REGION OF PEEL

The Peel Region Long Range Transportation Plan (LRTP) study was initiated in late 2002 as part of the Regional Official Plan Strategic Update and following the 2012 LRTP, it was recently updated in 2019. The purpose of the study was to establish a transportation network system in Peel where 50% of travel is through sustainable modes, such as walking, cycling, transit, and carpooling by 2041.

The Peel Region LRTP 2019 has identified the following roadway improvements by 2031 in the study area:

- *Bovaird Drive*: 2 to 4 lane widening from Mississauga Road to 1.5 km West of Heritage Road (EA Completed)
- *Bovaird Drive*: 4 to 6 lane widening from James Potter/Creditview to Mississauga Road (EA Completed)
- *Bovaird Drive*: 4 to 6 lane widening from Mississauga Road to North/South Freeway (1 km W of Mississauga Road) (EA Completed)
- *Mississauga Road*: 2 to 4 lane widening from Bovaird Drive to Mayfield Rd (EA Completed)
- *Mississauga Road*: 4 to 6 lane widening from Financial Drive to Queen Street (Works in Progress)
- *Mississauga Road*: 4 to 6 lane widening from Queen Street to Bovaird Drive (Works in Progress)
- *Mississauga Road*: 4 to 6 lane widening from Bovaird Drive to Sandalwood Pkwy (EA Completed)

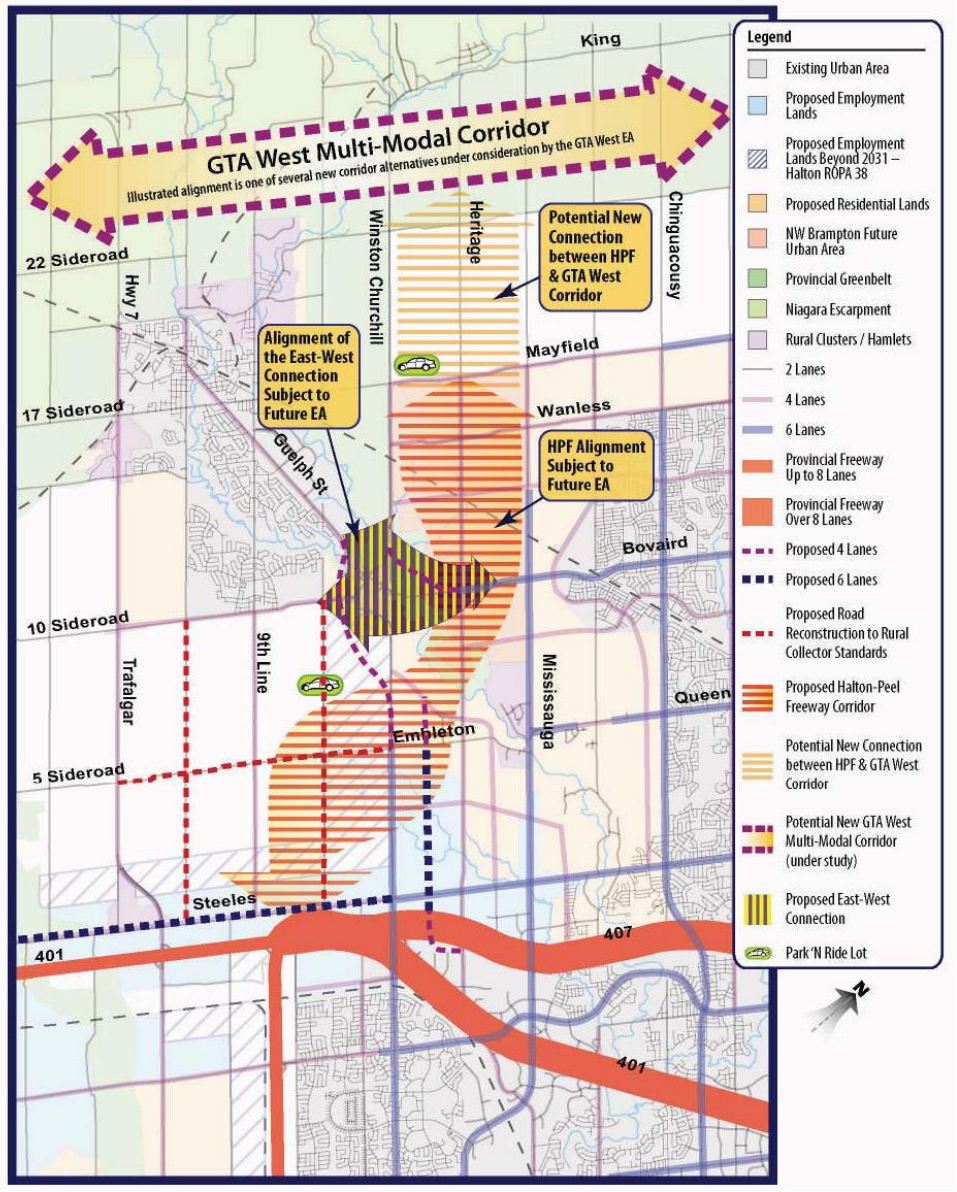
The recommended preferred alternatives from the recently completed EA studies for Bovaird Drive and Mississauga Road confirm the need to widen Bovaird Drive and Mississauga Road in accordance with the Region's Capital Program.

The Halton-Peel Boundary Area Transportation Study (HPBATS) identified the Halton-Peel Freeway Option as the preferred North-South Transportation Corridor (NSTC). The corridor will connect to Highway 401/407 to the south and extend north past Bovaird Drive and Wanless Drive by the 2031 horizon year. The approximate location of the NSTC is shown in **Figure 4-8**. It should be noted that in the Brampton EMME model, the NSTC is coded to intersect Bovaird Drive between Heritage Road and Mississauga Road. The HPBATS Report was adopted by the Councils of participating municipalities including the Region of Peel, the City of Brampton, the Town of Caledon, Halton Region and the Town of Halton Hills.

It should be noted that the Region's Capital Program is reviewed on an annual basis with respect to project schedules (accelerated or deferred), new projects and overall capital cost estimates and budget. Since the

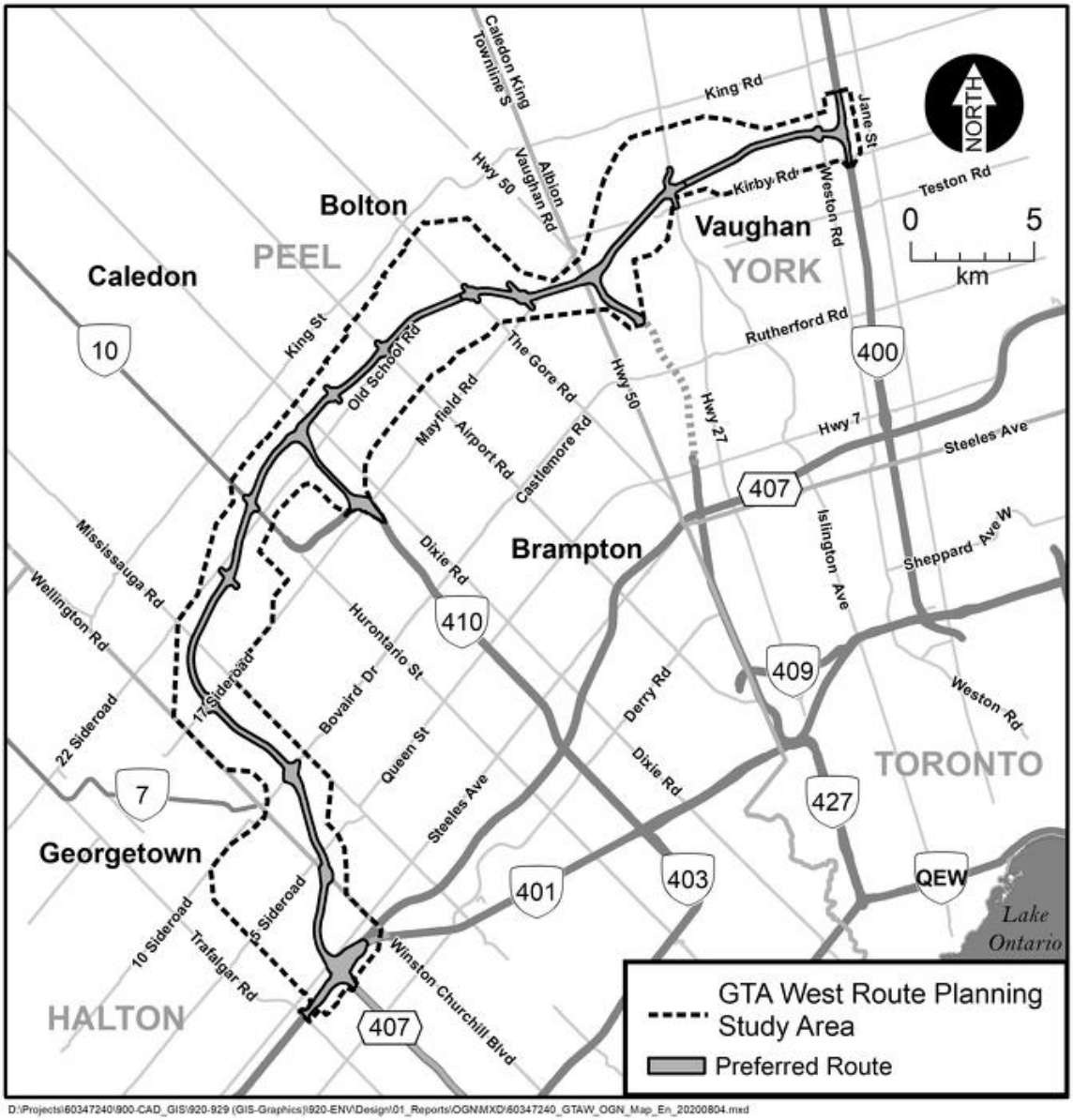
Capital Program is approved by Regional Council annually, the noted schedule for roadway improvements are potentially subject to change.

The GTA West Transportation Corridor Route Planning and Environmental Assessment Study was initiated to overlap with the HPBATS Study Area. The outcomes from Stage 1 of the GTA West was to develop a multimodal Transportation Development Strategy. The GTA West was initiated stage 2 of the Transportation Corridor Route Planning and Environmental Assessment Study in 2014 upon the recommendations from the first stage to address the future transportation demands by 2031. The new corridor will extend from Highway 400 (between Kirby Road and King-Vaughan Road) in the east to the highway 401/407 ETR interchange area in the west, and will feature a 400-series highway, a transitway, and potential goods movement priority features. The approximate location of the GTA West Corridor is shown in **Figure 4-9**.



Source: Halton Peel Boundary Area Transportation Study, May 2010

Figure 4-8: Approximate NSTC Location - Halton-Peel Freeway Option



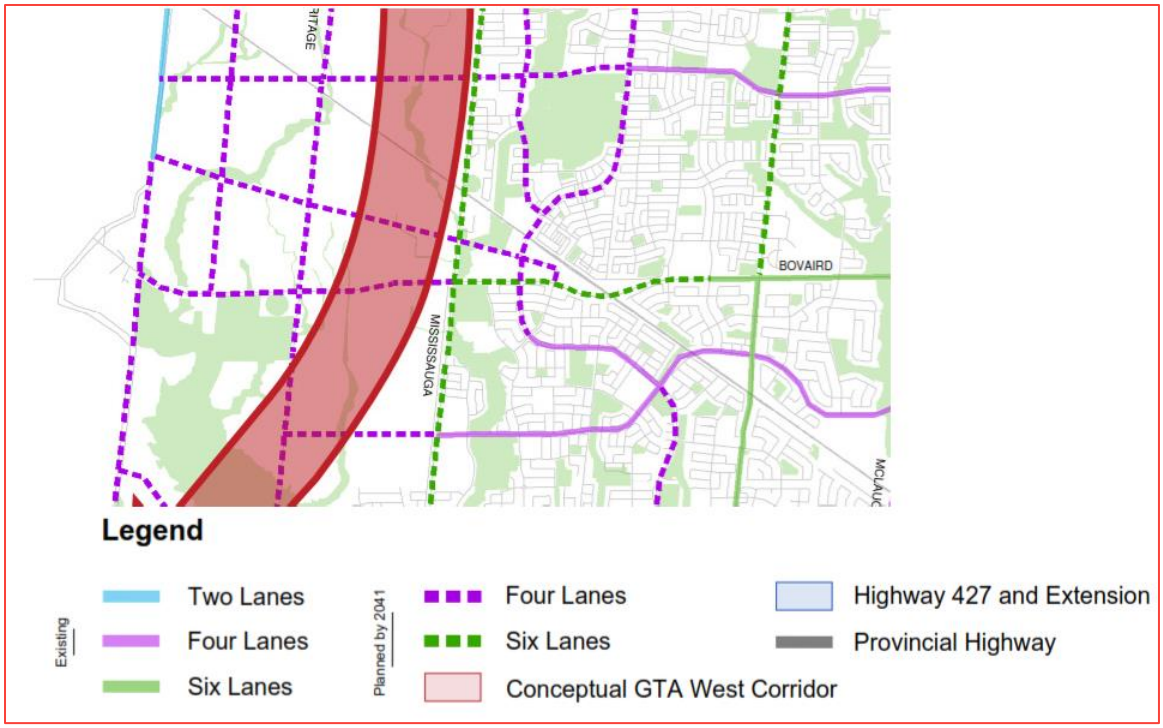
Source: GTA West Transportation Corridor Route Planning and Environmental Assessment, Stage 2

Figure 4-9: Route Alternatives for a New Multimodal Transportation Corridor - GTA West Corridor

CITY OF BRAMPTON

The City of Brampton Transportation Master Plan Update, Transit Map presented at PIC#2, 2014, MMM Group (see **Figure 4-10**), shows the following additional roadway improvements by 2041:

- realignment Creditview Road and widen to four lanes
- widening Heritage Road from two to four lanes north and south of Bovaird Drive
- construction the East-West Connection from Creditview Road to Winston Churchill Boulevard



Source: City of Brampton Transportation Master Plan Update, Roadway Map presented at PIC#2

Figure 4-10: Draft Recommended Road Network Needs by 2041

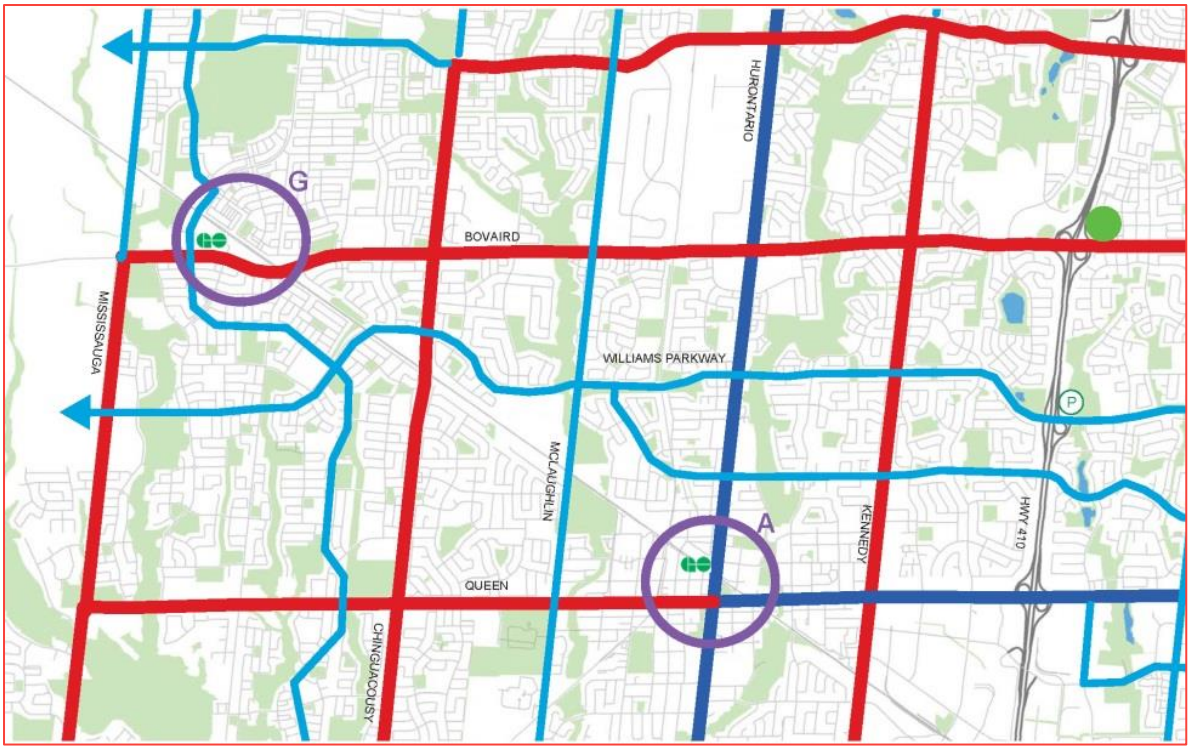
The secondary planning for Secondary Plan Areas 52 (Huttonville North) and 53 (Mount Pleasant West), collectively referred to as the "Heritage Heights Community", is currently in process. The most recent concept plan after consolidated input from various groups are shown in **Figure 3-2**.

Lagerfeld Drive is identified in the preferred network as a key transit and active transportation spine to achieve community connections and sustainable modes of travel.

TRANSIT NETWORK IMPROVEMENTS

The City of Brampton Transportation Master Plan Update, Transit Map presented at PIC#2, (see **Figure 4-11**), shows that Brampton Transit is expected to expand substantially. Improvements include:

- Züm on Bovaird Drive across Brampton and on Mississauga Road south of Bovaird Drive;
- Support corridors (Creditview Road and Mississauga Road);
- Mount Pleasant GO station is identified as a mobility hub gateway.



Source: City of Brampton Transportation Master Plan Update, Transit Map presented at PIC#2

Figure 4-11: Recommended Rapid Transit Implementation by 2041

4.1.6.2 *FUTURE TRAFFIC VOLUMES*

The traffic analysis and safety reports are found in **Appendix C.** In planning analyses such as transportation master plans and transportation studies for environmental assessments, typically the focus is more on link capacity and screenline capacity. The primary service quality measures for LOS are V/C ratio for a road link or series of links across a barrier or other screenline. Screenline analyses recognize that, while one facility may be projected to operate at capacity and below service standards, an adjacent facility may have significant reserve capacity; and the system is assessed balancing service across screenlines. The demand to capacity analysis planning approach adopted for this study examines the capability of the auto network to address existing levels of transportation activity as well as to determine the magnitude of the surplus capacity available in the future roadway network. A V/C ratio greater than 1.0 indicates above-capacity operations and a need for additional capacity along screenline corridors. A threshold value of 0.85 for the roadway V/C ratio is used to identify the critical capacity issues on a roadway.

As a part of the initial phase of the EA study, screenline and link analyses for the area were conducted to review the need for the proposed East-West Connection.

WSP collected the network attributes (number of lanes and capacity) and assigned auto trips (PM peak hour) for the following scenarios from City of Brampton:

- 2011Existing
- 2021 Do-Nothing (all 2021 planned roadway and transit improvements, no East-West Connection)
- 2031 Do-Nothing (all 2031 planned roadway and transit improvements, no East-West Connection)

A total of five screenlines, as summarized below, were evaluated for the study area:

- Screenline #1 – East of Winston Churchill Boulevard;
- Screenline #2 – East of Heritage Road;
- Screenline #3 – West of Mississauga Road;
- Screenline #4 – East of Transit Spine Road;
- Screenline #5 – East of Creditview Road.

4.1.6.3 *FUTURE ROAD NETWORK*

The future road network included in the EMME model for 2021 and 2031 conditions are consistent with the roadway network improvements identified in Section 4.1.6.1 of this report. A summary of the improvements that are relevant to the screenline analysis are shown in **Table 4-4**.

Table 4-4: Summary of Roadway Improvements (Number of Lanes) in EMME Model

Roadway Link	2011	2021 Do Nothing	2031 Do Nothing	2021	2031
Bovaird Drive West of NSTC	2L	2L	4L	2L	4L
Bovaird Drive between NSTC and Mississauga Road	2L	2L	4L-6L	2L	4L-6L
Bovaird Drive east of Mississauga Road	4L	4L	6L	4L	6L
Bovaird Drive east of Creditview Road	6L	6L	6L	6L	6L
Station Road between Heritage Road and Creditview Road	0L	0L	0L	4L	4L
Station Road west of Heritage Road	0L	0L	0L	0L	4L
Heritage Road North and South of Bovaird Drive	2L	2L	4L	2L	4L
Mississauga Road North of Bovaird Drive	2L	4L	6L	4L	6L
Mississauga Road South of Bovaird Drive	4L	4L	6L	4L	6L
NSTC	0L	0L	6L	0L	6L
Creditview Road Realignment	0L	4L	4L	4L	4L

4.1.6.4 *EXISTING (2011) LINK AND SCREENLINE ANALYSIS*

The existing (2011) link volumes and the capacities on the major roadways across the screenlines were obtained from the 2011 EMME plots. **Figure 4-12** shows the existing (2011) link volumes and V/C ratios for the peak direction of the peak hour. The existing (2011) link analyses show the following:

- all screenlines are below capacity;
- Bovaird Drive east of Heritage Road has near capacity link volumes (V/C = 0.85).

4.1.6.5 *FUTURE (2021) DO-NOTHING LINK AND SCREENLINE ANALYSIS*

The future (2021) Do-Nothing scenario link volumes and the capacities on the major roadways across the screenlines were obtained from the 2021 Do-Nothing EMME plots. **Figure 4-13** shows the future (2021) Do-Nothing scenario link volumes and V/C ratios for the peak direction of the peak hour. The future (2021) Do-Nothing analyses show the following:

- All screenlines are below capacity;
- Screenline #1 – East of Winston Churchill Boulevard has near capacity link volumes (V/C = 0.86);
- Bovaird Drive between Winston Churchill Boulevard and Mississauga Road has near capacity link volumes (V/C = 0.91 to 0.92);
- Bovaird Drive between Mississauga Road and Creditview Road has over capacity link volumes (V/C = 1.16).

4.1.6.6 *FUTURE (2031) DO-NOTHING LINK AND SCREENLINE ANALYSIS*

The future (2031) Do-Nothing scenario link volumes and the capacities on the major roadways across the screenlines were obtained from the 2031 Do-Nothing EMME plots. **Figure 4-14** shows the future (2031) Do-Nothing scenario link volumes and V/C ratios for the peak direction of the peak hour. The future (2031) Do-Nothing analyses show the following:

- All screenlines are below capacity;
- Screenline #3 – East of Mississauga Road has near capacity volumes (V/C = 0.88);
- Sandalwood Parkway between Mississauga Road and Transit Spine Road has near capacity link volumes (V/C = 0.85);
- Bovaird Drive between Winston Churchill Boulevard and Mississauga Road has near capacity link volumes (V/C = 0.87 to 0.88);
- Bovaird Drive between Mississauga Road and Creditview Road has over capacity link volumes (V/C = 1.15).

Figure 4-12: 2011 Peak Direction Peak Hour Link and Screenline Analysis

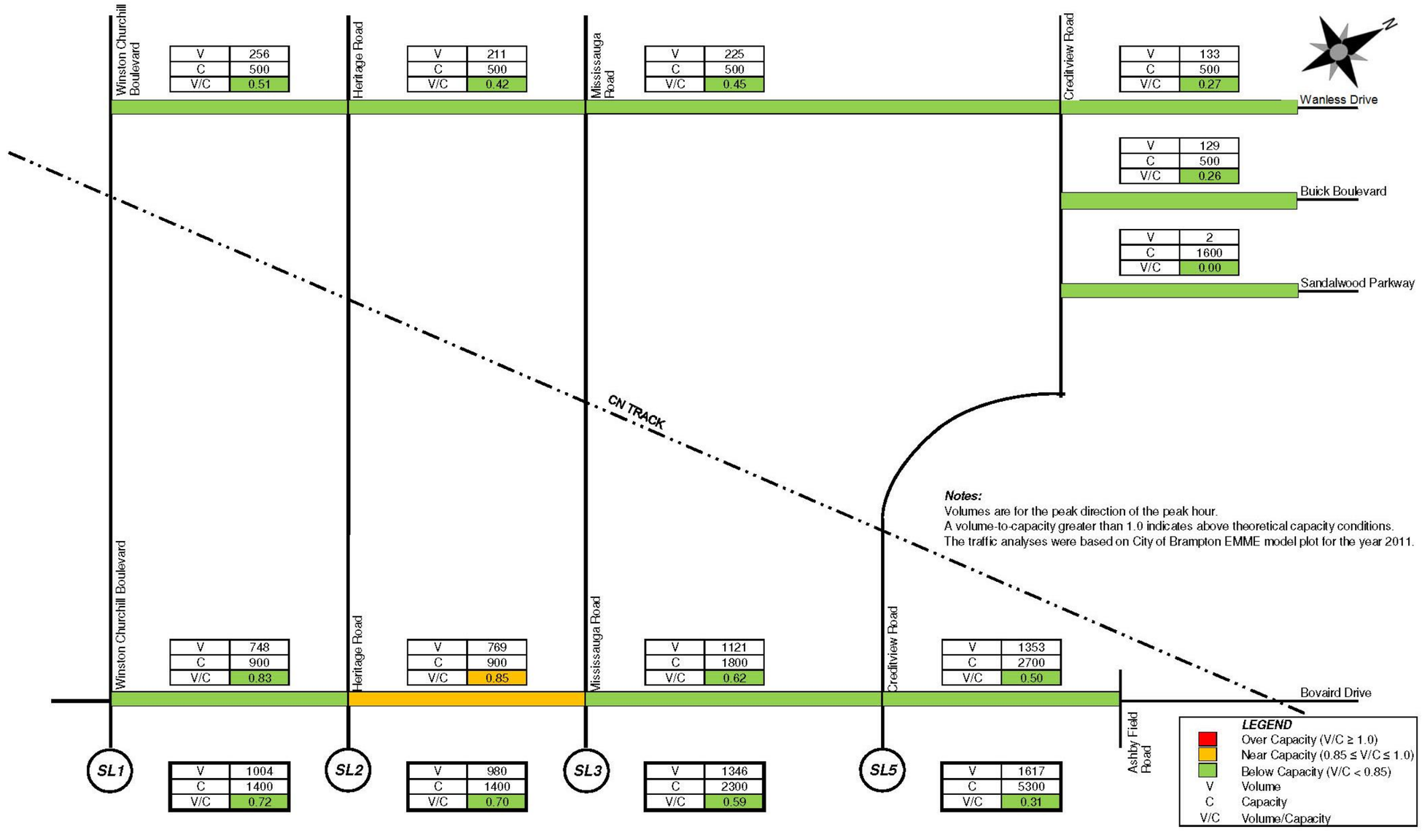


Figure 4-13: 2021 Do Nothing Peak Direction Peak Hour Link and Screenline Analysis

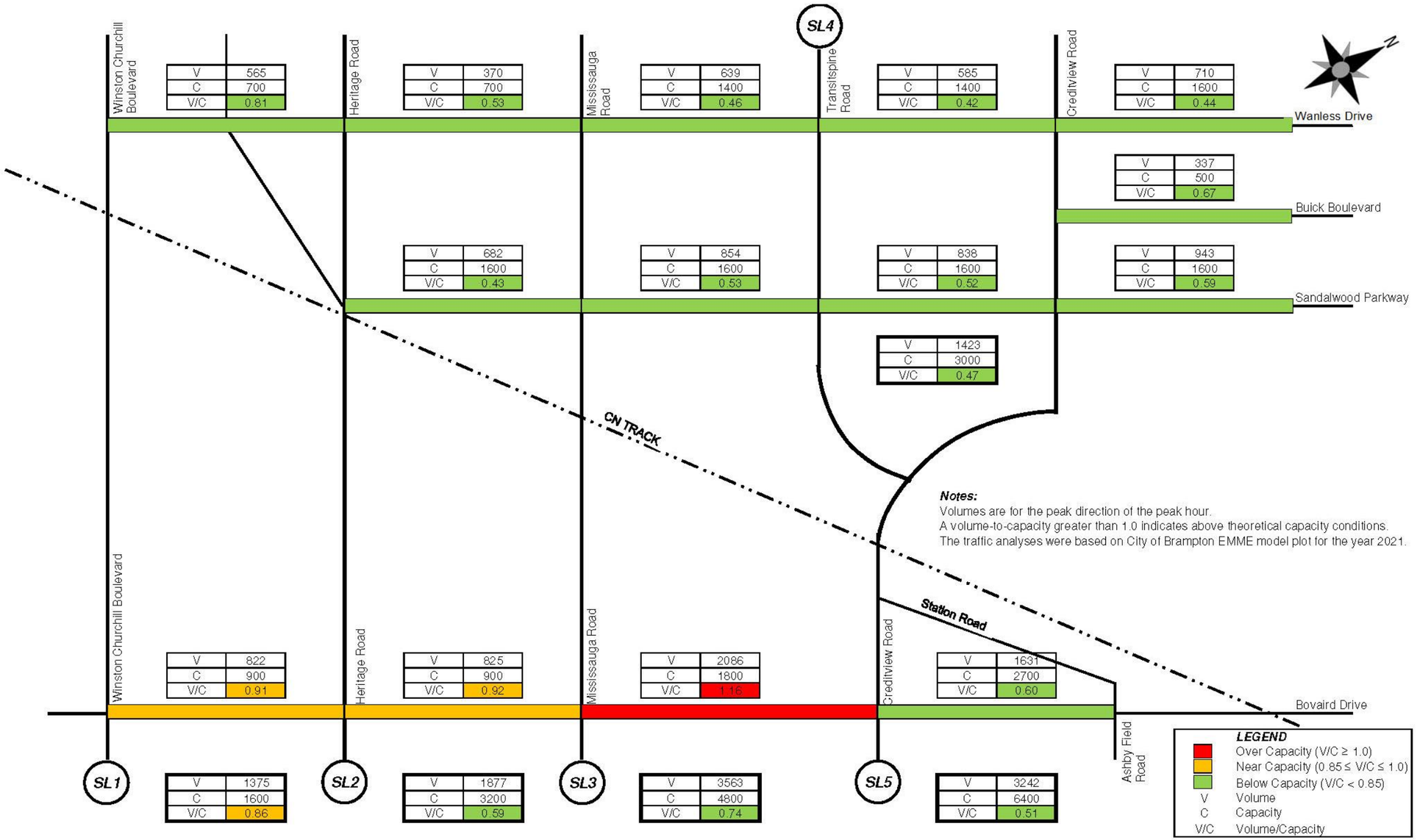
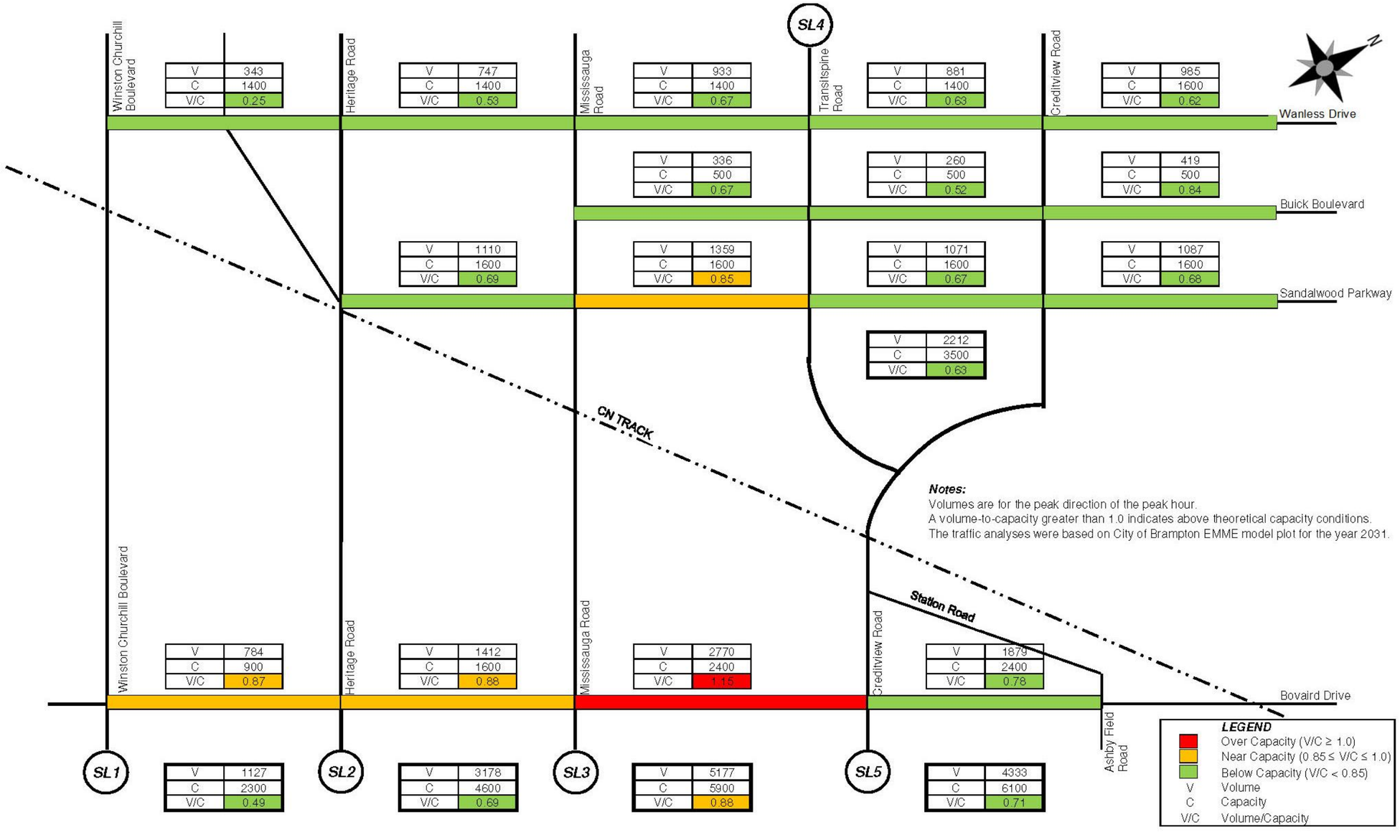


Figure 4-14: 2031 Do Nothing Peak Direction Peak Hour Link and Screenline Analysis



4.1.6.7 *FUTURE (2021) LINK AND SCREENLINE ANALYSIS*

The future (2021) scenario link volumes and the capacities on the major roadways across the screenlines were obtained from the 2021 EMME plots. **Figure 4-15** shows the future (2021) scenario link volumes and V/C ratios for the peak direction of the peak hour. The future (2021) analyses show the following:

- All screenlines are below capacity;
- Screenline #1 – East of Winston Churchill Boulevard has near capacity link volumes (V/C = 0.89);
- Bovaird Drive between Winston Churchill Boulevard and Mississauga Road has near capacity link volumes (V/C = 0.86 to 0.94);
- The East-West Connection alleviates approximately 270 vehicle per hour (vph) from Bovaird Drive between Mississauga Road and Creditview Road compared to the 2021 Do-Nothing network and the link V/C ratio reduces from 1.15 to 1.01.

4.1.6.8 *FUTURE (2031) LINK AND SCREENLINE ANALYSIS*

The future (2031) scenario link volumes and the capacities on the major roadways across the screenlines were obtained from the 2031 EMME plots. **Figure 4-16** shows the future (2031) scenario link volumes and V/C ratios for the peak direction of the peak hour. The future (2031) analyses show the following:

- All screenlines are below capacity;
- Screenline #3 – East of Mississauga Road improves from near capacity volumes (V/C = 0.88) to below capacity volumes (V/C = 0.79) when compared to the 2031 Do-Nothing scenario;
- Sandalwood Parkway between Mississauga Road and Transit Spine Road has near capacity link volumes (V/C = 0.87);
- Bovaird Drive between Heritage Road and Mississauga Road improves from near capacity link volumes (V/C = 0.88) to below capacity link volumes (V/C = 0.73) when compared to the 2031 Do-Nothing scenario; the section between Winston Churchill Boulevard and Heritage Road remains at near capacity volumes (V/C = 0.90);
- The East-West Connection alleviates approximately 260 vph from Bovaird Drive between Mississauga Road and Creditview Road compared to the 2031 Do-Nothing network and the link V/C ratio reduces from 1.15 to 1.05.

Figure 4-15: 2021 Peak Direction Peak Hour Link and Screenline Analysis

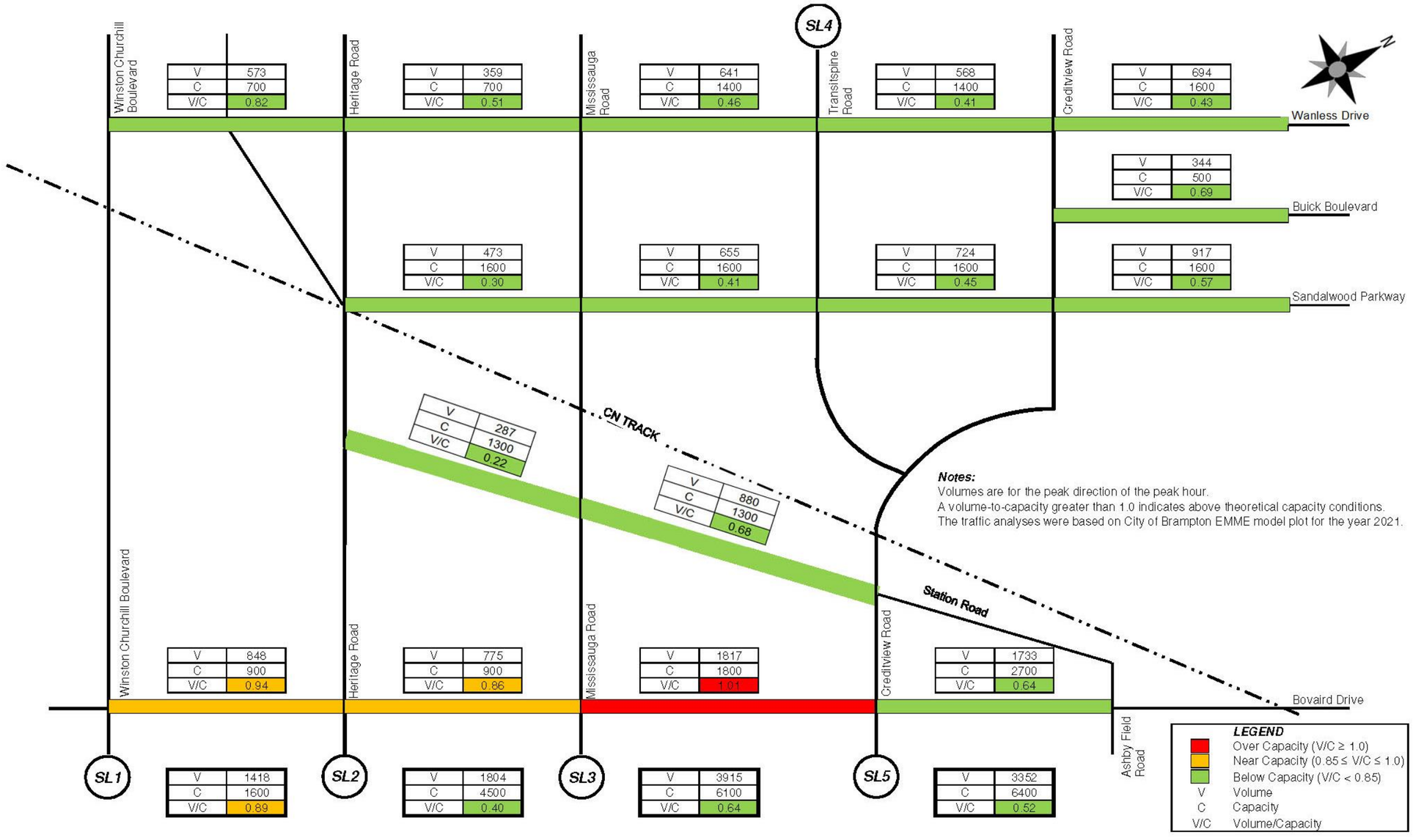
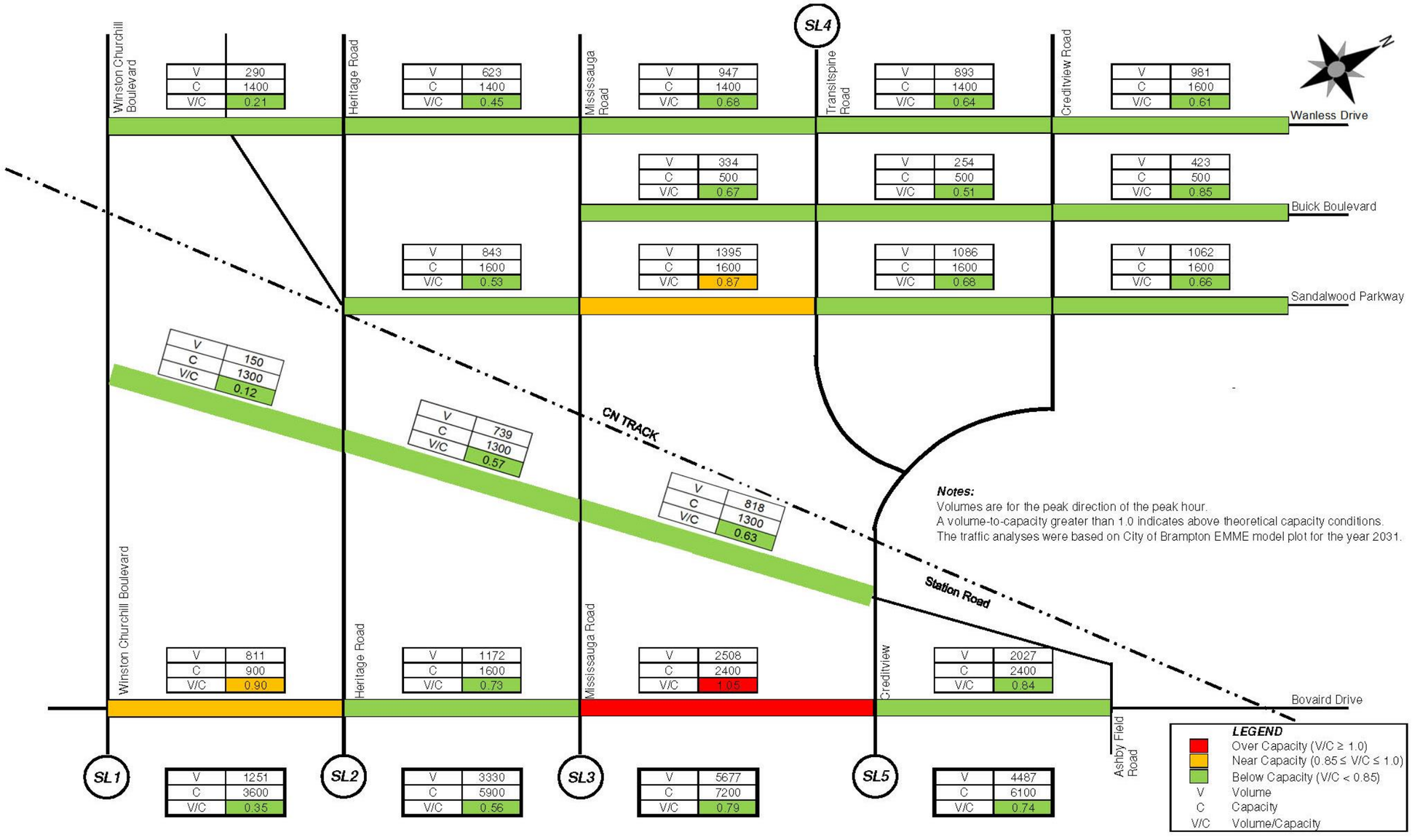


Figure 4-16: 2031 Peak Direction Peak Hour Link and Screenline Analysis



4.1.6.9 *FUTURE (2031) TRAFFIC ANALYSIS*

The 2031 total traffic analysis was completed for the key intersections in the study area to determine the required lane configurations and the anticipated operation of the intersections. The intersection capacity analysis for 2031 was undertaken using Synchro 8. The following assumptions were used for future conditions planning analysis:

- Heavy vehicle percentages from existing turning movement counts;
- PHF of 1.0 for all movements.

The key intersections that were assessed include:

- Bovaird Drive at Heritage Road;
- Bovaird Drive at Mississauga Road;
- Bovaird Drive at Creditview Road / James Potter Road;
- Bovaird Drive at Ashby Fields Road;
- Station Road at Heritage Road;
- Station Road at Mississauga Road;
- Station Road at Creditview Road.

A summary of the intersection capacity analysis results is provided in **Table 4-5**.

The lane configurations along Bovaird Drive were consistent with the recommendations from the Bovaird Drive EA (see **Figure 4-17**). The lane configurations recommended for the East-West Connection intersections are also included in the figure.

As requested by the Region, WSP undertook a signal warrant analysis for 2031 condition for the intersection of Mississauga Road at the East-West Connection. WSP completed the signal warrant analysis using OTM Book 12 Justification 7 – Projected Volumes and the forecasted 2031 traffic volumes. This methodology involves the calculation of an Average Hourly Volume (AHV) based on peak hour volumes and, for a future intersection either Justification 1 (Volume) or Justification 2 (Delay) needs to be met at 150%. The calculations show that a traffic signal is required in 2031 and the intersection was assessed as a signalized intersection.

Table 4-5: 2031 Intersection Capacity Analysis Results

Intersection	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
Movement	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS	V/C	Delay (sec.)	LOS
With Northbound Right Turn Lane									
Mississauga Road & Lagerfeld Drive	**0.57**	**18**	**B**	**0.52**	**17**	**B**	**0.44**	**17**	**B**
Without Northbound Right Turn Lane									
Mississauga Road & Lagerfeld Drive	**0.57**	**18**	**B**	**0.53**	**17**	**B**	**0.46**	**17**	**B**

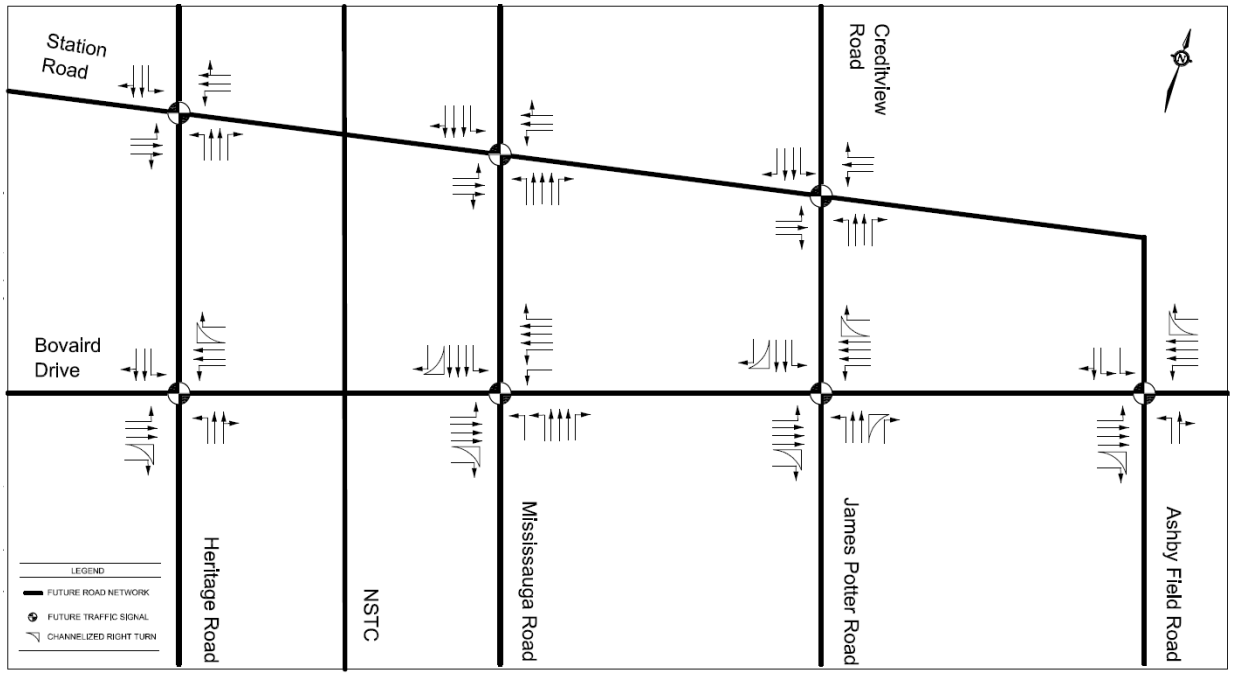


Figure 4-17: 2031 Future Lane Configuration (Bovaird Drive Lane Configuration as per Bovaird Drive)

The capacity analysis results show that with the northbound right turn lane the intersection would operate with an overall V/C ranging between 0.44 and 0.57, no critical movements and LOS B during the peak hours. Without the northbound right turn lane, the overall V/C would remain the same during the AM peak hour and marginally increase by 0.01 to 0.02 to 0.53 and 0.46 during the PM and Saturday peak hours. There would be no critical movements and the LOS would remain at LOS B.

4.1.7 TRAFFIC ANALYSIS CONCLUSIONS

In summary, the existing (2011) link analyses show that all screenlines are below capacity and that Bovaird Drive east of Heritage Road has near capacity link volumes.

With planned roadway improvements but without the East-West Connection, the following links and screenlines would have near capacity or above capacity link volumes:

- Screenline #1 – East of Winston Churchill Boulevard has near capacity link volumes (2021);
- Screenline #3 – East of Mississauga Road has near capacity volumes (2031);
- Bovaird Drive between Winston Churchill Boulevard and Mississauga Road has near capacity link volumes (2021 and 2031);
- Bovaird Drive between Mississauga Road and Creditview Road has over capacity link volumes (2021 and 2031);
- Sandalwood Parkway between Mississauga Road and Transit Spine Road has near capacity link volumes (2031).

With the East-West Connection, the following screenline and link capacity improvements would be realized:

- Screenline #3 – East of Mississauga Road improves from near capacity volumes to below capacity volumes (2031);

- Bovaird Drive between Heritage Road and Mississauga Road improves from near capacity link volumes to below capacity link volumes (2031);
- The East-West Connection alleviates approximately 260 to 270 vph from Bovaird Drive between Mississauga Road and Creditview Road compared to the networks without the East-West Connection and the link V/C ratio reduces from 1.15 (2021 and 2031) to 1.01 (2021) and 1.05 (2031).

4.1.8 SAFETY

As part of the Environmental Assessment for the East-West Connection (Lagerfeld Drive), WSP has conduced a plan-base road safety review of the preferred alternative alignment for the Lagerfeld Drive extension developed by the project team.

The purpose of this review was to identify the safety performance issues of the facility, and to determine the potential for the proposed geometry and operational features to contribute to collisions.

Road Safety Review can be found in **Appendix D**.

FINDINGS

The left-turn lanes at the Mississauga Road intersection have a negative offset. Therefore, sightlines for left-turning vehicles may be obstructed by vehicles in the opposing left-turn lane. This is of particular concern for the westbound approaching vehicles due to the presence of a horizontal curve west of the intersection. The provision of fully protected left-turn phases should be considered. Alternatively, the intersection reconfiguration to provide left-turn lanes with positive offsets should be examined.

- Both northbound and southbound approaches at the Mississauga Road intersection consist of a left-turn lane that varies in width. The width changes from 5.5 to 3.5 meters and a median island is introduced while approaching the intersection. This may impact driver expectation, and further result with undesirable driver behaviour and increased risk of collisions. Lane hatching, or some form of delineation should be considered to improve the lane width consistency at these locations.
- The cross-section changes for the southbound lanes on Mississauga Road. The outside lane terminates shortly after the intersection with Lagerfeld Drive. This configuration may contribute to increased driver workload and risk of collisions. Relocating this lane-drop further downstream of the intersection is more desirable option. The provision of appropriate warning signs and lane designation markings should be considered to improve the positive guidance offered to drivers and to reduce the risk of last-minute lane change maneuvers. It is our understanding that future plans include widening of Mississauga Road to a 6-lane cross section and that safety concerns indicated above may be eliminated.
- It was noted that a continuous bicycle lane is provided along Lagerfeld Drive only. The lane configuration provided on the eastbound and the westbound approaches to the Mississauga Road intersection may result with a following conflicts between motor vehicles and bicycles:
  - Right-turn conflicts – due to vehicles making right turns across the bike lane;
  - Left-turn conflicts – due to cyclists trying to change lanes and make left turns onto Mississauga Road.

  Mitigating measures should be considered to reduce the potential conflicts at the intersection. These may include the provision of additional delineation, installation of left-turn queue boxes or the provision of protected bicycle signal phase. The MTO Bikeways Design Manual1 provides guidance on recommended signs and pavement markings for bicycle facilities.
- A future access is proposed at station 80+530 in close proximity to the intersection with Creditview Road located to the east. Vehicles turning from this access may encounter limited turning sightlines due to the presence of horizontal curvature. This is of particular concern for vehicles making left turns, as they must cross two lanes and a median. Also, due to the potential for high traffic volumes on Lagerfeld Drive, drivers turning from this access may experience increased delay. As a result, frustrated drivers may select

gaps in oncoming traffic that are less than desirable. This may contribute to an increased risk of higher severity collision types (turning and angle collisions) at this location.

A review of the available turning sight distance at the proposed access was conducted by the WSP design team using the following values:

- Right turn: Minimum 130 m turning sight distance consistent with 70 km/h design speed;
- Left turn: Minimum 130 m turning sight distance consistent with 60 km/h design speed.

The road safety team has identified the following concerns with this approach:

- It is our understanding that posted speed of 50 km/h is proposed along the facility. The 130m value used for left turns is a minimum value for such conditions and is based on a vehicle turning left onto a two-lane two-way roadway. At the proposed access, left turning vehicles will be crossing two lanes and a median. As a result, the gap value used to determine the required left-turning sight distance should be adjusted as necessary to reflect the proposed conditions.
- Turning sightlines at the proposed access appear to be limited by a transformer to the west and a proposed building to the east.

The Modification to the proposed design should be considered to ensure sightline requirements are achieved. If the available sightlines can not be improved, potential countermeasures may include:

- The provision of advanced warning signage;
- The implementation of left-turn restrictions;
- The used of alternative intersection traffic control such as traffic signal or roundabout.

- The Preliminary Street Lighting Design plans does not indicate direct illumination of the Mississauga Road intersection. However, after discussion with members of the design team, it is our understanding that light fixtures will be installed on the proposed traffic signal poles and that the appropriate levels of illumination will be provided at this location.
- A review of the cross-section details provided by the design team, indicates that several roadside elements proposed along the facility may be located within the required clear zone and may present a roadside hazard for errant vehicles. Examples of such roadside hazards include large trees, utilities and light poles, retaining walls, and steep embankment slopes.

  A detailed review of specific roadside elements should be conducted, and opportunities to remove or relocate hazards beyond the required clear zone should be examined. If relocation is not practical, the hazards should be made traversable (i.e. provide frangible bases for light poles) or assessed for barrier need.

  It is our understanding that a posted speed of 50 km/h (60 km/h design speed) is proposed for this facility, and the expected AADT ranges from 8,000 to 13,000. The 2017 MTO's Roadside Design Manual suggests a 5 m clear zone for these conditions. This value is consistent with the 4.5 m to 5 m clear zone guidance offered in the 2017 TAC Guide.

  However, Chapter 7 of the 2017 TAC Guide also notes the following:

  In general, the guidelines influencing the Clear Zone design domain presented in this Chapter are intended for use on rural highways, urban and rural freeways, and urban expressways, where speeds are generally higher (greater than 70 km/h) and vehicles are operating under free flow conditions. However, for arterials and other non-controlled roadways in an urban environment, rights-of-way are typically narrower. In many cases, establishing a Clear Zone using the guidance in this section is not practical and sometimes not desirable from the perspective of street character and context…. As a result, a secondary goal should be to identify and treat critical urban roadside locations.

  In addition:

  Roadside barriers may be warranted in urban situations if there is a potential of vehicles leaving the roadway at a specific location and that the cumulative consequences of those departures outweigh the

cumulative consequences of effects with the barrier. The AASHTO RSAP toolset can be used to conduct a comparative analysis.

- The plans reviewed in the course of our work provide limited details on the extension of Lagerfeld Drive further west of the study area limit. Therefore, we have not provided comments on this segment of the design. It is our understanding that this extension is subject of a future study and development plans.

4.2 SOCIO-ECONOMIC ENVIRONMENT

The following sections describe the project study area, including the existing and future land uses, social/cultural and terrestrial and aquatic environmental features. Planning considerations are also presented. This information was considered when reviewing the potential effects of alternative planning solutions and design concepts.

A complete Socio-economic Report can be found in **Appendix E**.

4.2.1 EXISTING LAND USES

The study area, currently located in a rural area, is expected to develop as an urban area in order to maintain momentum in the development east of Creditview Road and south of Bovaird Drive West. The presence of the Mount Pleasant GO Station, identified as a potential Gateway Mobility Hub in the Metrolinx Regional Transportation Plan, provides opportunities for intense mixed-use transit-oriented development. Thus, the existing use will change as lands become developed based on the City's Official Plan and Secondary Plans.

Figure 4-18 shows the current land use of the study area. The existing land use can be grouped into five categories: agricultural and forestry, residential, business, community features, roads and utilities. It should be noted that the portion north of the CNR tracks is currently under development.

AGRICULTURAL AND FORESTRY

The presence of agricultural activity is observed on either side of Mississauga Road, with some agricultural operations such as the Crawflyn Farms. There is also a Provincially Significant Wetland (PSW) and an associated woodlot approximately mid point between Bovaird Drive and the CNR tracks, in the western part of the study area.

RESIDENTIAL

Some single-family residences are scattered along Mississauga Road. Dwellings located along Commuter Drive, north of CNR tracks, are clustered and part of the developing Mount Pleasant Village, a transit-oriented development.

BUSINESSES

Two agricultural related businesses are located along Mississauga Road: Norval Farm Supply, and the Apple Factory.

COMMUNITY FEATURES

Three community features are located in the project study area: the Guru Granth Sahib Academy, located along Mississauga Road; the Faith Gospel Tabernacle, located south of Bovaird Drive West and east of CNR tracks; and the Mount Pleasant GO Station, which provides GO commuter rail and bus service, located at the junction of the CNR tracks and Bovaird Drive West. Mount Pleasant GO Station is on the Georgetown commuter rail link, connecting Georgetown GO Station to Union Station.

ROADS AND UTILITIES

Mississauga Road and Bovaird Drive West (Highway 7) are both considered major regional arteries and secondary transit corridors by the City of Brampton (Schedule B and C). Ashby Field Road provides access to the Mount Pleasant GO Station from Bovaird Drive West.

The CNR tracks limiting the study area to the north cross the City of Brampton along an east-west axis. GO Transit, the regional public transit service for the Greater Toronto and Hamilton Area, also uses the CN rail line. A natural gas pipeline easement crosses from the west of Creditview Drive west and continues to the west of Mississauga road Hydro One Telecom has UG fiber at two places at project location west of Creditview Road up to Heritage Road bounded by Bovaird Drive West and the CN Rail. Further, there is an Aerial Fiber running along the Bovaird Drive west. Zayo facilities in the area indicated are within CN-owned structure along the rail right of way. The drawing from Telus has shown that Telus has cable in 360GT's leased ducts and vaults, close to the proposed route or area, along railway tracks. There will be a moderate potential to impact existing services and utilities such as planned sewer services and utility upgrades along the study area. However, a new right-of-way accommodates future improvements to services and utilities within the corridor.

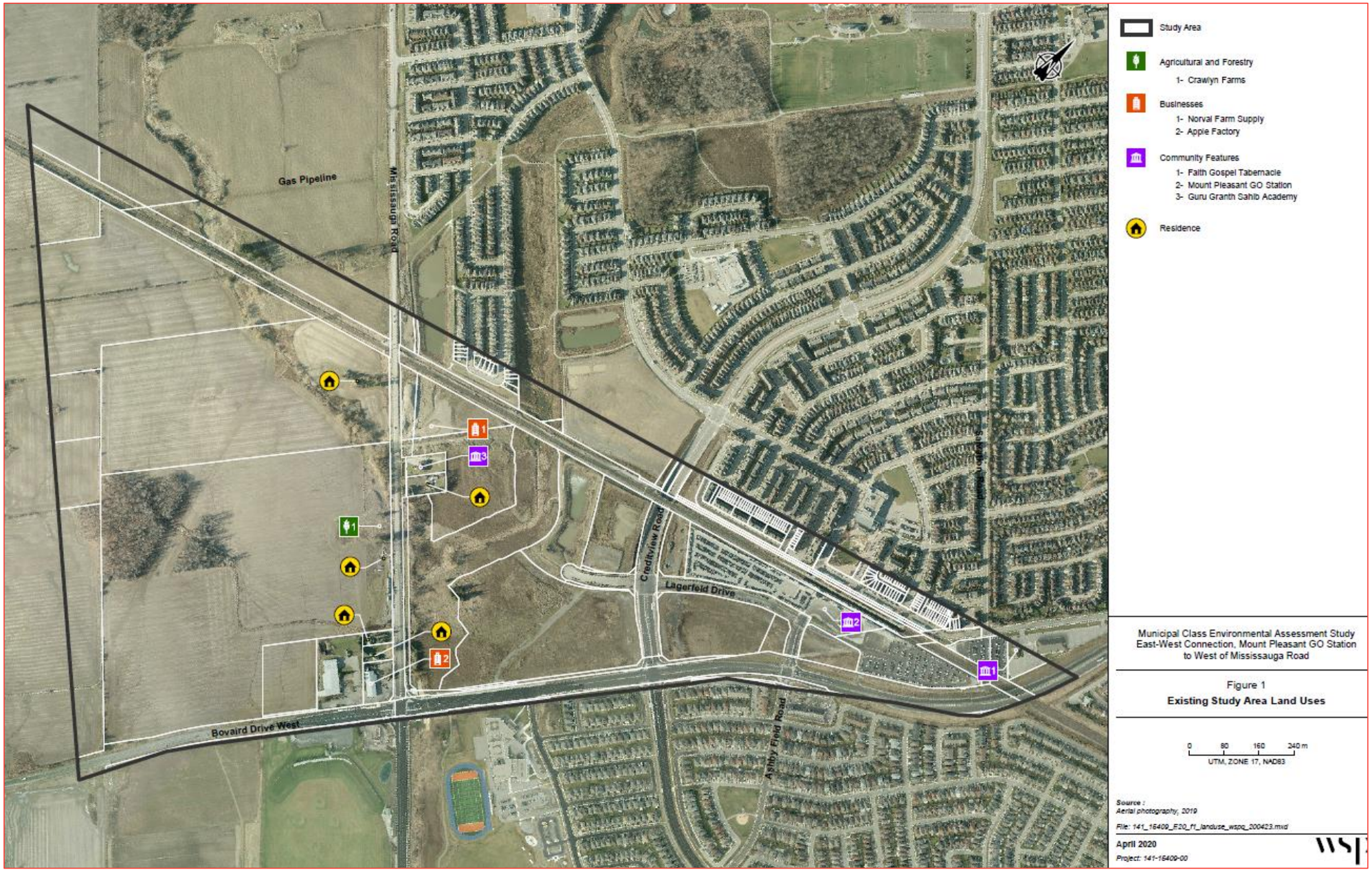


Figure 4-18: Existing Study Area Land Uses

4.2.2 FUTURE LAND USES

The territory of the study area is subject to three secondary plans. The Mount Pleasant and Fletcher's Meadow Secondary Plans were approved while studies leading to the approval of the Heritage Heights Secondary Plan are in progress. In addition, according to Brampton's 2040 vision, a portion of the study area is under study for a development project: the future commercial/town centre development (Mixed-use Centre). The following sections describe briefly the content of these plans.

4.2.2.1 MOUNT PLEASANT SECONDARY PLAN

The Mount Pleasant Secondary Plan (MPSP) Area 51 was approved in 2010. Subsequently, the block plans for sub-area 51-1 and sub-area 51-2 were also approved. The MPSP is intended to be a transit oriented and pedestrian friendly community that promotes environmental sustainability and superior community design.

The area affected by the MPSP within the study area (see **Figure 4-19**) is bounded by Mississauga Road, the CNR tracks and Bovaird Drive West, excluding the portion occupied by the Mount Pleasant GO Station, which is located on the territory of the community of Fletcher's Meadow. In this area, the Official Plan provides the actual designations "Residential" and "Open Space". Thus, the Secondary Plan proposes the uses "Retail" ("District Retail" that may contain residential units_ and "Natural Heritage System". The infrastructure provided under the Secondary Plan includes a "Stormwater Management Facility", a "GO Layover Facility", two "Grade Separations" and the extension of James Potter Road as an arterial road.

The overall framework for Mount Pleasant Block Plan 51-1 is defined by "the existing concession road fabric that will be developed as the major community road network. This network consists of the north-south arterials including Mississauga Road and Creditview Road/James Potter Road and the east-west roads consisting of Mayfield Road, Wanless Road, Sandalwood Parkway and Bovaird Drive. To various extents, these roads are expected to carry the vast majority of vehicular traffic and transit service to Mount Pleasant, the Mount Pleasant Village transit hub and outlying communities.

The Mount Pleasant Secondary Plan has provided noteworthy objectives and policies that will deliver an improved Natural Heritage System (NHS), including its ecological functions while balancing the other planning considerations over the current conditions.

MOUNT PLEASANT SECONDARY PLAN AREA TRANSPORTATION MASTER PLAN

The Mount Pleasant Secondary Plan Area Transportation Master Plan (June 2009) is the basic description of the transportation infrastructure required to accommodate and support the Mount Pleasant Secondary Plan Area.

The Transportation Master Plan's (TMP) objectives aim to create "an innovative-pedestrian-friendly and transit-oriented community and ensure that both the road network and the community-friendly transit service are planned and implemented in conjunction with one another. It considers a wide range of options to satisfy future travel demands and establishes the need for future transportation improvements."

The road network recommended is intended to reflect the principles of continuity and connectivity of roads. These principles are viewed as key elements of the Mount Pleasant Community. "A network of roads, with direct connections to existing roads, provides an efficient way for future residents and workers in Mount Pleasant and adjacent existing communities to travel between neighbourhoods, whether by automobile, transit, walking or cycling."

Since the Mount Pleasant TMP completion, several road Environmental Assessment studies in the Mount Pleasant Secondary area and in the vicinity of the Mount Pleasant GO Station have been completed and currently are in the design or construction stage. Two major projects are the Creditview Road realignment which this has been completed and the widening of Mississauga Road. **Figure 4-19** shows the Mount Pleasant Secondary Plan –Future Study Area Land Uses.

4.2.2.2 *FLETCHER'S MEADOW SECONDARY PLAN*

The Fletcher's Meadow Secondary Plan was approved in 1998. It includes provisions for the re-alignment of the Creditview Road in conjunction with the development of the secondary plan area and Mount Pleasant GO Station.

Under this Secondary Plan, the designation "Mixed Used Node" is given to the land that is part of the project study area bounded by Bovaird Drive to the south, Lagerfeld Drive and Go Transit lands to the north, Creditview Road to the west, and Go Transit lands to the east (see **Figure 4-20**). In addition, the Secondary Plan designates the lands where the Mount Pleasant GO Station is located a "Special Policy Area".

The Block Plan of the area, Fletcher's Meadow Sub-Area 44-1 also called the Mount Pleasant Village Mobility Hub Block Plan has been designed to create a transit-oriented urban village core around the Mount Pleasant GO Train Station. This planned future Mixed-Used Centre is expected to be composed of employment lands, commercial, office and higher density residential uses.

BY-LAW 25-2013

In February 2013, the City of Brampton adopted amendment number OP 2006-079 and its purpose being to allow district retail uses in the southerly portion of the "Mixed Used Node" area for the Fletcher's Meadow Secondary Plan. It also establishes an increased limit in the amount of retail/commercial space within the "Mixed Use Node" and articulates the mix of uses to achieve the required density target in the Mount Pleasant Mobility Hub Block Plan. Furthermore, this amendment provides a collector road function of Lagerfeld Drive and its westerly extension and includes a requirement for a contribution of costs for improved pedestrian access along Bovaird Drive West to the Mount Pleasant GO Station.

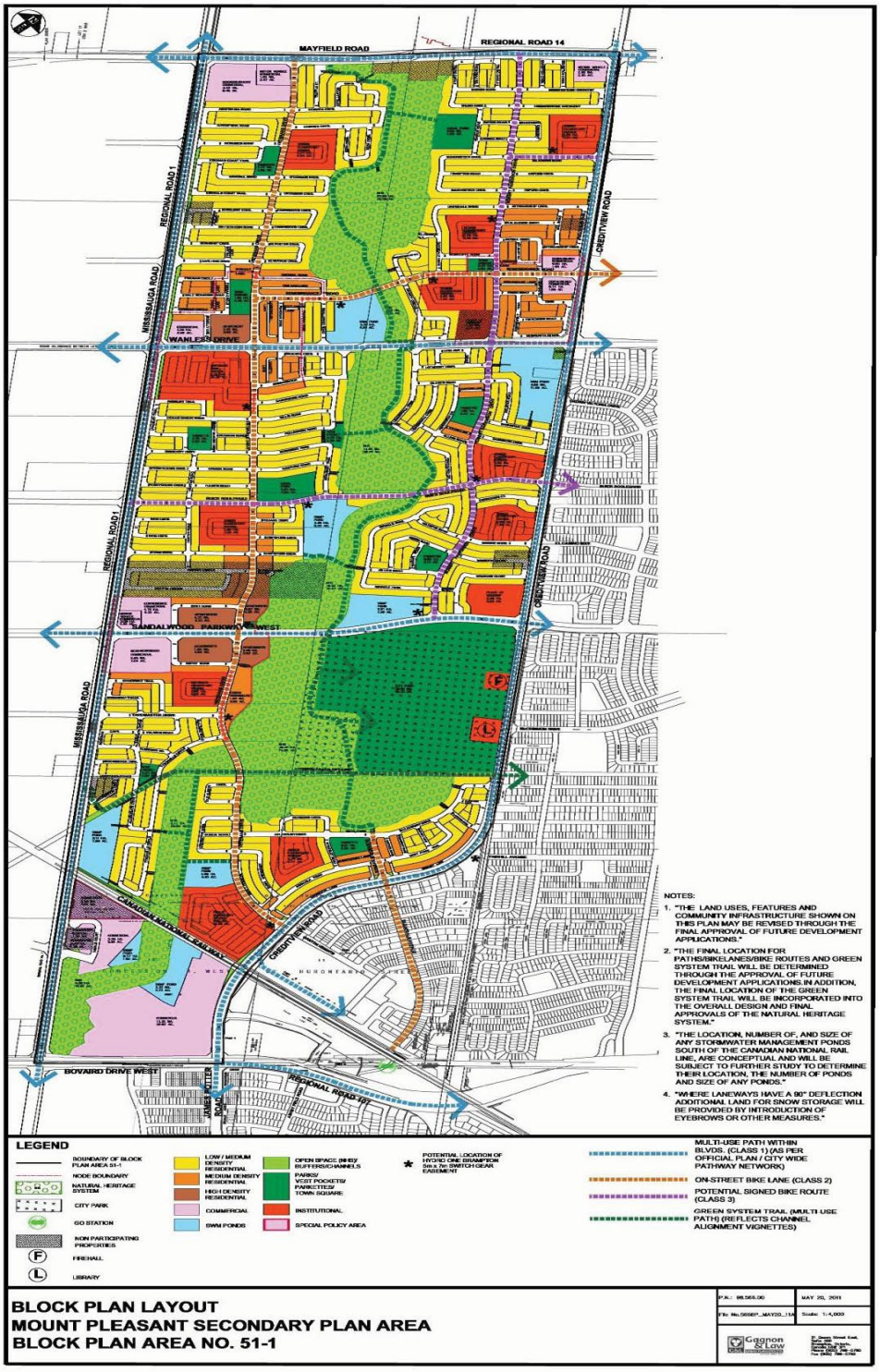


Figure 4-19: Mount Pleasant Secondary Plan - Future Study Area Land Uses

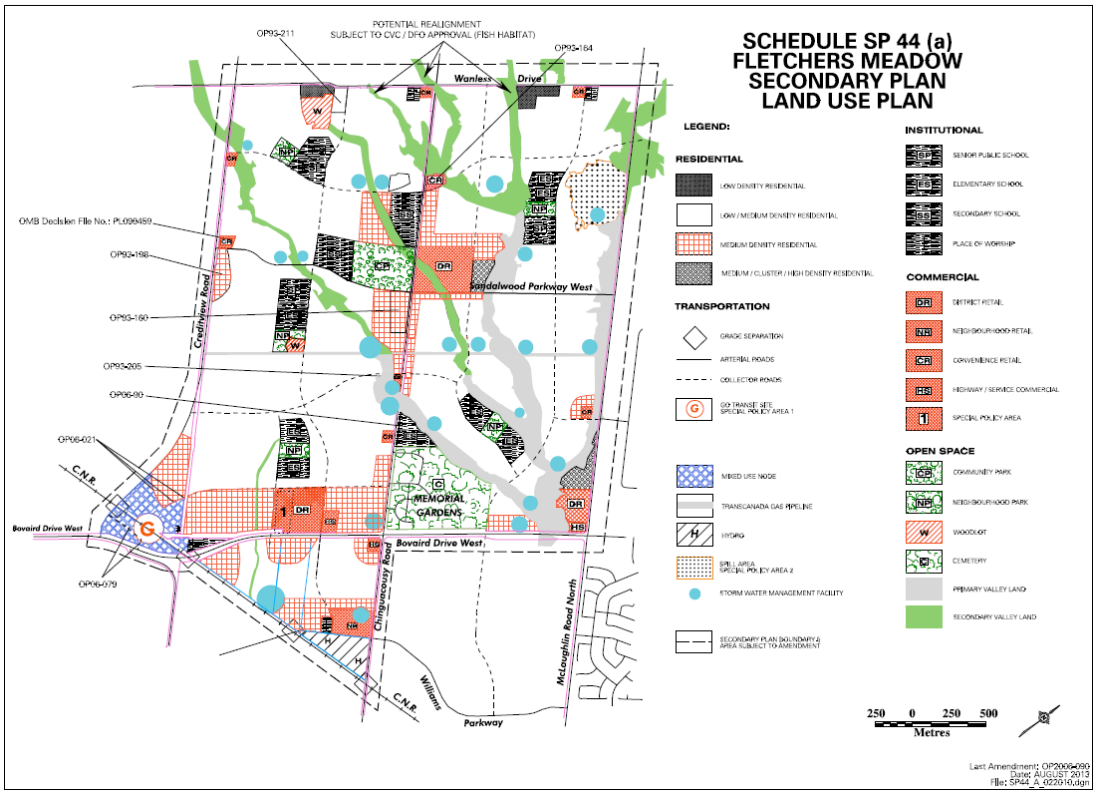


Figure 4-20: Fletcher's Meadow Secondary Plan

4.2.2.3 *HERITAGE HEIGHTS PRELIMINARY CONCEPT PLAN*

Part of the study area, the sector known as Heritage Heights is located west of Mississauga Road (see **Figure 3-2**). This area was designated by the City of Brampton for urban expansion and to accommodate a portion of its future growth. Heritage Heights is planned to accommodate 43,000 residents and allow for the creation of 20,000 jobs by 2031.

In 2009, secondary planning was initiated by the City for this community and in 2013, a Preliminary Concept Plan was presented. Regarding the project study area of the project, two main uses are planned on both sides of Lagerfeld Drive, designated as a character road, which connects to the Mount Pleasant GO Station. This designation is meant to highlight that the road's cross section is more compact with a strong built form orientation to the street, with emphasis on a comfortable pedestrian environment through unique streetscape features and adjacent land uses. North of Lagerfeld Drive, it is designated as "Compact Urban Residential", and to the south, the land is designated for a "Proposed Regional Centre".

At the time of this study, the City is in the process of developing an updated secondary plan for Heritage Heights, which is expected to be different from the 2013 plan. There are no secondary plans in place for Areas 52 & 53 (Heritage Heights). Secondary planning is underway.

MIXED-USE RETAIL CENTRE

The City has received the application to amend the Official Plan from the owner of a property which is located within the Heritage Heights Community, for which the City has initiated Secondary Planning. A property owner intends to develop a new mixed-use regional retail centre on its site. The application to amend the Official Plan

was submitted to the City of Brampton in the aims to add the subject lands to the Mount Pleasant Secondary Plan as a Special Policy Area (City of Brampton, June 9, 2014).

The original proposal for Regional Centre is as follows: To permit a three phase development including an enclosed regional retail centre with an approximate gross floor area of 1,129,470 square feet; street retail uses with an approximate gross floor area of 140,800 square feet; pad retail uses with an approximate gross floor area of 85,500 square feet; office uses with an approximate gross floor area of 300,000 square feet; a hotel and medium and high density residential development of approximately 2,000 units. The development application is currently inactive, and a new development application is pending. Development plans have been provided to WSP. The Mattamy site at the north east corner of Mississauga road/Lagerfeld Drive is in preliminary stage at this time (not approved). **Figure 4-21** shows the land use designation in the study area.

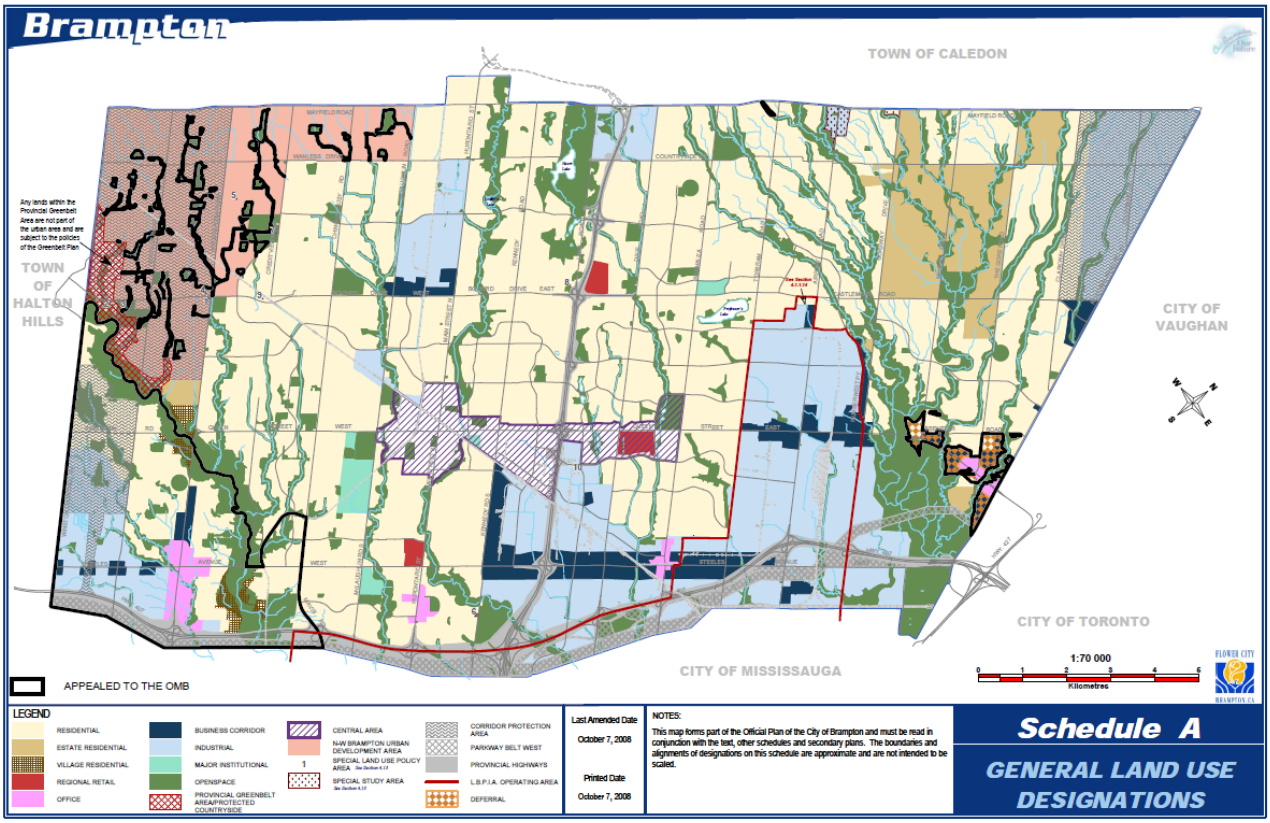


Figure 4-21: City of Brampton Land Use Designation

4.3 RELATED PLANNING STUDIES

4.3.1 PEEL REGION OFFICIAL PLAN

The Region Official Plan (ROP) is a long-term plan used to assist the Region in managing growth and development. The Official Plans of Mississauga, Brampton and Caledon must conform to the ROP. Peel's ROP was adopted by Council on July 11, 1996 and approved with modifications by the Minister of Municipal Affairs and Housing on October 22, 1996. As required by the Planning Act, a municipality will revise its Official Plan every five years. In 2013, the Region of Peel completed the Peel Region Official Plan Review to

bring its Official Plan policies into conformity with provincial requirements. The plan outlines strategies to guide growth and development in Peel Region until 2041.

The following elements from Peel's ROP are noteworthy with regards to the project study area:

- The Northwest Brampton Policy Area, which intersects the study area, is to be developed as an urban area to accommodate a large portion of Brampton's growth. Opportunities will be maximized for the expansion of services at the Mount Pleasant GO Station;
- A core area of the Greenland system is present within the study area. It is located mid-way between Mississauga Road and Heritage Road, and mid-way between the CN railway and Bovaird Drive;
- The area west of Mississauga Road is a High Potential Mineral Aggregate Resource Area;
- The study area is located in the North-West Brampton Urban Development Area;
- The "Growth Plan Policy Areas" of Peel categorizes the study area in two categories: the zone that includes the Mount Pleasant GO Station is located in the Build-Up Area while the remainder of the study area is located in the Designated Greenfield Area;
- The Mount Pleasant GO Station is identified as a Potential Mobility Hub;
- The study area is located in a settlement area outside the Greenbelt.

4.3.2 CITY OF BRAMPTON OFFICIAL PLAN

Brampton City Council adopted its Official Plan on October 11, 2006. The Regional Municipality of Peel partially approved the Plan on January 24, 2008, and it was subsequently partially approved by the Ontario Municipal Board on October 7, 2008.

Planned land use designations are shown as part of the City of Brampton Official Plan Schedule A. The study area overlaps a territory for which four general designations as well as specific policies are planned: "Residential"; "North West Brampton Urban Development Area"; "Corridor Protection Area"; and "Open Space".

NORTH WEST BRAMPTON URBAN DEVELOPMENT AREA

Lands of the project study area west of Mississauga Road are located in the "North West Brampton Urban Development Area". North West Brampton has been included within the urban boundary of the Official Plan in order to provide certainty regarding areas intended for future growth in the municipality. The "North West Brampton Urban Development Area" is planned to be a compact, complete and connected community. This Area will also provide opportunities for mixed-use development including a range of housing types, and densities as well as employment lands.

CORRIDOR PROTECTION AREA

The western part of the project study area is located in one of the three "Corridor Protection Area" designations of the Plan: the "North West Brampton North-South Corridor Protection Areas". According to the Official Plan, the "Corridor Protection Area" designation identifies zones where the location and precise characteristics of a higher order transportation corridor, or of the associated and connecting arterial road network, is dependent on the completion of additional transportation studies, and for which specific land use planning and development approvals processing may not be completed until such transportation studies are deemed sufficiently completed.

The Official Plan contains specific policies for the development of the "North West Brampton North-South Corridor Protection Areas". Development proposals may not be approved if it is determined that they may unduly restrict the alternatives for the planning or construction of a North-South higher order transportation facility. Policies also state that the alignment of a North-South Higher Order Transportation Corridor in this

area shall be determined by an Environmental Assessment Study, or by a process satisfactory to the municipal stakeholders and the Province of Ontario.

OPEN SPACE

The City's Open Space System consists of both natural and cultural heritage as well as recreational open space features. The policies related to environmental open space are included in the Natural Heritage and Environmental Management Section of the Official Plan (Section 4.6). The recreational open space network is made up of Public Parkland, Conservation Areas and Private Commercial Recreation.

The natural heritage system's features and areas that are included in the study area according to Schedule D of the Official Plan are: "Valleylands and Watercourses Corridors"; "Woodlands"; "Lakes and Ponds"; and "Other Wetlands".

Lands identified as "Valleylands/Watercourses Corridors" are intended primarily for the preservation and conservation of the natural features, functions and linkages. Although development is generally prohibited within valleylands and watercourse corridors, there are some existing uses and some permitted uses that can be recognized. Expansion of existing uses and new conservation projects are subject to an approval process as well as the recommendations and requirements of the relevant watershed, subwatershed and environmental studies.

The inventory of woodlands within the City of Brampton is based on the most up-to-date information provided by the Region of Peel, the Ministry of Natural Resources and the area's Conservation Authorities. Prior to development, the Official Plan states that significant woodlands must be identified based on the direction contained in the Province's Natural Heritage Manual, or the municipal approaches that achieve or exceed the same objective. It is also stated that development and site alteration are not permitted in significant woodlands unless it can be demonstrated that there will be no negative impacts on these features or their ecological functions.

Within the City of Brampton, there are a number of wetlands ranging from "provincially significant", "locally significant" and "unevaluated wetlands".

East Huttonville Creek will be realigned and re-vegetated within the enhanced floodplain corridor that will connect the fragmented woodlands and wetlands to provide ecologically diverse and sustainable fish and wildlife habitat. The pathway system intended to connect Mount Pleasant to Fletcher's Meadow (east of Creditview Road) and future Heritage Heights (west of Mississauga Road), and on-street paths along the Spine Road.

A review of Official Plan Schedule E- Major Recreational Open Space (**Figure 4-22**) has shown that there is no City-Wide Park, Community Park, Private Commercial Recreational and Conservation Area within the study area. Community Park was identified on the east-south of Mississauga Road and Bovaird Drive West.

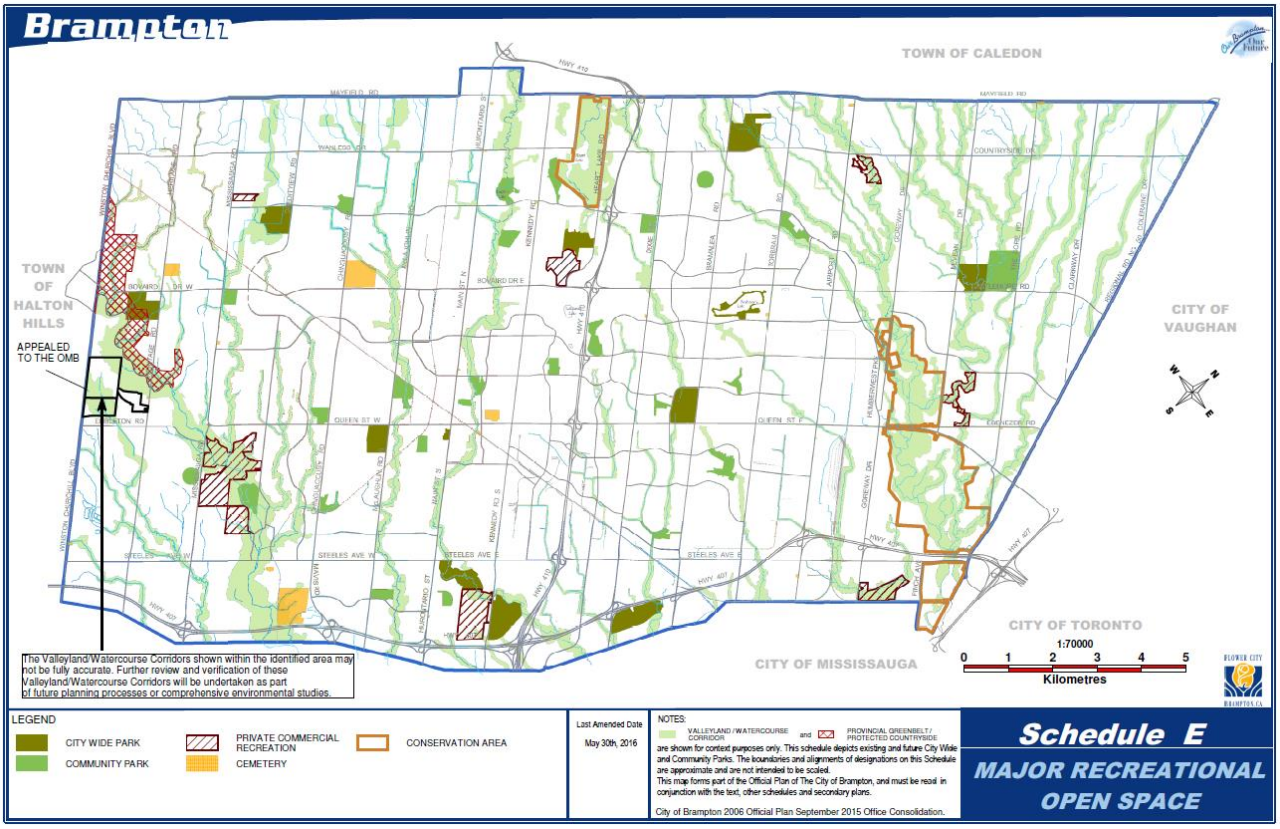


Figure 4-22: Official Plan Schedule E Major Recreational Open Space

4.4 BRAMPTON 2040 VISION

Brampton's 2040 Vision is an aspirational long-term plan to what Brampton will become in 2040. The vision emphasizes the importance of transit, walking and cycling network development. As such, the study area is within Heritage Heights, which is one of the five Town Centres, strategically located around the downtown area. The proposed new town centres are presented in **Figure 4-23**. The location of the Town Centre is evolving as further planning is advanced south of Mount Pleasant GO station, and westerly in Heritage Heights. This highlights the importance of the Lagerfeld link in the development of wider city-wide multi-modal transportation network.

The preferred preliminary design supports the socio-economic environment of the study area. As such, the proposed new Town Centres will have a complete profile of commerce and mixed housing, a retail centre, good local and regional transit connections, and a tailored street system for good internal circulation, especially for walking and cycling. Complete, full-service, mixed-use, diverse Town Centres with lots of workspace and nearby multiple-family housing options, but also leveraging the benefits of a suburban identity, will give Brampton the competitive edge it is now missing. Major initiatives will build a strong new dual core for Brampton by 2040 – Uptown and Downtown.

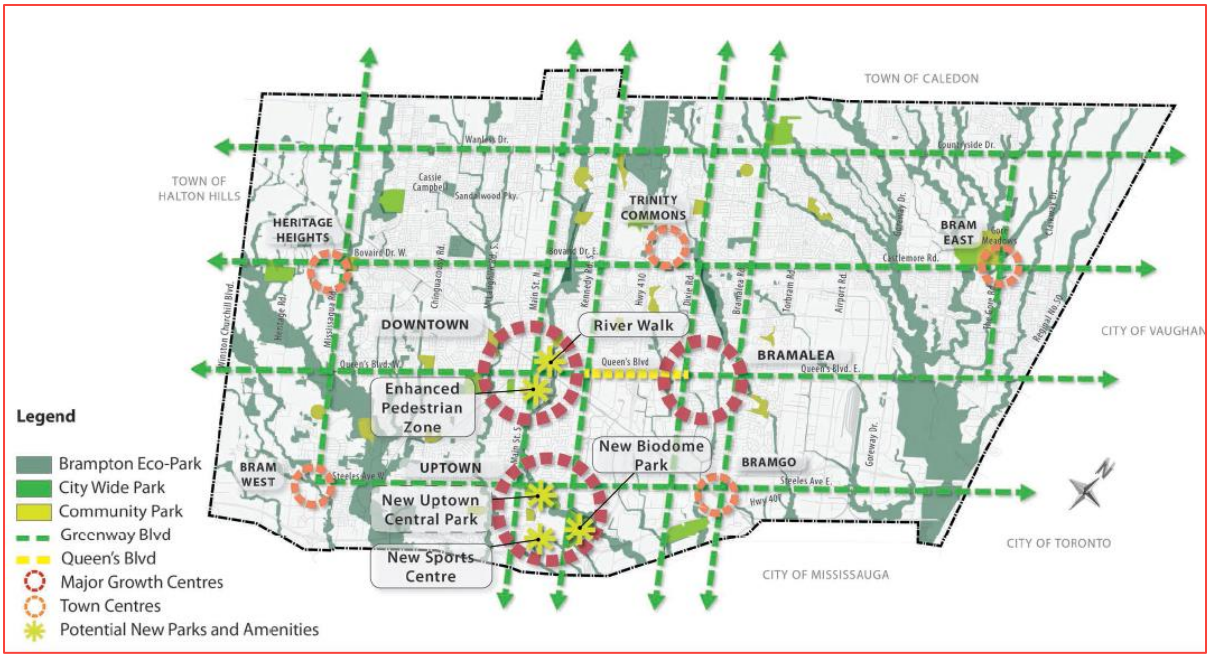


Figure 4-23: Proposed New Town Centres

The central component of the priority network is the City's signature loop, with connecting east-west routes that provide access to the loop and connect a number of existing north-south corridors (recreational trails).

Once Brampton's intensive business and living hubs develop, a local transit network will have to overlay current patterns and reach out for full regional connections, especially to the airport. Many commuters have naturally shifted from the long daily auto drive. The hierarchy of centres is connected through transit as are most neighbourhoods. The new "Figure-8 Transit Loop" will integrate the entire dual core on one line. A new 'Figure-8 Loop' rapid transit line links the double core and connects it to the regional transit system. It connects homes to jobs and a string of many new development sites. Stations and stops will be easily within walking distance of all of Downtown and Uptown. This new transit loop will spur growth at key desirable locations. **Figure 4-24** and **Figure 4-25** provides an overview of Brampton Transit Concept and Figure-8 Transit Loop, consecutively.

The Kitchener to Toronto regional GO Transit rail service line runs through Brampton, and the City has established its Züm bus rapid transit network. Some of the network challenges however, also present opportunities. A number of utility corridors in the city such as the TransCanada Pipeline, Orangeville-to-Brampton Railway and Hydro Corridor present a great option for accommodating linear active transportation infrastructure.

East-west road crossing will also provide for better land development capacity in the study area. Create value around Mount Pleasant GO commuter train station, which acts as a mobility hub connecting inter-regional GO service (rail and bus-connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit. Full east west crossing /road will provide direct connection from community to Mount Pleasant GO and Mixed-use centre.

The centrally located new city centre of Brampton and the other established job centres now have tens of thousands of jobs of all kinds with all kinds of companies that prefer a suburban setting close to their employees. A business-based organization was founded to go after those companies and get them settled into Brampton in partnership with City Hall. Over 60% of residents' jobs are now in Brampton.

Through all these efforts, a first target would be that at least 60% of residents work within the community and, then, even more local jobs should be anchored here every year for a true jobs/housing balance.

The new east-west road will reduce overall travel time for all modes of transportation, reduce congestion and greenhouse gas emission impact and mitigation costs and ultimately reduce overall cost and negative impact to the economy. In addition, the aim of the jobs-housing balance is to provide local employment opportunities closer to where people live that may reduce overall commuting distance among residents. The minimum range recommended for suburban transit-oriented centres is 1 job per household to 1.5 jobs per household.

The recommended permanent pedestrian and cyclist counter locations focus on off-road facilities and representative locations on the Brampton Trail Loop and East-West Connections and within the major planning areas based on the City of Brampton's Secondary Planning Areas. Supporting east-west links allow the City to endorse Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.

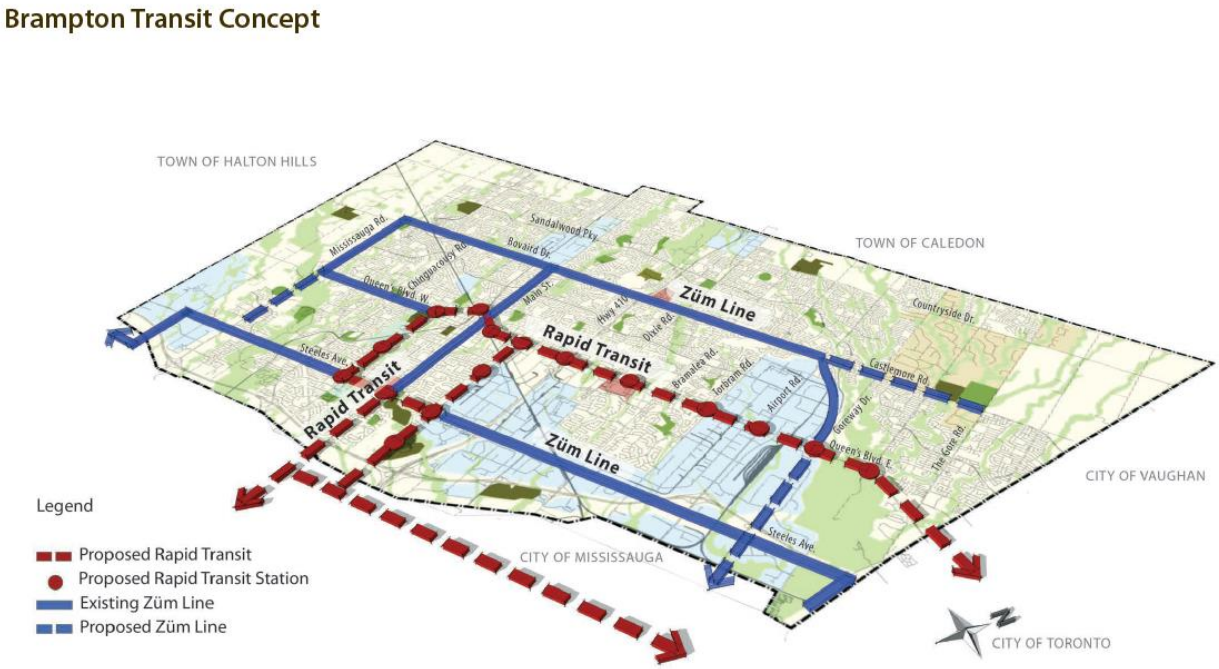


Figure 4-24: Brampton Transit Concept

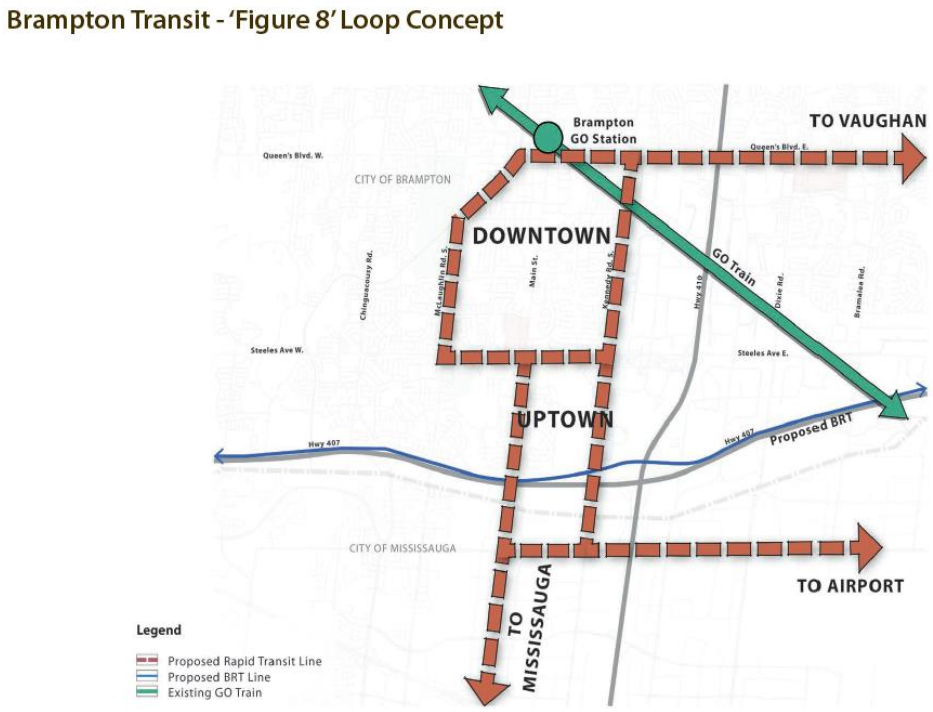


Figure 4-25: Figure-8 Transit Loop

4.5 CULTURAL ENVIRONMENT

4.5.1 ARCHAEOLOGICAL ASSESSMENT

In July 2014, WSP completed a Stage 1 Archaeological Assessment (**Appendix F**) for the proposed East-West Connection, Mount Pleasant Go Station to West of Mississauga Road within the City of Brampton, in the Region of Peel.

This study involved a review of documents pertaining to the property including historic maps, aerial photographs and local histories. A property inspection was conducted on June 2, 2014. The evaluation indicates that there is archaeological potential for the discovery of pre-contact sites and historic Euro-Canadian sites on the undisturbed/previously unassessed areas of the property.

4.5.2 REGISTERED ARCHAEOLOGICAL SITES

The subject property itself has been assessed previously and had undergone Stage 4 mitigation of development impacts in the area east of Mississauga Road. There are additional sites registered in the immediate proximity which impact the site evaluation. There are watercourses and known archaeological sites on and adjacent to the property. Proximity to water sources and the presence of known archaeological resources on or adjacent to the property are key factors in the determination of archaeological potential.

4.5.3 ARCHAEOLOGICAL POTENTIAL

A number of factors are employed in determining archaeological potential:

PRE-CONTACT ARCHAEOLOGICAL POTENTIAL

The property is within 300 m from primary water sources. There are records of previous archaeological field work both on the property and within a radius of 50m around the property. There are identified archaeological sites within the study area. There are registered sites located within a 1 km radius of the study area.

The undisturbed areas of the property exhibit potential for the discovery of pre-contact archaeological material.

HISTORIC ARCHAEOLOGICAL POTENTIAL

A review of the historic maps from the 1800s and land registry records show that the area was part of an active rural farming community since the time of the earliest patents. The records indicate that the property was used as active farmland into the 21st century.

Although no longer standing, the William McClure farmstead once existed on the subject property in lands alongside properties containing existing built heritage structures and landscapes and assists in defining areas of archaeological potential.

There are records of previous archaeological field work both on the property and within a radius of 50 m around the property. There are identified archaeological sites within the study area. There are registered sites located within a 1 km radius of the study area.

The undisturbed areas of the property exhibit potential for the discovery of historic Euro-Canadian sites.

A complete Stage 1 Archaeological Assessment Report and Built Heritage Report can be found in **Appendix F**.

4.5.4 ARCHAEOLOGICAL RECOMMENDATIONS

The assessment determined that the study area has potential for the discovery of precontact archaeological sites and has potential for the discovery of historic Euro-Canadian sites. Based on the presence of archaeological sites within and adjacent to the study area, as well as on the presence of two watercourses; and the historic land use within the study area; the subject lands have potential for the identification of historic and precontact archaeological sites in areas where archaeological potential has not been negated by intensive, recent construction disturbance.

However, prior archaeological assessments have cleared areas of the subject property from having further concern. Where this is the case, and the reports have been entered into the Register, no further assessment of those areas is required.

Archaeological recommendations have been made based on the background historic research, property inspection, locations of known or registered archaeological sites, previous archaeological assessments and indicators of archaeological potential. These recommendations include the following:

- The undisturbed areas of the property within the study area that has been previously unassessed must be subject to Stage 2 survey. Areas of actively or recently cultivated agricultural land must be subject to pedestrian survey. All other areas where ploughing is not possible or viable must be subject to test pit survey.
- The balance of the property has been previously assessed and holds low archaeological potential for the discovery of precontact archaeological sites and low potential for the discovery of historic Euro-Canadian sites. No further archaeological assessments are required in these areas.

Figure 4-26 shows the areas of archaeological potential. As the majority of the areas subject to Stage 2 assessment are areas of actively or recently cultivated agricultural land, they must be subject to pedestrian survey. All other areas where ploughing is not possible or viable must be subject to test pit survey.

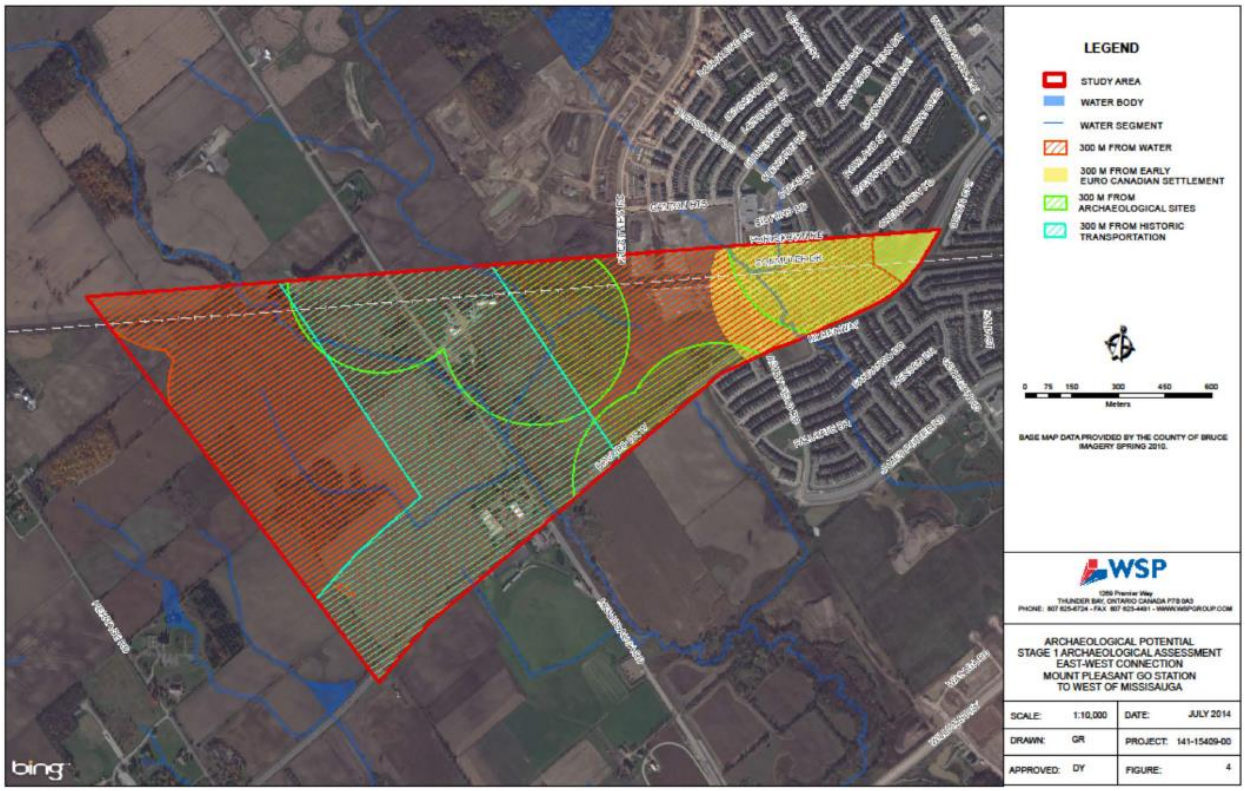


Figure 4-26: Areas of Archaeological Potential

4.6 CULTURAL HERITAGE

In June 2014, WSP completed a Built Heritage Report (**Appendix F**) for the proposed East-West Connection, Mount Pleasant Go Station to West of Mississauga Road within the City of Brampton, in the Region of Peel.

4.6.1 BUILT HERITAGE AND CULTURAL HERITAGE LANDSCAPES

Figure 4-27 shows the identified Cultural Heritage resources within and directly adjacent to the study area. The Brampton Register of Property of Cultural Heritage Value or Interest lists the following (see **Table 4-6**):

Table 4-6 Registered Heritage Sites within the Study Area

Address	Feature Type	~Year Built	Architect Style	Heritage Status of Property
10020 Mississauga Road	Farmhouse	1870s	Vernacular Victorian	Listed
10244 Mississauga Road	Farm	Pre-1878	Gothic Revival	Listed, also Cultural Landscape (McClure Farm Complex)
1985 Bovaird Drive West	Residence	Pre-1878	-	Designation in Progress, also Cultural Landscape (McCandless Farm)
160 Salvation Road (formerly 10060 Creditview Road)	Church	1904	20th Century Gothic Romanesque	Designation in Progress
10055 Creditview Road	Farmhouse or Inn	Pre-1900	Vernacular	Listed

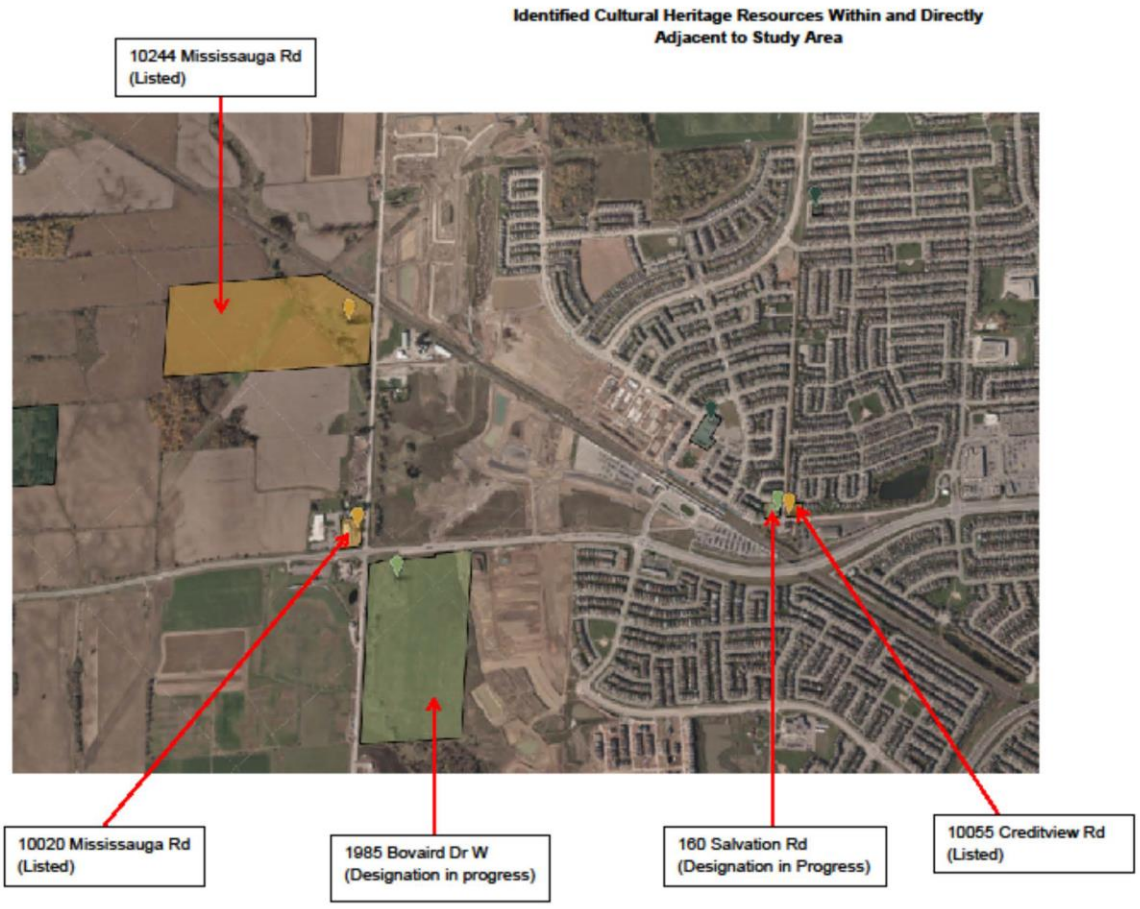


Figure 4-27: Identified Heritage Resources Within and Directly Adjacent to the Study Area

Heritage properties within the study area have all been previously assessed by Archaeological Services Inc. in 2007.

4.6.2 RECOMMENDATIONS

This study involved a review of documents pertaining to the property including historic maps, aerial photographs and local histories. Existing background information was reviewed, including reports/materials, the City's Official Plan policies, as well as relevant provincial standards and guidelines. The City & Region was contacted in regard to local heritage interest and value. A field visit was conducted on June 2, 2014.

The evaluation indicates that the heritage properties within the study area have all been previously assessed (Archaeological Services Inc. 2007a). The 2007 report (Built Heritage and Cultural Landscape Assessment; Alloa Reservoir Pumping Station, and Feedermain Class Environmental Assessment, City of Brampton, Region of Peel, Ontario) should be used as an ongoing reference.

Based on a review of the available background information, the heritage properties within the study area have all been previously assessed. The recommendations to be considered for that study included:

- Any proposed alterations within the study area should be planned in a manner that avoids any identified, above ground, cultural heritage resource. Where any identified, above ground, cultural heritage resource is to be affected by loss or displacement further research should be undertaken to identify both the specific heritage significance of the affected cultural heritage resource and appropriate mitigation measures required to avoid or minimize impact.
- Where features are to be disrupted by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting, suitable measures such as landscaping, buffering or other forms of mitigation should be adopted. In this regard provincial guidelines should be consulted for advice. Where possible, existing trees and plantings should be retained.

4.7 NATURAL ENVIRONMENT

A Natural Heritage Assessment was completed in March 2021 as part of the Class "C" Environmental Assessment (EA) for Lagerfeld Drive in the City of Brampton. The assessment was conducted on lands southwest of Creditview Road, extending southwest approximately 700 m past Mississauga Road, to approximately 100 m north of the CN rail line and bounded to the south by Bovaird Drive.

Background information related to the existing natural heritage features within the study area was collected from a variety of sources from Credit Valley Conservation Authority, Ministry of Natural Resources and Forestry and the City of Brampton.

The study area is located within the Northwest Brampton Urban Development Area within the Urban System as outlined in Schedule D – Regional Structure in the Peel Region Official Plan (2018). The study area is not located in the Oak Ridges Moraine Conservation Plan Area, Greenbelt Plan Area, or the Niagara Escarpment Plan Area. A woodland within the western portion of the Study Area is identified as a Core Area within the Greenlands System in Peel Region (Schedule A; 2013)

The Provincially Significant Wetland (PSW) and woodlot on the western portion of the study area along with the corridors flanking the branches of Huttonville Creek have been identified as being located within the Provincial Greenbelt Area and are subject to the policies of the Greenbelt Plan. Valleylands, watercourses, woodlands, and other Natural Heritage Features are mapped on Schedule D and E of the City of Brampton Official Plan (2013). **Figure 4-28** shows Schedule D – natural heritage features and areas.

A complete Natural Heritage Assessment Report can be found in **Appendix G**.

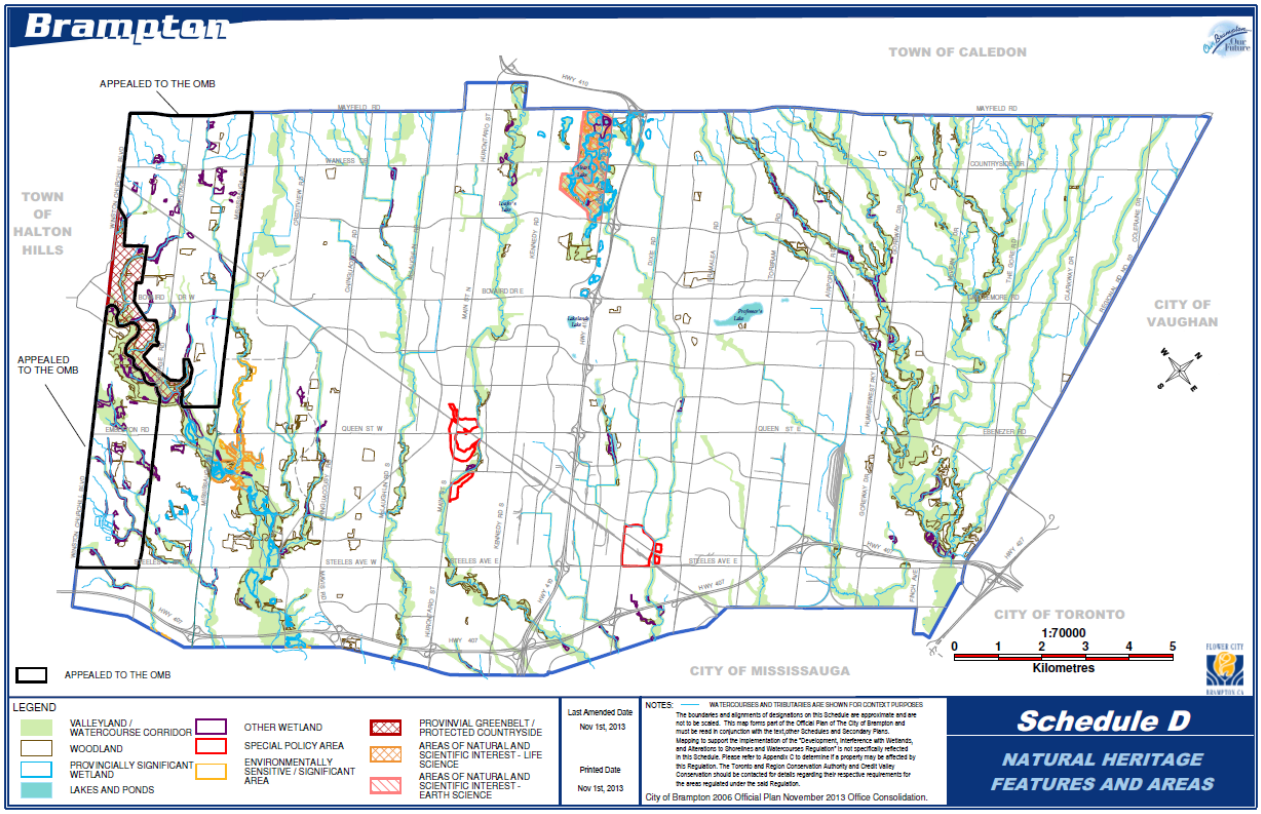


Figure 4-28: Schedule D - Natural Heritage Features and Areas

4.7.1 EXISTING CONDITIONS

The following sections outline the Natural Heritage Features identified within the Study Area as described within the information sources reviewed during the site investigation.

4.7.1.1 FISH HABITAT

The West, East and Main Branches of the Huttonville Creek traversing the Study Area are regulated as 'occupied habitat' for Redside Dace. As such, these watercourses, their meander belts, and 30 m on either side of the meander belts are protected under the Endangered Species Act (Ontario, 2007). The CVC and MNRF have advised that the Huttonville and Fletcher's Creeks, as well as contributing habitats, should be considered as coolwater/warmwater (Stonybrook Consulting Inc. et al., 2011).

4.7.1.2 HABITAT OF ENDANGERED OR THREATENED SPECIES

A search of the MNRF Natural Heritage Areas Mapping, including data maintained by the Natural Heritage Information Centre (NHIC) (MNRF, 2014 and 2020) was conducted to determine the existence and approximate location of recorded occurrences of species at Risk in the Study Area. Seven one square kilometer (1 km^2) quadrants (17NJ92_35, 17NJ93_34-36, 17NJ94_35-36, and 17NJ95_36) surrounding the Study Area were checked to ensure potential Species at Risk (SAR) were accounted for during field surveys. The search revealed eight (8) species of conservation concern. Of these eight records, two are listed as Threatened (Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*)) and one is listed as Endangered (Redside Dace (*Clinostomus elongatus*)) on the Species at Risk in Ontario (SARO) and Committee

on the Status of Endangered Wildlife in Canada (COSEWIC) lists. The remaining species do not appear on the SARO or COSEWIC lists but have been identified as species of conservation concern in Ontario with subnational ranks (SRank) of S2 (Imperiled) and S3 (Vulnerable), respectively, based on records maintained by the NHIC.

In addition to the search of the NHIC database, the Ontario Breeding Bird Atlas (OBBA) (Bird Studies Canada et al., 2006), Ontario Reptile and Amphibian Atlas (Ontario Nature, 2011), satellite imagery, and available background studies were consulted to determine if there were other Endangered or Threatened species known to be present within the vicinity of the Study Area. In addition to the species listed in **Error! Reference source not found.**, there is also potential for Butternut (*Juglans cinerea*), Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Chimney Swift (*Chaetura pelagica*), and Whip-poor-will (*Caprimulgus vociferus*) within the general area. The significant woodland within the western portion of the Study Area, and treed areas along the stream corridors, have potential to provide roosting habitat for endangered bat species including, Eastern Small-footed Myotis (*Myotis leibii*), Northern Myotis (*Myotis septentrionalis*), Little Brown Myotis (*Myotis lucifugus*), and Tri-colored Bat (*Permyotis subfavus*).

The Distribution of Fish Species at Risk maps for the CVC provide information regarding aquatic SAR and the level of protection afforded to, or proposed, for watercourses within the watershed under the Species at Risk Act. A review of these maps indicated that the West Huttonville Creek, its tributary and the Huttonville Creek may support Redside Dace and is under consideration for listing of protected habitat of Endangered and Threatened Species at Risk (Fisheries and Oceans Canada, 2014). Other studies indicate that the West, East and Main Branches of the Huttonville Creek traversing the Study Area are regulated Redside Dace habitat. As such, these watercourses, their meander belts, and 30 m on either side of the meander belts are protected under the Endangered Species Act (Ontario, 2007).

An assessment of the habitat potential for the above-mentioned Endangered or Threatened species within 120 m of the Study Area is provided in **Table 4-7**. Special consideration was given to these species and their habitat during site investigations.

Table 4-7: Endangered and Threatened Species Habitat Potential Assessment

SPECIES NAME	SARO[1]	COSEWIC[1]	HABITAT DESCRIPTION[2]	HABITAT POTENTIAL	FIELD OBSERVATIONS
Bank Swallow	THR	THR	The Bank Swallow traditionally nested in exposed banks along waterways. It continues to nest in these areas but also makes use of sand and gravel pits and stockpiles of soils and other materials.	Low	Species not observed. The shallow banks of the Huttonville Creek and tributaries within the Study Area did not provide ideal habitat for this species.
Barn Swallow	THR	THR	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. This species forages over a wide area.	High	Barn Swallows were observed on several occasions during the 2014 and 2017 site investigations. This species was also noted in background studies within the general area (Dougan & Associates, 2012; AMEC, 2012). Cup nests were found within the concrete box culvert on Mississauga Road.

Bobolink	THR	THR	This species builds its nests on the ground in dense grasses, such as those found in hay fields, tallgrass prairies and open meadows.	Low to Moderate	Species was not observed during 2014 surveys. Agricultural fields within the Study Area did not provide suitable habitat. This species was observed in hayfields in the general area during 2011 and 2012 (AMEC, 2012). Bobolinks prefer fields containing a high percentage of graminoids.
Butternut	END	END	The species is found in deciduous forests in areas with rich, moist, well-drained soils and is often found along streams. Due to its low tolerance for shade, this species is typically found in sunny openings or along forest edges.	Low - Moderate	Species not observed. Suitable habitat for this species occurs within remnant woodland patches and within valley and stream corridors within the general area.
Chimney Swift	THR	THR	This species feeds in flocks around water bodies due to the presence of a large number of insects. Nesting occurs in large, hollow trees or in the chimneys of houses in urban and rural areas.	Low	Species was not observed during 2014 surveys. A pair was observed in 2012 (AMEC) within the Heritage Heights survey area. Suitable nesting structures were not identified within the Study Area.
Eastern Meadowlark	THR	THR	This species prefers native grasslands, pastures and savannahs though will use a variety of other grassland habitats such as hayfields, weedy meadows, etc.	Low - Moderate	Species was not observed. Agricultural fields and meadows within the Study Area did not provide suitable habitat. This species prefers fields containing a high percentage of graminoids.
Redside Dace	END	END	In Ontario, this species is found predominately in streams flowing into western Lake Ontario. They prefer pools and slow-moving parts of streams and headwaters, especially with a gravel bottom.	Moderate	The West, East and Main Branches of the Huttonville Creek within the Study Area are regulated as ‘occupied habitat’ for this species.
Whip-poor-will	THR	THR	The species breeds in patchy forests with clearings, and generally avoids exposed, open areas, or closed-canopy forests.	Low	Species was not observed. Suitable habitat was not present within the Study Area.

Eastern Small-footed Myotis	END	-	This species roosts in a variety of habitats including rock outcrops, in buildings, under bridges, in caves, and in hollow trees. During the winter they hibernate, most often in caves and abandoned mines.	Moderate	This species was not observed. Suitable man-made structures were not identified in the Study Area. Potential maternity roost habitat is limited to the significant woodland in the western portion of the Study Area, though occasional roost trees may also be present along the stream corridors where mature trees are present. Detailed surveys were not completed.
Little Brown Myotis	END	END	During the summer, this species roosts in trees, abandoned buildings, attics, and barns close to water. This species overwinters in large groups in warm, moist caves or abandoned mines.	Moderate	This species was not observed. Suitable man-made structures were not identified in the Study Area. Potential maternity roost habitat is limited to the significant woodland in the western portion of the Study Area, though occasional roost trees may also be present along the stream corridors where mature trees are present. Detailed surveys were not completed.
Northern Myotis	END	END	This mainly solitary species is most commonly associated with the boreal forest where they roost in tree cavities or under loose bark. Over-wintering occurs in caves or abandoned mines that remain above freezing.	Moderate	This species was not observed. Suitable man-made structures were not identified in the Study Area. Potential maternity roost habitat is limited to the significant woodland in the western portion of the Study Area, though occasional roost trees may also be present along the stream corridors where mature trees are present. Detailed surveys were not completed.

Tri-colored Bat	END	END	Tri-colored Bats are found in a variety of mature forested habitats. Maternal colonies are usually in large trees and occasionally in man-made structures such as barns.	Moderate	This species was not observed. Suitable man-made structures were not identified in the Study Area. Potential maternity roost habitat is limited to the significant woodland in the western portion of the Study Area, though occasional roost trees may also be present along the stream corridors where mature trees are present. Detailed surveys were not completed.

[1] Source: Species at Risk Public Registry (SARA, 2012) COSEWIC Status and [3] Source: Species at Risk in Ontario List (SARO; Ontario, 2018). EXP – Extirpated, END – Endangered, THR – Threatened, SC – Special concern, '-' - Not listed.
[2]Source: COSEWIC reports and/or Species at Risk in Ontario (SARO) List. SARO and COSEWIC designations: END = Endangered; THR = Threatened; SC = Special Concern.

4.7.1.3 *SIGNIFICANT AREAS OF NATURAL AND SCIENTIFIC INTEREST*

Significant Areas of Natural and Scientific Interest (ANSI) are defined as areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

The Natural Heritage Information Centre (NHIC) database (MNRF, 2014) and Schedules D and E of the City of Brampton Official Plan (2015) were searched for the presence of ANSIs on or within 120 m of the Study Area. There were no ANSIs detected on or within 120 m of the Study Area.

4.7.1.4 *BIOPHYSICAL INVENTORIES/OBSERVATIONS*

BIRD POPULATIONS

A cumulative total of 30 species were observed on or within 120 m of the Site over the two survey periods during the 2014 field investigation. Two provincially listed species at risk, Barn Swallow (*Hirundo rustica*) and Eastern Wood-pewee (*Contopus virens*), were observed within the Study Area. Barn Swallow is listed as Threatened on the SARO List, while Eastern Wood-pewee is listed as Special Concern. Breeding was not confirmed, and suitable nesting structures were not identified within the Study Area. Eastern Wood-pewee was observed during both surveys at point count #2 within the woodland at the western boundary of the Study Area.

During the June 2017 field investigation approximately seventeen (17) cup nests were observed within the concrete box culvert located under Mississauga Road. Barn Swallows were seen flying in and out of the culvert during the site investigation which would indicate that at least some of these nests were active.

VEGETATION COMMUNITIES

Descriptions of vegetation and land use within the Study Area are based on ELC mapping from background studies and observations obtained during the November 12, 2014 and June 29, 2017 site visits. At the time of the investigations, limited access was given to the west side of Mississauga Road; therefore, descriptions of the vegetation communities are based on the AMED report (2012) and roadside observations. During the 2017 site visit field observations focused on the lands east of Mississauga Road surrounding the East Huttonville Creek. The majority of the lands within the Study Area consisted of active agricultural lands, those undergoing active development, or those under current anthropogenic use. Cultural Meadow (CUM)/Mixed Meadow (MEM), Graminoid Meadow (MEFM), Meadow Marsh (MAM), Forb Meadow Marsh (MEFM), Cultural Thicket (CUT), Cultural Woodland (CUW), Deciduous Forest (FOD) and Deciduous Swamp (SWD) have been documented on or within 120 m of the Study Area. Natural areas were restricted to the riparian corridors of the

West and Main Branches of the Huttonville Creek, and within the vicinity of the confluence of the West and East Branches on the east side of Mississauga Road.

On the west side of Mississauga Road, the riparian corridor was identified as a Fresh-Moist Willow Lowland Deciduous Forest (FOD-3) (AMEC, 2012). Willows, Manitoba Maple (*Acer negundo*), Red-osier Dogwood (*Cornus sericea*), Common Buckthorn (*Rhamnus cathartica*), and Staghorn Sumac (*Rhus typhina*) were the most abundant species in this area. The woodland at the western limit of the Study Area was composed of several different vegetation communities, including Fresh-Moist Oak-Maple-Hickory Deciduous Forest (FOD9), Oak / Maple Mineral Deciduous Swamp (SWD1/SWD3), and Dry-Fresh Sugar Maple-Beech Deciduous Forest (FOD5-2) (AMEC, 2012).

AQUATIC HABITAT MAPPING

Aquatic habitat mapping was completed during a site visit on June 29, 2017 in order to investigate a number of alternative alignments for Lagerfeld Road, several of which require crossings of Huttonville Creek, West Huttonville Creek and East Huttonville Creek. West Huttonville Creek is a permanent and defined watercourse that originates as agricultural surficial drainage southwest of Mayfield Road and Mississauga Road. It flows southeast primarily through agricultural land and woodland patches for approximately 4.5 km before reaching the Study Area. East Huttonville Creek is a permanent watercourse originating as agricultural surficial drainage southeast of Mayfield Road and Mississauga Road. It flows southeast primarily through residential lands for 4.7 km before reaching the Study Area. The two creeks join to form a confluence within the Study Area, which marks the origin of the Main Branch of Huttonville Creek and flows for 260 m before crossing Bovaird Drive West. An unnamed tributary originates on the west side of Mississauga Road, and according to existing mapping, flows into the Main Branch of Huttonville Creek approximately 176 m north of Bovaird Drive. This tributary was not investigated along with the other watercourses noted above as permission to enter was not granted. The water temperature was 18°C and the air temperature was 17°C on the day of the site investigation. Conditions were cloudy with significant rain in the past 24 hours.

4.7.1.5 *SIGNIFICANT WETLANDS*

Satellite photographs and available mapping resources for the Study Area and surrounding area were reviewed for the presence of wetlands. A review of the Natural Areas Mapping (MNRF, 2020) confirmed that portions of the Huttonville Creek and Area Provincially Significant Wetland (PSW) Complex occur within the Study Area. Two small wetland units surround West Huttonville Creek and another unit is associated with the SWD1/SWD3 community within the woodland at the western limit of the Study Area.

Unmapped wetland units were documented during the 2017 vegetation survey and were described as Mixed Forb Mineral Meadow Marsh (MAM2-10) and Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2).

4.7.1.6 *SIGNIFICANT COASTAL WETLANDS*

The Study Area is not located within 120 m of the Great Lakes and as a result an assessment of Significant Coastal Wetlands is not applicable.

4.7.1.7 *SIGNIFICANT WILDLIFE HABITAT*

Guidelines and criteria for the identification of significant wildlife are detailed in the Significant Wildlife Habitat: Technical Guide (OMNR, 2000), and the Significant Wildlife Habitat Criterion Schedule for Ecoregion 6E (MNRF, 2015). Significant Wildlife Habitat (SWH) is described under four main categories:

- Seasonal concentrations of animals,
- Rare vegetation communities or specialized habitats for wildlife,
- Animal movement corridors, and
- Habitats of species of conservation concern.

Although targeted surveys for bat maternity roost habitat and SAR bats were not completed as part of the EA work program, it is thought that the significant woodland (FOD5-2, FOD9) at the western limit of the Study Area has potential to provide bat maternity roosting habitat due to the relative abundance of preferred roost tree species within these communities (i.e., Maples and Oaks). As such, this woodland is considered candidate Significant Wildlife Habitat.

The partially wooded riparian areas surrounding the West and Main Branches of Huttonville Creek may facilitate animal movement throughout the landscape as they are vegetated corridors that link other natural areas throughout the City of Brampton. With increased urbanization of this area over time, these valley corridors are expected to play an increasingly important function within the landscape as critical movement corridors and crossing designs should include consideration for passage by terrestrial and aquatic wildlife within the structures.

A search for Species of Conservation Concern presence and associated habitat was conducted using the NHIC database (MNRF, 2014 and 2020). A total of eight species occurrences were recorded for the area searched, including two Threatened species and one Endangered species. The other five species are not on the SARO or COSEWIC lists but are still tracked by the NHIC. These species were not observed during the site visits and were not identified within the background studies. Based on a review of aerial photographs and available habitat types in the general area it was determined that there is potential for Common Nighthawk (*Chordelies minor*), Eastern Wood-Pewee, Hooded Warbler (*Wilsonia citrina*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Wood Thrush (*Hylocichla mustelina*), Snapping Turtle (*Chelydra serpentina*), and Monarch (*Danaus plexippus*) in or within 120 m of the Study Area.

4.7.1.8 *SIGNIFICANT WOODLANDS*

The majority of the Study Area is composed of agricultural, cultural and anthropogenic vegetation communities or lands uses and there is little woodland cover. The woodlands within the western portion of the Study area has been identified as a Core Feature within the Region of Peel Greenlands System (2018). Development and site alteration within Core Features are generally prohibited unless it has been demonstrated that there will be no negative impact on the features and its functions. The woodland was identified as a candidate significant woodland by AMEC (2012), and portions of this woodland have been identified as part of the Huttonville Creek and Area PSW Complex. In addition, as the woodland provides habitat for Eastern Wood-pewee, a Special Concern species on the SARO List, and potential habitat for SAR bats, the woodland is thought to meet the criteria for significance.

Other wooded areas associated with riparian corridors within the Study Area have not been identified as candidate significant woodlands and are not identified as Core Features within the Greenlands System. Nevertheless, their association with riparian corridors and in some instances a PSW, ensures that they will be protected as part of the Natural Heritage System, and/or part of the regulated habitat protected for Redside Dace.

4.7.1.9 *SIGNIFICANT VALLEYLANDS*

A review of available background studies and Official Plan schedules was completed to determine if Significant Valleylands have been identified within the Study Area. The riparian areas surrounding the West, East and Main Branches of the Huttonville Creek have been identified as Valleylands / Watercourse Corridors on Schedule D of the City of Brampton Official Plan (2015) and are considered part of the City of Brampton's Natural Heritage System. The Heritage Heights Subwatershed Study identifies the West Huttonville Creek valley between the CN rail line and Mississauga Road as a candidate significant valleyland (AMEC, 2012). Development and site alteration are generally not permitted in valleylands and watercourse corridors unless it has been demonstrated that there will be no negative impact on the features and its functions. In general, no new development will be permitted within the identified 100-year erosion limit and/or meander belt width hazard (City of Brampton, 2015). Due to the presence of Redside Dace habitat within these watercourses, the meander belt and a 30 m setback on either side of the meander belt is protected under the Endangered Species Act (Ontario, 2007).

4.7.2 PREFERRED DESIGN

Alternative 1B is a continuation of the existing Mount Pleasant GO Station access road (Lagerfeld Drive) to lands west of Mississauga Road. The extension will consist of a 4-lane urban cross section with auxiliary turning lanes at Mississauga Road. On-street bike lanes are proposed on both sides. The alignment passes through Mississauga Road approximately 419 m north of the centreline of Bovaird Drive and involves crossings over East and West Huttonville Creek.

Preliminary design of the East Crossing over East Branch of Huttonville Creek includes a proposed crossing on a slight skew consisting of a single-span 38 m precast 1.0 m girder bridge with abutment centrelines outside of the meander belt, but within the 30-m buffer to the meander belt. It is estimated that the bridge will impact approximately 142 m^2 of the Redside Dace regulated habitat area, while the road and retaining walls will impact 1,373 m^2 and 522 m^2 of the regulated habitat, respectively. The general arrangement indicates the bridge will provide a minimum clearance of approximately 4 m near the western abutment, and approximately 5.34 m clearance over the channel.

Preliminary design of the West Crossing is proposed at West Branch Huttonville Creek just east of Mississauga Road and consists of a two-span precast 1.0 m box girder bridge with a total length of 47 m. The western abutment is located within the meander belt and is partially within the area to be disturbed as part of the Mississauga Road Improvements works. The central Piers are proposed just outside the eastern limit of the meander belt, while the eastern abutment is located beyond the 30-m buffer to the meander belt. Impacts to regulated habitat for Redside Dace associated with the intersection of Lagerfeld Drive and Mississauga Road within the 30 m buffer to the meander belt are expected to be addressed through the Mississauga Road Improvements EA. Permanent impacts to the regulated habitat for Redside Dace for this crossing are associated with the west abutment and central piers which will impact approximately 49.5 m^2 of the meander belt and 5.7 m^2 of the 30 m buffer to the meander belt, respectively. The general arrangement indicates that the bridge will provide approximately 3.79 m clearance near the central piers.

Detailed design of the crossings should include design considerations for passage by both aquatic and terrestrial wildlife within the structure. The preliminary designs provide openings greater than 3 m in width and height, which will be suitable for larger mammals, including deer and coyote (CVC, 2017).

The preferred solution provides a setback of 30 m for the Significant Woodlands and Significant Wetlands within the western limit of the study area. It is our understanding that the City wishes to engage in additional consultation to determine if a reduced setback might be possible. This additional discussion is expected to occur during detailed design.

Final alignment and right-of-way for the road segment west of Mississauga Road are subject to future development planning and will be finalized through detailed design of subdivision without the need to amend the NHR.

4.7.3 HUTTONVILLE CREEK MEANDER BELT ASSESSMENT

A meander belt assessment of Huttonville Creek (**Appendix H**) for the study area was completed in October 2017 and revised in November 2019 to characterize the local fluvial geomorphology of Huttonville Creek, identify its trends and rates in lateral and down-valley erosion, and establish its meander belt boundaries.

Huttonville Creek is a 3rd order stream that flows through the South Slope physiographic region. The study area was separated into 4 reaches to better characterize the channels. The main channel has characteristics typically related to a Rosgen C3/4. The assessed beltwidths follow the valley trend and, where possible, fall within the valley confinement. The amplitude width was determined using the centerline of the channel for the years 1985, 2002 and 2013. One-hundred-year erosion rates were calculated to be 15 metres for the East Branch, 9.7 metres for the East Branch and 20 metres for the main channel. The ranges of final beltwidths for each reach are shown in **Table 4-8**.

Table 4-8: Summary of Final Beltwidths by Reach

Reach	Min. Beltwidth	Max. Beltwidth
1	24.8m	38.3m
2	16.2m	20.8m
3	21.8m	31.4m
4	20.8m	48.2m

The studies indicate that the West, East and Main branches of the Huttonville Creek traversing the Study Area are regulated Redside Dace habitat. As per the Recovery Strategy for Redside Dace in Ontario a 30-metre riparian buffer is to be applied to the preliminary meander beltwidth (MNR, 2010). As such, these watercourses, their meander belts, and 30 m on either side of the meander belts are protected under the Endangered Species Act (Ontario, 2007).

This 30-metre regulated habitat is shown on **Figure 4-29**. Refer to **Appendix H** for the Meander Beltwidth Assessment Report.

Multiple alternative design concepts have been evaluated with Alignment 1 having the highest score. This alignment has two crossings of the creeks within the study area, the first is in Reach 2 and the other in Reach 3, as represented in Figure 3 of the report. The two proposed crossing structures are precast girder bridges that will have their abutments outside of the 30 metre Redside Dace setback, this therefore includes spanning the meander beltwidths of their respective crossings as required by the guidelines. However, the bridges will require the use of piers placed within the 30 m setback but outside of the meander belt, which is acceptable, and generally occurs for confined systems.

In order to proceed with the extension of a road west of Mississauga Road permits from the CVC and MECP will be required due to the regulated nature of the West, East and Main Branches of the Huttonville Creek. Specifically, an Overall Benefit Permit under Section 17(c) of the Endangered Species Act (2007) will be required to complete work within the protected habitat of Redside Dace. Continued consultation with the MECP is required to negotiate the terms of this development.

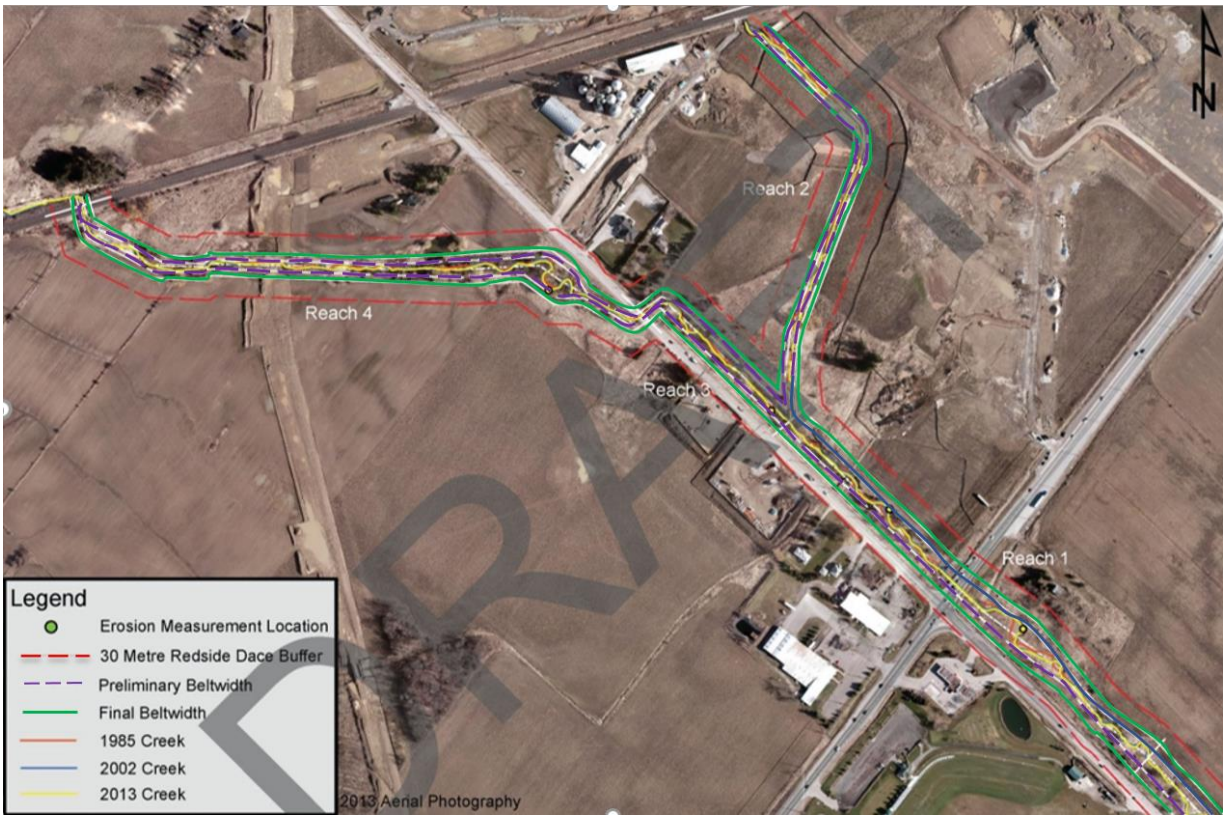


Figure 4-29: Huttonville Creek and Tributaries Meander Belt Width

4.8 SURFACE WATER AND STORMWATER MANAGEMENT

A Stormwater Management and Drainage Report was completed in July 2020 as part of the Class "C" Environmental Assessment (EA) for Lagerfeld Drive in the City of Brampton. The Stormwater Management and Drainage Report can be found in **Appendix I**. The assessment was conducted on lands from approximately 700 m west of Mississauga Road to the existing limit of Lagerfeld Drive, between the CN Rail to the north and Bovaird Drive West to the south. The site will cross over the TransCanada Pipeline and Huttonville Creek. The site covers a total drainage area of 4.78 hectares, divided into four catchment areas (A, B, C, D) with associated outlets.

Five conceptual road alignments were developed and evaluated to select the preferred road alignment. WSP completed a preliminary HEC-RAS hydraulic analysis and floodplain assessment for different alignments to ensure that no negative impact would result from the proposed road extension. It should be noted that flood elevations at the Mississauga Road would not increase under any of the proposed creek crossings. At early stages of the study, Alignments 4 and 5 were considered not feasible and were excluded from the evaluation process. Drainage evaluation was undertaken for Alternatives 1, 2 and 3 at a high-level using the following criteria:

- Potential increase in flooding risk in the creeks;
- Potential to increase stormwater run-off (water quantity);
- Increase in pollutants to receiving watercourses (water quality);
- Flooding and Erosion Hazards.

Floodplain Assessments under different Alignments were completed by WSP. The results showed that none of the road alignments are flooded from the change in water surface elevations resulting from the proposed water crossings.The proposed creek crossings have adequate capacity to fully convey the Regional flow without being overtopped. It should be noted that flood elevations at Mississauga Road would not increase under any of the proposed creek crossings.

There is an increase in flood elevations for the preferred alternative, particularly for the reach of East Huttonville Creek. Table 3-3 (Crossing 1B East) in the Stormwater Management and Drainage Report indicates that the maximum increase in Regional flood elevation is 230 mm directly upstream of the crossing and this increase vanishes at further upstream cross sections. Appendix B of the same report presented floodplain delineation under existing and Alternative 1B, and it shows that the floodline extent will increase in the order of 1.5 m horizontally, contained within the creek corridor. The increases noted are contained within property limits of the City of Brampton. This increase in the floodline limits does not impact any private or Regional properties. In addition, there are no off-site impacts to Regional property.

The proposed design, particularly for the preferred Alignment 1B, has specified the bridge abutments are located within the erosion hazard / meanderbelt. A more detailed geomorphic assessment must take place during detailed design in order to clearly define the impacts this may have on the hazard and to ultimately confirm the 100-year erosion hazard at these locations.

The exact location of the proposed bridge abutments will be determined by a Fluvial Geomorphologist during the detailed design to ensure that they are located outside the 100-year erosion hazard limits to satisfy the CVC Design Criteria. If this cannot be achieved, then scour protection or bank hardening measures will be designed at the toe of the abutments.

There are a number of ongoing projects in the general project area which may affect future flows/modeling and will need to be further coordinated to ensure the prospective design is not altered due to any of the adjacent projects. Further coordination of the hydraulic modeling will be undertaken during the detailed design stage to ensure the prospective design is not altered due to any of the adjacent projects.

As the Region of Peel continues to work on the detailed design for the new crossing of Huttonville Creek on Mississauga Road, it will be important to ensure proper coordination between the two projects as detailed design of this project commences.

Based on the completed hydraulic analysis, it was concluded that there is no overtopping/flooding of roadways with the proposed alternatives and under all storm events including the Regional storm event. The no-overtopping condition will be achieved when the Mississauga Road culvert is replaced with a larger structure as well.

4.8.1 STORMWATER MANAGEMENT DESIGN CRITERIA

Background information related to the stormwater management study area was collected from the City of Brampton as well as the Credit Valley Conservation (CVC).

CREDIT VALLEY CONSERVATION (CVC)

The CVC document “Stormwater Management Criteria” (August 2012) includes stormwater management criteria that new development must adhere to within CVC regulated areas. This site is within the Huttonville Creek Subwatershed area, and specific criteria applicable to this watershed is summarized below:

Erosion Control: a minimum on-site retention of 5 mm is required for road drainage that does not discharge to a SWM pond. For sites with stormwater management (SWM) ponds, 25 mm – 48 hr detention is required.

- **Quantity (Flood) Control**: Control post-development peak flows to pre-development levels for all return period storms (i.e. 2, 5, 10, 25, 50 & 100-year).

- **Quality Control**: Enhanced Level of Protection (80% TSS removal) as per the latest MOE SWMPD Manual is required.
- **Water Balance**: Endeavor to match pre-development proportions of infiltration, runoff, and evapotranspiration on an average annual basis.

CITY OF BRAMPTON CRITERIA

Stormwater management criteria for the City of Brampton is included in the City of Brampton Subdivision Design Manual (December 2008). This document details standards for stormwater conveyance design, and stormwater management facilities design. However, stormwater management criteria is specified through area specific master plans or the Conservation Authority. The specific criteria applicable for the major and minor systems is summarized below:

The major stormwater system must be designed to accommodate runoff exceeding the capacity of the minor system for the flows up to the 100-year return frequency. Major overland flow must be contained within the road allowance and walkways only.

The maximum water depth for the overland flow shall be the lesser of 0.3 m from the gutter or the water level up to the right-of-way limit.

The storm sewer system should use a 10-year return storm design plus adequate provision for continuous overland drainage of roads.

- Catch basin spacing is as follows:

> 10 m pavement	< 4.5% slope	75m
	> 4.5% slope	60m
< 10 m pavement	< 4.5% slope	90m
	> 4.5% slope	75m

4.8.2 DRAINAGE AND STORMWATER MANAGEMENT OF THE PREFERRED ALIGNMENT

The drainage and stormwater management report has been prepared to support the proposed drainage area for the East-West Connection (i.e. Lagerfeld Drive) road expansion in the City of Brampton, Ontario. The relevant guidelines have been reviewed and measures to adhere to those guidelines have been proposed and checked for proof of concept. The key recommendations of this report are summarized below.

EROSION CONTROL

A minimum on-site retention of 5 mm is required to meet the erosion control criteria for drainage that cannot be treated by a stormwater management (SWM) pond. It is assumed that all landscaped areas will retain at least 5 mm of rainwater prior to runoff generation due to shallow depression storage and wetting, with consequent evaporation. Retention of 119.78 m^3 of water through bioretention or urban tree root systems will achieve the erosion control criterion for Catchments A, B, and C. Catchment D will discharge into an existing SWM pond such that erosion control will be achieved through the pond. With a total erosion volume of 155.37 m^3 a minimum of 776.85 m^3 of soil media is required to store the volume within the 0.2 retention void space of the media.

WATER BALANCE

An average annual water balance calculation has been undertaken to compare the post-development proportions of infiltration, runoff, and evapotranspiration of pre-development to post-development conditions. From **Table**

4-9, it can be seen that with no mitigation measures, the increase in imperviousness has resulted in less infiltration and evapotranspiration, and in greater runoff volumes. As the proposed stormwater management measures rely on either bioretention or urban tree root support systems, the effects of these measures on water balance can be assessed.

As approximately 90% of annual rainfall consists of events totalling 25 mm or less (water quality volume), the bioretention and tree root support measures capture approximately 90% of runoff on an average annual basis. Volume captured by the bioretention or urban tree root systems is infiltrated, retained in soil media, or overflows to the storm sewer in larger events. From **Table 4-9**, it can be seen that directing the impervious areas of the site to the bioretention or urban tree root systems results in a substantial reduction in runoff, and an increase in infiltration and evapotranspiration on an average annual basis.

Table 4-9: Water Balance Analysis Summary

Site Conditions	Infiltration (m^3)	Evapotranspiration (m^3)	Runoff (m^3)
Pre-Development	8,060	21,786	12,089
Post-Development	2,816	10,340	28,779
Post-Development with Mitigation	34,399	(137)	7,673

Using a treatment train approach (i.e., bioretention or urban tree root systems), pre-development proportions of infiltration and evapotranspiration on an average annual basis have been matched or exceeded.

WATER QUANTITY CONTROL

In consultation with CVC staff, quantity controls are not proposed for Catchments A, B, and C for the following reasons:

- Drainage area for Catchments A, B and C (3.38 ha) accounts for 0.36% of the total upstream contributing area (938 ha);
- A comparison of peak flows shows that the 100-year and Regional flows from Catchments A, B and C are 0.55% of the total peak flows at the site location;
- It was determined that the increase in impervious area of the Lagerfeld Drive extension will have negligible impacts on upstream and downstream properties;
- In addition, drainage areas from these subcatchments are too small (i.e., less than 5 ha) to implement a SWM pond. The limited space available for this project also constrains the use of SWM ponds. Therefore, quantity controls are not provided for these subcatchments;

Quantity controls for Catchment D will be provided through an existing SWM pond located south of the CN Rail, north of Lagerfeld Drive, and west of Creditview Road.

ROAD RUNOFF CONTROL

The road runoff is proposed to be controlled through the implementation of a storm sewer system calculated using the Rational Method equation as per guidelines. The storm system will convey runoff from Catchment A westerly through the future extension of Lagerfeld Drive, Catchment B will outlet to Huttonville Creek, Catchment C will outlet to a tributary of Huttonville Creek and Catchment D will outlet to an existing SWM pond located north of Lagerfeld Drive near the existing cul-de-sac to be extended.

For runoff treatment, bioretention methods will be used prior to the storm sewer collection system. As bioretention does not fit within the ROW for the east portion of catchment B as well as majority of catchment C due to conflict with the bridge approach slabs, OGS and CB Shield units can be added at the outlet of the storm sewers to provide a level of treatment for all runoff.

WATER QUALITY CONTROL

An enhanced level of water quality treatment (i.e., 80% TSS removal) will be achieved through a treatment train approach using a combination of pre-treatment measures, on-site retention and detention measures. Assessed for feasible Quality treatment for Catchment D will be provided by an existing SWM pond located south of the CN Rail, north of Lagerfeld Drive, and west of Creditview Road. Bioretention and urban tree root system have been assessed. The urban tree root system is not the City of Brampton's preferred alternative based the City's internal cost benefit analysis.

OUTLET EROSION CONTROL

Plunge pools with dispersion berms and level spreaders will dissipate erosive velocity flows and encourage sheet flow to receiving watercourses. However, it is not a preferred option for the City from a maintenance perspective. Riprap stones will be placed beyond the outlets where feasible as erosion control measures.

4.9 HYDROGEOLOGICAL ASSESSMENT

A hydrological Investigation Report was completed in October 2018 and revised in March 2021 to support the Environmental Assessment for the proposed Lagerfeld Drive road upgrades near Bovaird Drive and Mississauga Road, in the City of Brampton. A zone of 500-m (the "Study Area") has been added from the approximate boundaries of the proposed road extension, to assess the hydrogeological conditions for this project.

The hydrogeological investigation was co-ordinated and conducted in step with an active geotechnical investigation that was completed by WSP in 2018. The findings of that investigation are provided under separate cover, dated June 2018 (WSP Canada Inc., 2018).

The complete Hydrogeological Investigation Report can be found in **Appendix J**.

4.9.1 SITE SETTING

WSP conducted a geotechnical investigation at the Site in April 2018 to report on the subsurface conditions for the proposed roadwork. The field investigation consisted of the advancement of six (6) boreholes (BH18-01 to BH18- 06) to depths that ranged from 3.2 meters to 5.2 meters below ground surface (m BGS). Four of the boreholes were subsequently completed as monitoring wells (BH18-01, BH18-04, BH18-05 and BH18-06).

The Site is located within the jurisdiction of Credit Valley Conservation (CVC). Parts of the alignment are located within a CVC regulated area and as such is regulated by Ontario Regulation (O.Reg.) 166/06. The Study Area is in the Huttonville Creek subwatershed of the Credit River. The West and East branches of Huttonville Creek cross the planned alignment east of Mississauga Road. The West, East and Main branches of the Huttonville Creek are considered to be regulated Redside Dace habitat, and therefore the 30-m buffer zone around each meander belt is protected under the Endangered Species Act (S.O. 2007, Chapter 6).

The MECP Water Well Records (WWR) database indicated that there are fifty-eight (58) well records within the Study Area. A review of the well records indicates that fourteen (14) well records are considered water supply wells, ten (10) well records are reported as abandoned, twenty (20) records are classified as test wells, and fourteen (14) records reported as unknown. Of these records, 34 had geological data. Most of the records indicated that the overburden consisted of clay / silt / till, with some more granular layers present as well (sand, gravel). Shale bedrock was identified in seven of the well records, being encountered at depths between 1.2 and 14.6 m below ground surface.

4.9.2 DEWATERING ASSESSMENT

The proposed road enhancement includes potential crossings of the tributaries to Huttonville Creek. The crossings may require open excavations for footings, support structures, or abutments. In addition, it is expected that linear infrastructure will also be installed below the roadways in the form of sanitary/storm sewers and watermains. The detailed design for these services, including proposed depths and alignments are not available at this stage.

The following preliminary hydrogeological recommendations for consideration during the detailed design phase are based on the field investigation and borehole/monitoring well information. Recommendations are intended to support the EA phase, and are not to be considered instructions for contractors. Further investigation will likely be required to support detailed design features, including detailed dewatering analysis.

4.9.2.1 POTENTIAL EXCAVATIONS – CREEK CROSSING

It is anticipated that some excavation work will be required to facilitate the installation of bridge abutments. In places that the depth of excavation is above the water table, some groundwater seepage could be expected from perched groundwater and other sources of nuisance water. It is expected that traditional pumping from gravity fed filtered sumps would be adequate to control this source of groundwater. Surface water in the form of precipitation should be controlled by directing it away from open excavations.

In cases where a deeper excavation below the water table is required, a dewatering assessment will be required to assess expected flow rates and whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a Permit to Take Water (PTTW).

4.9.2.2 POTENTIAL EXCAVATIONS – LINEAR INFRASTRUCTURE

Additional excavations for underground services will likely be required using open trenches. It is recommended that the length of open trench be limited by using staged construction and backfilling methods. Some minor groundwater seepage from bedding planes, granular base, or perched conditions could require minor dewatering using filtered sumps and pumps where the excavation is done above the water table. In deeper excavations, active lowering of the water table could be required to ensure a dry excavation. Dewatering efforts should focus on lowering the water table to a minimum of 1.0 m below the base of excavation. Limiting the open trench length to distances of less than 50 m for these deeper excavation areas can reduce the dewatering effort and therefore the discharge rates. A dewatering assessment will be required to assess potential flow rates during the detailed design stage to determine whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a PTTW.

4.9.2.3 STORMWATER INTO OPEN EXCAVATIONS

The accumulation of stormwater into open excavations can increase the volumes associated with construction dewatering. Additional capacity should be accounted for to control larger precipitation events that could otherwise disrupt construction. Best efforts should be made to divert stormwater runoff from entering open excavations. The dewatering contractor should consider additional capacity to handle the additional source of water during weather events.

4.9.3 EVALUATION OF POTENTIAL GROUNDWATER IMPACTS

IMPACTS TO GROUNDWATER USERS

The MECP well search uncovered fourteen (14) possible groundwater well users within the Study Area. The proposed project has the potential to impact the water quality and water quantity of these stakeholders. Construction dewatering will lower water levels within the zone of influence, which could impact the supply to

nearby users. In addition, dewatering can also cause contaminants to migrate, which could impact the quality of groundwater to nearby users.

It is recommended that at the detailed design stage, a residential well survey be conducted to determine the status, location, and use of private water wells and septic systems within the Study Area. This survey should include attempts to collect baseline information from well users, including water levels, supply, quality, and reliability of the systems.

IMPACTS TO NEARBY STRUCTURES

There is always a possibility of inducing settlement to neighboring buildings, utilities and underground structures/infrastructure when lowering water levels or depressurizing an aquifer. It is considered a best practice to instigate a pro-active monitoring program in order to identify any potential areas of concern and the need and type of monitoring required. Utilities, and transit owners may have stringent monitoring requirements, which will have to be adhered to. During the detailed design stage, it is recommended that a geotechnical review of potential ground settlement be conducted to ensure that risk to the nearby structures is minimized during active dewatering.

IMPACTS TO SURFACE WATER FEATURES

The potential construction activities are in close proximity to the West and East Huttonville Creek waterways. These waterways are classified as Redside Dace habitat. Groundwater discharge to these waterways should be maintained to protect these sensitive species. Nearby construction dewatering could alter the natural hydraulic gradient, diverting groundwater discharge from the creek towards the source of pumping. It is recommended that during the detailed design stage, the potential for groundwater discharge to the West and East Huttonville Creek be assessed. Baseline surface water quality should also be established by conducting water sampling from the creeks.

Construction methods should be examined that seek to limit excavation depths near the waterway to above the seasonal water table, if practical. If necessary to dewater, a detailed monitoring and mitigation plan will be required that includes adequate sediment and erosion control and possibly the use of drive-point piezometers and staff gauges to evaluate hydraulic gradients. Alternately, a groundwater cut-off structure could be used to reduce the dewatering needs for excavations that extend below the water table.

SOURCE WATER PROTECTION

The study area lies within the Credit River watershed, which is a part of the larger Great Lakes – St. Lawrence watershed, and is therefore in the Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Region (SPR). The CTC SPR is under the jurisdiction of the Toronto and Region Source Protection Authority, Central Lake Ontario Source Protection Authority, and the Credit Valley Source Protection Authority. The Approved Source Protection Plan (2015) is the reference document which outlines the relevant policies within the jurisdiction boundaries (CTC Source Protection Region, 2015).

The study boundaries were evaluated to identify any potential drinking water vulnerabilities and threats, including the proximity to any vulnerable areas, including the following:

- Wellhead Protection Areas (WHPA)
- Intake Protection Zones (IPZ)
- Highly Vulnerable Aquifers (HVA)
- Significant Groundwater Recharge Areas (SGRA)
- Wellhead Protection Area-Q (WHPA-Q, Water Quantity)

The MECP Source Protection Information Atlas indicates that the site falls within or near several vulnerable areas, as highlighted in **Table 4-10**.

Table 4-10: Source Water Protection Summary

Source Protection Details for Location					
Source Protection Area:	Credit Valley	**Wellhead Protection Area (WHPA):**	No	**Wellhead Protection Area E (GUDI):**	No
Intake Protection Zone (IPZ):	No	**Issue Contributing Area:**	No	**Significant Groundwater Recharge Area (SGRA):**	No
Highly Vulnerable Aquifer (HVA):	Yes, score = 6	**Event Based Area:**	No		
Wellhead Protection Area Q1 (WHPA-Q1):	No	**Wellhead Protection Area Q2 (WHPA-Q2):**	No	**Intake Protection Zone Q (IPZ-Q):**	No

As indicated, the study area is not within a WHPA or surface water IPZ. The closest municipal water supply well is located more than 7 km west of the area in Georgetown. The closest IPZ was identified over 26 km south of the area along Lake Ontario**.**

The study area is within an area identified as HVA but just outside a SGRA area. Based on this, and the geological information collected during the field program, it is concluded that it is unlikely that there is a hydrological connection to an aquifer that is a source of drinking water.

POINTS OF DISCHARGE

During any active construction dewatering, it will be necessary to consider the final point of discharge of any construction effluent produced. The potential source for discharge includes the following options:

- Discharge to a municipal storm and/or sanitary sewer;
- Collection onsite for removal by tanker to an approved waste handling facility;
- Discharge to the natural environment.

Any discharge option will potentially require consideration for the pre-treatment of the effluent to ensure it meets the relevant discharge requirements. For discharge to a municipal sewer, the limits are outlined within the municipal sewer use by-law. For discharge to the natural environment, treatment will require compliance with the Provincial Water Quality Objectives. In either case, a discharge agreement will be required from the relevant authority. The application process will require an assessment of the groundwater quality.

LONG-TERM DRAINAGE

The proposed options for the road alignment do not feature any long-term foundation drainage systems. Therefore, it is not anticipated that there will be any long-term groundwater discharge. Underground utilities and structures should be designed with sufficient cut-off features to eliminate any preferential groundwater conduits (coarse bedding planes). This will reduce alterations to the natural groundwater regime.

WELL DECOMMISSIONING

Following the completion of construction activities, all remaining monitoring wells, well points and eductors (if any) installed at various stages of this project must be decommissioned. The installation and eventual decommissioning of the wells and the dewatering system must be carried out by a licenced water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

4.9.4 CONSTRUCTION MONITORING

The active construction dewatering stage will require monitoring designed to assess the potential for impacts to water levels in aquifers, water quality, and surface water. In addition to the aforementioned components, the use of responsible construction mitigation methods should also include implementing an Erosion and Sediment Control (ESC) plan for receiving surface water courses.

4.9.4.1 DISCHARGE VOLUME REPORTING

During active dewatering, the contractor will be required to document discharge pumping rates as a required condition of the PTTW, with regular reporting of water taking volumes via the MECP Water Taking Reporting System. A flow meter should be supplied and all discharged ground and storm water should be discharged through the properly field calibrated device. A non-resettable flow meter that records discharge in both instantaneous and cumulative modes is recommended. Daily recording of the discharge volumes will be required for regular reporting. The total combined daily discharge must never exceed the limits as outlined in the PTTW. Additional storage measures (such as extra tank storage or temporary settling ponds) can be used to control large rain events and reduce the instantaneous discharge/pumping rates.

4.9.4.2 GROUNDWATER LEVEL MONITORING

Once dewatering proceeds, it is recommended that groundwater levels be monitored across the monitoring well network to detect construction related impacts to water supply in the creeks or adjacent properties. Weekly groundwater monitoring can be undertaken with the use of programmed data loggers installed in preselected monitoring wells and drive points located along the creek. During the first week of construction, the frequency of the data collection should be daily for manual measurements and hourly for data logger reading frequency, and as the target water levels are reached, the frequency of manual measurements can be extended to weekly, with data logger reading frequency extended to daily. Data logger data should be downloaded and reviewed on a weekly basis during the early stages of dewatering to verify that water levels are stable. Once confirmed that impacts are minimal, the monitoring interval can be increased to monthly.

If engagement from the nearby private well users is positive, data can be collected from neighboring wells during the first week of dewatering. If there are no observable impacts to supply, the monitoring program interval can be increased to monthly. During the construction period, if there are any groundwater supply complaints received, they can be reviewed on a case by case basis to determine the cause of the disruption and the need for mitigation, in accordance with groundwater supply protection best management practices.

If remediation is required, the short-term solution must include provisions to supply potable water to any affected users. Long-term remediation will require provisions on a case-by-case basis.

4.9.4.3 SURFACE WATER MONITORING

During construction, and when area groundwater levels exceed the streambed elevation (i.e. springtime), the water level in the piezometers should be monitored on a daily basis for evidence of any lowering to the water table. If impacts are observed from active dewatering, the pumping rates should be lowered until conditions return or treated water can be directed back to the watercourse to allow for flow supplementation. Reducing excavation areas near the tributaries and within the expected zone of influence to 25 m length can also be implemented to further reduce pumping rates if any impacts are observed. After target water levels are reached, the frequency of monitoring can be extended to weekly.

4.9.4.4 GROUNDWATER AND EFFLUENT QUALITY MONITORING

A monitoring program should be implemented that is based on the selected discharge option. The monitoring program should consist of daily visual examination of the construction effluent for the presence of any sheen, foam, or odour. Water clarity and sediment level should also be monitored to ensure that the quality is not degrading during construction. Filters should be examined on a regular basis, and any failures to equipment

should be repaired immediately. Discharge permitting may also include specific water quality testing that must be adhered to.

To ensure that excess erosion and sediment-laden water is not directed into the nearby watercourse, and in accordance with OPSS 518 (and 185), all dewatering discharge will be laminar and directed through energy dissipating / settling / filtration systems prior to return to the natural environment. Water pumped from the work area should be treated for suspended solids as necessary, prior to release. No dewatering discharge will be released directly into the watercourse. Dewatering discharge will be directed through a filter bag, splash pad, or settling facility located as possible at least 30 m from away from the watercourse, and allow water to flow overland to help equilibrate the temperature of the dewatering discharge with that of the natural watercourse.

Neighboring water users that agree to monitoring will also require regular sampling from a residential tap. During the initial dewatering period, it is recommended that a sample be collected bi-weekly for the initial month and the samples be submitted for comparison against the ODWQS. Any exceedances against the ODWQS as compared with baseline monitoring will require a detailed assessment to determine whether the exceedances are related to dewatering. If exceedances are related to dewatering, short-term remediation shall be provided in the form of a supply of potable water. Long-term measures will need to be determined on a case-by-case basis. Afterwards, testing is to be completed monthly.

Impacts to water quality can be controlled using safe construction practices that eliminate the potential for waste spills and other contamination events. Refueling should be performed in designated areas away from open excavations, and surface water features. In the event of a spill, remedial action must be undertaken immediately by the contractor, following all MECP and provincial spill guidelines.

4.9.4.5 *SURFACE WATER QUALITY MONITORING*

Should dewatering discharge back to the natural environment be directed towards either watercourse, additional sampling is to be conducted on a weekly basis during the first month of discharge to evaluate changes from baseline conditions. Samples are to be taken upstream and downstream of the discharge point to assess potential impacts.

Should significant changes in water quality occur, mitigation should be initiated, which could include changing discharge locations, reducing dewatering volumes, suspension of dewatering, or adding additional treatment measures.

4.9.5 WATER TAKING REQUIREMENT

The Environmental Activity and Sector Registry (EASR) guidelines are designed to facilitate groundwater taking during active construction dewatering applications in the cases where the volume of water removed is greater than 50,000 L/day and less than 400,000 L/day.

During the active construction dewatering phase, if the volume of water expected to be pumped does exceed the daily limit on groundwater taking under the Ontario Water Resources Act of 50,000 L/day it will be necessary to register the construction dewatering under the EASR guidelines. If the discharge rate is anticipated to exceed 400,000 L/day, a Category 3 PTTW will be required. Methods to reduce the volume of daily discharge include staged construction, limiting open excavations, diverting surface water away from excavations, and limiting the depth of excavations.

4.9.6 RECOMMENDATIONS

Based on the findings and conclusions of the Hydrogeological Investigation, the following summary of recommendations are provided:

- Equip monitoring wells with data loggers to measure groundwater levels for 6 to 12 months to assess seasonal fluctuations and the impact precipitation/spring melt has on the shallow groundwater;

- Produce dewatering estimates during the detailed design stage to assess for discharge and permitting needs;
- Prior to construction dewatering, conduct a door-to-door water well survey for all water supply wells located within the Study Area to provide a baseline assessment of pre-construction conditions;
- Review the potential impacts to surface and groundwater based on the dewatering assessment to direct future monitoring and mitigation.

4.10 GEOTECHNICAL ASSESSMENT

A Geotechnical Investigation Report was completed in June 2018 addressing subsurface conditions for the Environmental Assessment (EA) Phase of the design and subsequent construction of the proposed Brampton East-West Connector, to be located in the vicinity of Bovaird Drive and Mississauga Road, in Brampton, Ontario. The investigation comprised subsurface exploration by means of advancing and sampling a total of six (6) boreholes. A track mounted drill rig was used and drilling was completed using continuous flight power augers with standard penetration testing (SPT).

Geotechnical Investigation Report can be found in **Appendix K**. The report summarizes the procedures and findings of the geotechnical investigation completed in April 2018, including results of the drilling and laboratory testing program, and the general preliminary recommendations with regards to design and construction of the proposed roadway and creek crossings.

4.10.1 SUBSURFACE FINDINGS

Based on the borehole information, the subsurface soil profile at the site comprises surficial topsoil, overlying layers of native soils consisting predominantly of silty sand, sandy silt and clayey silt till.

A surficial layer of topsoil was encountered in each of the six (6) boreholes. The topsoil layer ranged from approximately 150 to 560 mm in thickness. The topsoil generally had a silty texture and contained significant organic material. The topsoil is expected to be devoid of structural properties and should be removed from structural loading areas, including the proposed roadway alignment.

Layers of glacial till were encountered immediately beneath the topsoil layers and extended to the full depth of the investigation (i.e., depths ranging from 3.5 to 5.2 mBGL). The composition of the till varied across the site (and with depth), but generally comprised silty sand, sandy silt or clayey silt. Occasional sand seams were observed within the material. Based on field observations and laboratory- determined moisture content ranging from 6 to 30%, the till was generally moist to wet (or about the plastic limit (APL) for cohesive till material) at the time of the investigation. Nvalues from SPT testing ranged from 4 to >50 blows, suggesting that the relative density of the fill ranged from loose to very dense.

Groundwater observations were made within the open boreholes upon completion. Groundwater accumulation was observed in three of the boreholes (BH18-01, BH18-05 and BH18-06) at depths ranging from approximately 1.8 to 3.4 mBGL. The remaining boreholes did not encounter groundwater seepage and/or accumulation during the drilling operations. Borehole caving was observed and recorded for three (3) of the boreholes (BH18-04 to BH18-06). It should be noted, although no groundwater seepage and/or accumulation was noted in borehole BH18-04, above the depth of borehole caving, the cave-in itself may be an indication of groundwater below this depth. Monitoring wells were installed in four (4) selected boreholes following drilling operations. The monitoring wells were installed in boreholes BH18-01, BH18-04, BH18-05 and BH18-06. The monitoring wells will be used for a Hydrogeological EA report, provided separately.

Groundwater levels are subject to seasonal fluctuations, specifically in response to extreme precipitation events and the spring thaw. As such variable levels should be anticipated, and groundwater could be encountered during construction, depending on site location and depth.

4.10.2 GEOTECHNICAL RECOMMENDATIONS

Based on the investigation findings, WSP has provided select preliminary geotechnical recommendations for consideration during the Environmental Assessment (EA) phase of the project.

A summary of geotechnical recommendations is provided under Future Commitments section.

4.10.3 DESIGN REVIEW, TESTING AND INSPECTION

. Conditions beyond borehole locations may vary from those discussed in the report. WSP should be contacted if any significant subsurface variability is found at a later time. WSP should be requested to confirm requirements for soil handling and disposal, and the need for dewatering and a Permit to Take Water according to Provincial Regulations when more information is available.

Based on the limited information related to the proposed creek crossing, the relevant bridge crossing recommendations should be considered as preliminary. Once exact location and loadings are available, WSP should be afforded the opportunity to review the recommendations provided in this report and make modifications if required. WSP should be contacted to provide geotechnical inspections and material testing during construction operations. Exposed subgrade soils are to be inspected to confirm the material is stable and competent to support design loads. Inspections of seepage and groundwater conditions during construction are also required, to further address requirements for dewatering. Testing and inspections for general QA/QC should include sampling and laboratory testing of fill materials and asphalt, and compaction testing.

4.11 NOISE IMPACT ASSESSMENT

A Noise Impact Assessment Report was completed in July 2020 as part of the Class “C” Environmental Assessment (EA) for Lagerfeld Drive in the City of Brampton. Noise Impact Assessment Report can be found in **Appendix L**. The Study Area is currently surrounded by green space, including a provincially significant wetland and Huttonville Creek, in addition to residential developments. The Canadian National Railway runs east-west and located to the north of the Lagerfeld Drive. The acoustical environment of the Study Area is suburban in nature with surrounding lands allotted for commercial and residential purposes. There are existing residential developments located to the north, northeast and southeast of the Study Area.

4.11.1 ENVIRONMENTAL NOISE ASSESSMENT

The two scenarios considered in the assessment are the following:

- **Scenario 1: Future “No Build”**. This scenario only includes a 6-lane Mississauga Road, without the Lagerfeld Drive.
- **Scenario 2: Future “Build”**. The assessment under this scenario includes a 6-lane Mississauga Road with the Lagerfeld Drive.

4.11.1.1 ROAD TRAFFIC DATA

Noise impact studies due to traffic typically require a minimum 10-year traffic forecast from the project completion date. Because the Lagerfeld Drive extension has no definitive completion date, ultimate traffic data was used for this study.

Ultimate traffic data along with day-night splits, and medium and heavy truck percentages for Mississauga Road in both scenarios was provided by the Region of Peel and is included in Appendix B of the Nosie Report. Traffic data for Lagerfeld Drive was conservatively estimated based on its designed lane capacity from the report, “Environmental Assessment Study –East-West Connection Mount Pleasant GO Station to West of

Mississauga Road, Phase 1 – Traffic Report", dated June 2015 (Traffic Report). Hourly lane capacity values were multiplied by a factor of 12.5 to obtain 24-hour traffic volumes for all 4 lanes.

For Lagerfeld Drive, the day/night split, medium and heavy truck percentages were assumed to be 90%/10%, 2%, and 3%, respectively, as is typical for collector roadways. The posted speed limit for both roads was provided. **Table 4-11** summarizes the road traffic data used in the assessment.

Table 4-11: Road Traffic Data

ROADWAY	ULTIMATE 24-HR TRAFFIC DATA	NO. OF LANES	DAY/NIGHT SPLIT (%)	MEDIUM TRUCKS (%)	HEAVY TRUCKS (%)	POSTED SPEED LIMIT (KPH)
Mississauga Road [1] (Scenario 1)	48,100	6	89/11	Day: 0.6% Night: 0.3%	Day: 6.8% Night: 6.1%	80
Mississauga Road [1] (Scenario 2)	48,100	6	89/11	Day: 0.6% Night: 0.3%	Day: 6.8% Night: 6.1%	80
Lagerfeld Drive (Scenario 2)	32,500 [2]	4	90/10 [3]	Day: 2% [3] Night: 2%	Day: 3%3 Night: 3%	50

Notes: [1] Data obtained from the Region of Peel
[2] Conservative estimate based on designed hourly lane capacity.
[3] Typical values for collector roads

4.11.1.2 *NOISE SENSITIVE AREAS*

A single-unit residential dwelling on the east side of Mississauga Road between Bovaird Drive and Sandalwood Parkway, with municipal address 10179 Mississauga Road, was determined to be the nearest sensitive receptor to the Lagerfeld Drive.

Any other receptors with similar or greater setbacks will have sound levels equal or less than those predicted. Setback distances to the most exposed side are summarized in **Table 4-12** below.

Table 4-12: Summary of Setback Distances

RECEPTOR	RECEPTOR ID	MOST EXPOSED FAÇADE	ROAD/SEGMENT	DISTANCE (m)
10179 Mississauga Road	R01 (Most Exposed Side)	Southwest	Mississauga Road Northbound	55
			Mississauga Road Southbound	72
			Lagerfeld Drive	82

4.11.1.3 *RESULTS*

Table 4-13 summarizes the predicted sound levels for both scenarios, as well as the change in sound levels due to the project.

Table 4-13: Summary of Predicted Sound Levels

RECEPTOR ID	NO. OF NOISE SENSITIVE LAND USES	ROADWAY	PREDICTED SOUND LEVEL ($L_{EQ\ 16\text{-}HOUR}$, dBA) Scenario 1 FUTURE "NO BUILD" [A]	PREDICTED SOUND LEVEL ($L_{EQ\ 16\text{-}HOUR}$, dBA) Scenario 2 FUTURE "BUILD" [B]	CHANGE DUE TO UNDERTAKING [B] – [A]
R01 [1] (Most Exposed Side)	2	Mississauga Road, Northbound	60.1	60.1	0.6
		Mississauga Road, Southbound	62.0	62.0	
		Lagerfeld Drive [2]	n/a	56.0	
		TOTAL	**64.2**	**64.8**	
R02 [1] (Outdoor Living Area)	2	Mississauga Road, Northbound	51.6	51.6	2.7
		Mississauga Road, Southbound	50.0	50.0	
		Lagerfeld Drive [2]	n/a	53.3	
		TOTAL	**53.9**	**56.6**	

Notes: [1] Assessed at 1.2 m high above grade, as per the MTO Document.

[2] Lagerfeld Drive does not exist under Scenario 1 "No Build".
n/a – not applicable

As can be seen on **Table 4-13**, the predicted sound levels at the most exposed side for both future scenarios ("No Build" and "Build" scenarios) are less than the MTO's 65 dBA design objective and the change in sound level is less than 5 dB. Thus, noise mitigation is not needed to comply with the requirements outlined in the MTO Document.

The predicted sound level at most exposed side, receptor R01, exceeded the City of Brampton's 60 dBA design objective. Thus, sound levels due to the undertaking has been predicted at the outdoor living area of receptor R01.

As can be seen on **Table 4-13**, the predicted sound level at the outdoor living area of R01 is 57 dBA. This is below the 60 dBA design object of the City and thus, no noise mitigation is needed.

It should be noted that there are future residential developments planned along Lagerfeld Drive. Noise mitigation measures needed to comply with the applicable noise guidelines at these future developments along Lagerfeld Drive should be the responsibility of developers.

4.11.2 RECOMMENDED MITIGATION MEASURES

The following construction noise mitigation measures, but not limited to, are recommended for considerations:

- Limit the major construction activities during the daytime hours only (i.e. 07:00 to 19:00 hours) and avoid evening and nighttime construction (19:00 to 07:00 hours);
- Combine all noisy activities to occur in the same time period. The combined sound level will not be significantly greater than the sound level if done separately;
- Install and maintain noise mitigation mechanisms such as muffler systems on construction equipment;
- Consider alternative construction methods (less intense);
- Use quieter construction equipment;
- Re-route the truck traffic away from the noise sensitive areas;
- Implement no idling policy and turn off construction equipment when not in use;
- Construct temporary sound barriers between the noisy construction activities and the noise sensitive areas, if feasible.

The assessment indicated that the predicted sound levels generated from traffic associated with the extension of Lagerfeld Drive, at the most exposed side of the nearest noise sensitive area, meet the MTO's design objective and the change in sound level is such that noise mitigation measures are not required.

The predicted sound level at the most exposed side exceeded the City's design objective and thus, sound level is predicted at the outdoor living area. The sound level at the outdoor living area is predicted to be in compliance with the City's 60 dBA objective without the need for noise control mitigation for noise control purposes.

Although noise arising from this project is permitted by and is not considered a contravention of the City of Brampton's Noise By-law, it is still recommended to minimize the construction-related noise to reduce the potential noise effect at the surrounding noise sensitive areas. Noise mitigation measures are provided for considerations.

4.12 PHASE 1 ESA

A Phase 1 Environmental Site Assessment (ESA) Report was completed in June 2019 as part of the Class "C" Environmental assessment (EA) for the proposed East-West Connection (Lagerfeld Drive) Mount Pleasant GO Station to West of Mississauga Road, in the City of Brampton, Ontario (herein referred to as the "Phase One Property"). Phase 1 Environmental Site Assessment (ESA) Report can be found in **Appendix M**. The Phase One Property is located from west of Creditview Road, crosses the vacant field and valley land along Huttonville Creek and extends westward across Mississauga Road. For the purpose of this assessment, Mississauga Road is referred to as running in a north-south direction. The Phase One Property is approximately 1.5 km in length and 33 m in width. The Phase One ESA was conducted in accordance with the general and specific objectives outlined in O. Reg. 153/04.

4.12.1 SPECIFIC OBSERVATIONS AT PHASE ONE PROPERTY

SUBJECT SITE STRUCTURES AND IMPROVEMENTS INCLUDING BELOWGROUND STRUCTURES

No buildings or structures were observed at the Phase One Property. Evidence of the former buildings at 10124 Mississauga Road was observed on the Phase One Property on the west side of Mississauga Road.

POTABLE AND NON-POTABLE WATER SOURCES

No water supply wells were observed at the Phase One Property. A dug well was observed in the Phase One Study Area just north of the Phase One Property, 10124 Mississauga Road. Properties within the Phase One Study Area are assumed to have municipal services, but water supply wells are located within the Study Area.

UNDERGROUND UTILITIES AND CORRIDORS

Private utilities drawings were not available for review. There is a potential that buried utilities remain in the area of the former buildings on 10124 Mississauga Road.

TransCanada pipeline is known to traverse the Phase One Property west of Mississauga Road.

WELLS

Several monitoring wells were observed on/immediately adjacent to the Phase One Property, protected in monument casings. A dug well was observed north of the Phase One Property along Mississauga Road, likely related to the former farm buildings on 10124 Mississauga Road. It is WSP's understanding that these monitoring wells are part of the hydrogeological studies completed for the proposed development in the Phase One Study Area.

SEWAGE WORKS

No sewage or wastewater is generated at the Phase One Property, as it is vacant with no buildings or structures. Tile drains were observed south of the Phase One Property near the woodlot on the south-western portion of the Phase One Study Area.

GROUND SURFACE

The surface elevation at the Phase One Property varies depending on the location. The ground surface at the Phase One Property is generally covered by grass with the exception of the west limit of the existing Lagerfeld Drive and crossing at Mississauga Road where pavements were observed.

RAILWAY LINES AND SPURS

The Canadian National (CN) railway is located at the edge of the Phase One Study Area to the north and runs in an east-west direction.

STAINED SOIL, VEGETATION OR PAVEMENT

No areas of stained soil or vegetation were observed at the Phase One Property.

STRESSED VEGETATION

No stressed vegetation was observed at the Phase One Property.

AREAS WHERE FILL AND DEBRIS MATERIALS APPEAR TO HAVE BEEN PLACED OR GRADED

Based on the records reviewed and the Site visit completed, the following issues were identified:

- Stockpiles of fill material were observed in the area of the former buildings on the west side of Mississauga Road on 10124 Mississauga Road; and
- Stockpile of fill at the end of Lagerfeld Drive (likely related to the construction activity where area north of the roadway was used for the staging area) that are within the proposed alignment on the Phase One Property.

4.12.2 POTENTIALLY CONTAMINATING ACTIVITY

PCAs identified within the Phase One Study Area and on the Phase One Property. **Table 4-14** summarises the PCAs that have been determined to contribute to on-Site APEC's.

Table 4-14: Summary of PCAs

POTENTIALLY CONTAMINATING ACTIVITY	OBSERVATIONS
PCA # 30: Fill Material of Unknown Quality **PCA # 40: Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Bulk Storage**	**On-Site** – Fill piles were observed during the Site reconnaissance in the area of the former buildings at 10124 Mississauga Road. The potential of importation of fill material of unknown quality as part of the building demolition at 10124 Mississauga Road and in close proximity of and this has the potential to impact soil at the Phase One Property. There is also a potential for storage of pesticides and use of fuels as well as equipment repair being carried out in the barn that are related to the farming practices also may impact shallow soil at the area of the Phase One Property The area where the PCAs are identified at the west side of Mississauga Road is identified as APEC-1.
PCA # 30: Fill Material of Unknown Quality	**On-Site** – Stockpile fill material of unknown environmental quality was observed on the west limit of Lagerfeld Drive on the Phase One Property and offsite on the Phase One Study Area. The on-site where the stockpiles are identified at the eastern portion of the Phase One Property is identified as APEC-2.
N/A: Application of Road Salt	**Off-Site** - The Site is adjacent to Mississauga Road, Creditview Road and Lagerfeld Drive, which are municipal roadways. These municipal roadways may have been subjected to seasonal de-icing activities. However, any potential contamination caused by the use of de-icing substances for the purpose of keeping a municipal roadway safe for traffic under conditions of ice and snow is not considered an exceedance under O.Reg.153/04, s.48 (3). Although the soil and groundwater should be assessed for the contaminants of concern associated with de-icing (i.e., EC and SAR in soil and chloride and sodium in groundwater), any identified impacts do not need to be delineated or remediated. This PCA is not considered to contribute to an area of potential environmental concern.

4.12.3 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

Two APECs were identified at the Phase One Property. The locations of the APECs are summarized in **Table 4-15**.

Table 4-15: Summary of Areas of Potential Environmental Concern

Area Of Potential Environmental Concern (APEC)	Location Of Area Of Potential Environmental Concern on Phase One Property	Potential Contaminating Activity	Location of Potential Contaminating Activity (Onsite Or Offsite)	Contaminants of Potential Environmental Concern	Media Potentially Impacted (Groundwater, Soil and/or Sediment)
APEC-1	West of Mississauga Road	30. Fill Material of Unknown Quality 40. Pesticides (including Herbicides, Fungicides and Anti-Fouling Agents) Bulk Storage 28. Gasoline and Associated Products in Fixed Tanks	On-site	Metals and Inorganics*, PHC BTEX, PAHs, OC Pesticides	Soil and groundwater
APEC-2	On west limit of Lagerfeld Drive	30. Fill Material of Unknown Quality	On-site	Metals and Inorganics*, PHC BTEX, PAHs	Soil

*Metals and Inorganics includes Metals, As, Sb, Se, CN-, B HWS, Cr(VI) and Hg
PHC BTEX – petroleum hydrocarbons including benzene, toluene, ethylbenzene and xylenes
OC Pesticides – Organochlorine pesticides

- APEC-1 (Area west of Mississauga Road): Fill piles were observed during the Site reconnaissance in the area of the former buildings at 10124 Mississauga Road. The potential of importation of fill material of unknown quality as part of the building demolition at 10124 Mississauga Road and in close proximity of the Phase One Property. There is also a potential for storage of pesticides and use of fuels as well as equipment repair being carried out in the barn that are related to the farming practices; and
- APEC-2 (On west limit of Lagerfeld Drive): Stockpile of fill was observed on the Phase One Property likely related to the construction work in the Phase One Study Area. As the soil is stockpiled on an asphalt surface, impacts to groundwater are not suspected.

4.12.4 PHASE ONE ESA RECORDS SUMMARY

Based on information obtained as part of the Phase One ESA records search, Site reconnaissance and interview process, the following findings are presented:

- The Phase One Property is located west of Creditview Road, crosses the vacant field and valley land along Huttonville Creek and extends westward across Mississauga Road;
- The surface topography of the Phase One Study Area gently slopes down to the south/southeast towards the valley land along Huttonville Creek that traverses the Phase One Property at two locations on the east side of Mississauga Road. The existing elevation along the Phase One Property ranges from 236.5 masl to 244 masl;
- Based on a review of surficial geology, native soil in the Phase One Study Area consists of clay to silt-textured till derived from glaciolacustrine deposits or shale (Ontario Geological Survey, 2010). Based on this information, the surficial soil is likely to have low to moderate permeability;
- Based on a review of topographic mapping, Huttonville Creek traverses the Phase One Property at two locations east of Mississauga Road;
- The area along Huttonville Creek on east of Mississauga Road is considered as a valleyland/watercourse corridor according to the City of Brampton Natural Heritage Mapping;
- Based on our review of the aerial photographs, a barn like structure was previously located on the Phase One Property west of Mississauga Road at 10124 Mississauga Road. Stockpiles of fill materials was observed during the Site reconnaissance in the area of the former buildings. There is a potential for storage of pesticides and use of fuels as well as equipment repair being carried out in the barn that are related to the farming practices. These are considered potentially contaminating activities (PCAs) onsite;
- A stockpile of fill of unknown quality was observed on the west limit of Lagerfeld Drive. The stockpile was observed to extend onto the Phase One Property during the Site reconnaissance. The stockpile is likely related to the construction work in the Phase One Study Area.

Based on the findings of the Phase One ESA, potential environmental impacts are present at the Phase One Property from PCAs identified at the Phase One Property and in the Phase One Study Area.

A Phase Two ESA in accordance with O. Reg. 153/04 is required to investigate soil and groundwater quality at the identified APECs prior to filing an RSC.

5 IDENTIFICATION OF ALTERNATIVE PLANNING SOLUTIONS

5.1 INTRODUCTION

The focus of Phase 2 of the Class EA process is the identification and evaluation of various solutions to the problems identified in above sections of this report. The following sections outline the process that was followed to review and evaluate potential solutions.

A full range of alternative solutions as described below are identified and compared to the "do nothing" (base case) alternative. The alternatives are assessed using screening criteria, such as compatibility with City's, Region's and Provincial objectives and policies, ability to serve planned developments, ability to accommodate future travel demand and provide strategic multi-modal connections linking future planned destinations, impact on public safety, potential impacts on natural environment (Vegetation and Wildlife, Water Resources, Species-at-Risk and Fisheries), and capital costs.

The Class EA planning process requires that various reasonable and feasible solutions to the identified problem be examined. A matrix format is used to show how each alternative rate on each screening criterion to compare alternative solutions.

The Class EA process recognizes that there are many ways of solving a particular problem and requires various alternative solutions to be considered. The five alternative solutions for consideration in this study are described in **Table 5-1**.

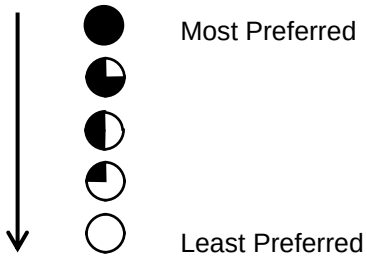
Table 5-1: Alternative Planning Solutions

Planning Alternative Solutions		Description
Alternative 1	Do Nothing	No change made within the Study Area (status quo).
Alternative 2	Transportation Demand Management (TDM)	Introduce TDM strategies to reduce demands on Mississauga Road and Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)
Alternative 3	Improve Transportation Operations along other Roads in the Network	Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.
Alternative 4	Construct road west of Mississauga Road only	The east-west connection will start at Mississauga Road, extending to the west. No connection from Mississauga Road with Mount Pleasant GO Station.
Alternative 5	Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road	Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road

5.2 EVALUATION FRAMEWORK AND CRITERIA

An evaluation framework was developed as presented in **Table 5-2**, including technical considerations and environmental components that address the board definition of the environment as described in the Environmental Assessment Act (EAA) and those based on comments received from relevant agencies.

A detailed assessment of each alternative was completed based on the described evaluation components. A descriptive qualitative evaluation was used to consider the suitability and feasibility of alternative solutions and design concepts. Trade-offs considering the advantages or disadvantages of each alternative to address the problem and opportunity statement with the least environmental effects and the most technical benefits forms the rationale for the identification of the preferred solution.



A comparative evaluation in a matrix format was prepared and is shown in **Table 5-3**.

Table 5-2: Criteria Evaluating Alternative Solutions

Component	Evaluation Criteria
Transportation	• Traffic Operations and Accommodation of Future Travel Demand: – Potential to accommodate long-term vehicular travel demands; – Potential to serve transit travel demand; – Direct Multi-modal connections connection between the Mobility Hub and Retail/High Density development and lands beyond – Improve east-west transportation capacity and accessibility to existing and future developments and to support alternative modes of travel (i.e., transit, walking and cycling). • Traffic Safety: – Potential to improve traffic safety based on the opportunity to reduce congestion and potential for collisions. • Road Network Compatibility/Connectivity: – Consistent with the proposed transportation system and function of roads in the long term (i.e. City of Brampton Transportation Master Plan Update (2015); Heritage Heights Transportation Master Plan (HHTMP); Draft Mount Pleasant Secondary Plan Transportation Master Plan, Mount Pleasant Natural Heritage System; Mississauga Road Municipal Class EA; – Create an efficient and comprehensive transportation network for the City and contribute to the Regional road network.

	• Transportation Master Plan (HHTMP); Mount Pleasant Secondary Plan Transportation Master Plan; Mississauga Road Municipal Class EA: – Create an efficient and comprehensive transportation network for the City and contribute to the Regional road network. • Accommodation of Pedestrians/Cyclists: – Ability to address walking and cycling objectives in the corridor (sidewalks, bike lanes, on-road routes, etc.); – Opportunities for transportation choices other than vehicle use; – Address the challenges associated with new growth in the City, and provide a multi-modal vision of "sustainable mobility" that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community; – Considerations for the City Active Transportation Plan. • Response Times/Access for Emergency Vehicles: – Potential to improve response time/accessibility for emergency vehicles due to changes in travel time.
Engineering Considerations - Constructability	• Services/Utilities: – Potential impact to services or utilities within the corridor; – Accommodation of planned services/utilities. • Construction Staging: – Impact to existing traffic operations during construction. • Drainage/Stormwater Management: – Potential increase in flooding risk in the creeks; – Potential to increase stormwater run-off (water quantity); – Increase in pollutants to receiving watercourses (water quality); • Flooding and Erosion Hazards.
Cultural Environment	• Archaeological resources: – Potential to impact archaeological resources (previously undisturbed areas with high potential for recovery of artifacts). • Built Heritage Resources: – Potential to impact known built heritage resources (i.e. listed/designated under Part IV or V of the Ontario Heritage Act and/or identified as 'culturally significant' by the Municipality).
Social/Economic Environment	• Sustainability and City/ Regional Planning: – Consistency with local and regional planning (i.e. Heritage Heights Secondary Plan, Mount Pleasant Secondary Plan, Mississauga Road EA); – Development objectives and economic growth; – Consistency with the Transportation Master Plan (TMP) and Active Transportation (AT) Plan; – Consistency with Endangered Species Act (ESA); – Consistency with Block 51-1 (Secondary Plan implementation principles, Comprehensive Fish Plan, Environmental Implementation Report); – Consistency with Draft Plan of Subdivision 21T-10022B. • Compatibility with Existing and Proposed Documents: – Potential to support development of lands served by Mississauga Road, Bovaird Drive, Heritage Road, and mid-block connection between Mount Pleasant GO Station and developments west of Mississauga Road.

	• Potential sustainability improvements to the community, including greenhouse gas emissions:
	  – Improve local sustainability by providing alternative transportation modes in order to reduce auto dependency.
	• Noise Impacts:
	  – Potential to increase noise in Noise Sensitive Areas (NSAs) (e.g. residential properties backing onto the roadway).
	• Property Impacts:
	  – Potential impacts to property.

Natural Environmental	• Vegetation:
	  – Potential impact to vegetation communities.
	• Wildlife:
	  – Potential impact to wildlife habitats and movement corridors.
	• Water Resources:
	  – Potential impact to watercourses.
	• Fisheries:
	  – Potential impact to fisheries habitat.
	• Potential to impact Species at Risk (SAR), Redside Dace Crossings Requirement per 'Best Management Practice – Guidance for Development in Redside Dace Habitat:'
	  – Stream crossings should be minimized and generally limited to one per km of stream;
	  – New stream crossings should avoid reached known to be occupied by Redside Dace;
	  – New stream crossings should cross over straight sections of the stream where there is less likelihood of bank erosion;
	  – Crossings should be done in areas that have already been disturbed.

Capital Cost/ Implementation	• Costs: – Relative cost in terms of capital costs, property costs and maintenance costs.

Table 5-3: Comparative Evaluation Matrix for Alternative Solutions

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce additional operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
TRANSPORTATION (Refer to footnote 'c')					
Traffic Operations and Accommodation of Future Travel Demand • Potential to accommodate long-term vehicular travel demands • Potential to serve transit travel demand • Direct Multi-modal connections connection between Mobility Hub and Retail/High Density development and lands beyond. • Improve east-west transportation capacity and accessibility to existing and future developments and to support alternative modes of travel (i.e., transit, walking and cycling)	• Low potential to accommodate future multi-modal travel demands and multi-modal connectivity in the study area to support a healthy built environment. • Transit travel demand impacted by anticipated capacity deficiencies and increased congestion along Mississauga Road and Bovaird Drive in the study area will require additional travel time between Winston Churchill Boulevard and Mount Pleasant GO Station • Congested conditions on Bovaird Drive are more likely to produce undesirable consequences and generate traffic spill over to adjacent roadways and further reduce intersection level of services, particularly at Mississauga Road • Planned roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031	• Low potential to accommodate future multi-modal travel demands and multi-modal connectivity in the study area to support a healthy built environment. • On its own, this alternative does not adequately address the long-term road capacity issues anticipated from the continued growth in the study area. Therefore, in areas where the road results in poor levels of services, additional capacity via new roadway is required. • Transit travel demand impacted by anticipated capacity deficiencies and increased congestion	• Operational improvements in wider road network may provide better potential to accommodate future multi-modal travel demands and multi-modal connectivity in the study area to support a healthy built environment • Better Level of Services (LOS) compared to Do Nothing alternative solution • Transit travel demands not met in the long term due to increased congestion; therefore, it will require additional travel time between Winston Churchill Boulevard and Mount Pleasant GO Station • Existing infrastructure upgrades (e.g. traffic signals) will only address the short-term improvements. This type of improvement will not address the long-term road capacity issues anticipated from the continued growth and connectivity in the study area. • Planned roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031	• Moderately improved Level of Services (LOS) compared to Do Nothing alternative solution • Does not provide direct access from the Mount Pleasant GO Station, which needed as an important alternative route for bus transit vehicles and GO patrons accessing the station • Missing connection east of Mississauga Road to GO Station will require additional travel time by transit and active transportation, which may reduce use of transit and cycling modes of transportation • Increase operational pressure on intersection at Bovaird Drive and Mississauga Road will impact Level of Services on other major intersections in the area, which will generate additional congestion, and increase travel time. • No direct east-west connection, Bovaird Drive will still be heavily used	• Best Improvement of Level of Services (LOS) for all modes of transportation compared to other alternative solutions. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area • The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station
	○	◔	◔	◑	●
Traffic Safety • Potential to improve traffic safety based on the opportunity to reduce congestion and potential for collisions	• Low potential to improve traffic safety • Traffic congestion will increase over time and increase potential for collisions due to degraded operations. • Results in delays and safety concerns associated with increased traffic along other east-west and north-south roadways in the study area • Congested regional intersections including Mississauga Road and Bovaird Drive would create delays and more driver frustration and aggressive behaviour	• Low potential to improve traffic safety in the study area • May reduce some auto use, with some improved operations and slightly reduce the potential for collisions	• Moderate potential to improve traffic safety in the study area • Improved traffic operations may reduce congestion and the potential for collisions for the short term	• Moderately high potential to improve traffic safety in the study area • Higher traffic volumes at the Mississauga Road and Bovaird Drive intersection will create operational impact and delays, more driver frustration and aggressive behaviour, which will increase traffic congestion, reduce travel safety, and increase the potential for collisions	• High potential to improve traffic safety because East –West road and direct link to GO Station will reduce traffic congestion, improve intersection operations and reduce the potential for collisions • Provides a lower speed road for pedestrians and cyclists
	○	◔	◔	◑	●
Road Network Compatibility/Connectivity • Consistent with the proposed transportation system and function of roads in the long term (i.e. City of Brampton Transportation Master Plan Update (2015); Heritage	• Inconsistent with the planned function of the corridor identified in the City's Transportation Master Plan and Heritage Heights DRAFT Transportation Master Plan • Does not support the land use policies and future development plans • Not consistent with the City's transportation infrastructure needs to connect major	• Consistent or supports with the City's and Region's intent to provide a variety of travel choices, however inconsistent with the identified need for additional east-west connection (does not address multi-modal capacity deficiencies)	• Does not completely meet the objectives outlined in the planned or approved provincial, regional, or City initiatives for sustainable mobility that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community	• Not consistent with the planned function of the corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Provide some relief to the east-west traffic connections but it does not fully support the land use policies and the future development plans in the area	• Consistent with the planned function of the corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Addresses anticipated capacity deficiencies • Provide needed roadway connectivity, and multi-modal capacity

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce additional operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
Heights Transportation Master Plan (HHTMP); Mount Pleasant Secondary Plan Transportation Master Plan; Mississauga Road Municipal Class EA • Create an efficient and comprehensive transportation network for the City and contribute to the Regional road network	destinations with multi-modal access, enhancing the connectedness, and improving overall mobility • Does not Connect Brampton's Mount Pleasant Mobility Hub to future planned higher density land uses, providing the path of least resistance for active transportation and higher order transit users • Does not integrate transportation and land use planning to build complete communities that are well-connected and accessible				• Facilitate direct travel for all modes, and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.
	○	◔	◐	◐	●
Accommodation of Pedestrians/Cyclists • Ability to address walking and cycling objectives in the corridor (sidewalks, bike lanes, on-road routes, etc.) • Opportunities for transportation choices other than vehicle use • Address the challenges associated with new growth in the City, and provide a multi-modal vision of "sustainable mobility" that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community • City Active Transportation Plan consideration?	• Existing roadways does not adequately accommodate pedestrians and/or cyclists	• Limited opportunities for improved public facilities (e.g. sidewalks, bike lanes) to encourage and promote alternative modes of transportation (e.g. walking, cycling)	• Auxiliary turn lanes and traffic signal improvements do not provide opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation • This alternative is focused on creating improvements for vehicles, and the improvements would be localized	• Allow for incorporation of improvements for cyclists, pedestrians, transit and streetscaping on parallel roadways • Provides opportunities for transportation choices other than vehicle use • Provides limited opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries	• Provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users) • Provides opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation (e.g. walking, cycling) • Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village • Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of "sustainable mobility" that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community
	○	◔	◔	◔	●

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce additional operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
Response Times/Access for Emergency Vehicles • Potential to improve response time/ accessibility for emergency vehicles due to changes in travel time	• Low potential to improve emergency service response times due to increased roadway congestion and associated travel times along Mississauga Road and Bovaird Drive	• Potential reductions in travel demand would not be sufficient to offset the traffic congestion increases over time; therefore, low potential to improve emergency service response times	• Moderate potential to improve emergency service response times • Improved traffic flow may improve emergency response times for the short term	• Higher potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Only provide improvement to response time west of Mississauga Road	• Highest potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.
	○	◔	◐	◔	●

LEGEND	○	◔	◐	◔	●
	Least Preferred			Most Preferred	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo for comparison purposes)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
ENGINEERING CONSIDERATIONS – CONSTRUCTABILITY (Refer to footnote 'c')					
Services/Utilities • Potential impact to services or utilities within the corridor • Accommodation of planned services/utilities	• Does not impact existing minor or major services/utilities • Does not support planned sewer service and/or utility upgrades for Mississauga Road and Bovaird Drive	• Low potential to impact existing minor and major services/utilities • Does not support planned sewer service and/or utility upgrades for Mississauga Road and Bovaird Drive	• Moderate potential to impact existing services/utilities such as planned sewer services and utility upgrades	• New right-of-way accommodates future improvements to services/utilities within the corridor (only west of Mississauga Road) • Lost potential to run services/utilities along possible link between Ashby Field Road and Mississauga Road	• New right-of-way accommodates future improvements to services/utilities within the corridor
	◔	◔	◑	◔	●
Construction Staging • Potential impact to existing traffic operations during road/lane closure Potential impact to air quality through exhaust, dust and noise	• No construction impacts in study area • No potential construction impact related to road improvements in the network.	• No construction impacts	• High potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Moderate potential to temporarily impact existing traffic operations throughout study area • Need new intersection with Mississauga Road • A traffic management plan would be required	• Moderate potential to temporarily impact existing traffic operations throughout study area • Need new intersection with Mississauga Road • Need new crossings for East Huttonville Creek and Huttonville Creek • A traffic management plan would be required
	●	●	◑	◑	◑
Drainage/Stormwater Management • Potential increase in flooding risk in the creeks • Potential to increase stormwater run-off (water quantity) • Increase in pollutants to receiving watercourses (water quality)	• No impacts to stormwater/ pollutant discharge as area of paved surface does not change	• Minor impacts for potential infrastructure improvements to support TDM implementation	• Minor increase in storm water runoff volumes due to slight increase in paved surface areas and associated salt distribution	• Moderate increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution	• Higher increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution
	◔	◔	◔	◑	◔
Flooding and Erosion Hazards	• No change to existing flooding and erosion conditions	• Low change to existing flooding and erosion conditions	• Low potential to impact flooding and erosion due to slight increased paved surface area	• Moderate potential to impact flooding and erosion due to increased paved surface area	• Moderate potential to impact flooding and erosion due to increased paved surface area • Potential for impacts to flooding related to new structures in the Huttonville Creek valley.
	●	◔	◔	◑	◔

LEGEND	○	◔	◑	◔	●
	Least Preferred			**Most Preferred**	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo for comparison purposes)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
CULTURAL (Refer to footnote 'b')					
Archaeological Resources • Potential to impact archaeological resources (previously undisturbed areas with high potential for recovery of artifacts)	• No ground disturbance required; therefore, no risk to archaeological resources	• Low potential impact anticipated	• Low potential impact anticipated	• Moderate potential for impacts to known archeological resources.	• Moderate potential for impacts to known archeological resources.
	●	◔	◔	◑	◑
Built Heritage Resources • Potential to impact known built heritage resources (i.e. Listed/ Designated under Part IV or V of the Ontario Heritage Act and/or identified as 'culturally significant' by the Municipality)	• No impact to existing built environment; therefore, no risk to any built heritage resources, regardless of significance	• Low risk to built heritage anticipated	• Low risk to built heritage anticipated	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features
	●	◔	◔	◑	◑

LEGEND	○	◔	◑	◔	●
	Least Preferred			Most Preferred	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo for comparison purposes)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
SOCIO-ECONOMIC ENVIRONMENT (Refer to footnote 'b')					
Sustainability and City/ Regional Planning • Consistency with local and regional planning (i.e. Heritage Heights Secondary Plan, Mount Pleasant Secondary Plan, Mississauga Road EA) • Development objectives and economic growth • Consistency with Transportation Master Plan (TMP) and Active Transportation (AT) Plan • Consistency with *Endangered Species Act* (ESA) • Consistency with Block 51-1 (Secondary Plan implementation principles, Comprehensive Fish Plan, Environmental Implementation Report,) • Consistency with Draft Plan of Subdivision 21T-10022B	• Inconsistent with local and regional planning • Does not support growth in the study area (City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031, and 2041) • Limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • High impacts to community and goods movement as a result of congestion • Consistent with ESA • Consistent with Block 51-1 planning documents. • Consistent with Draft Plan of Subdivision 21T-10022B	• Inconsistent with local and regional planning • Does not effectively support long term growth in the study area • Limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • High impacts to community and goods movement as a result of congestion • Consistent with ESA • Consistent with Block 51-1 planning documents. • Consistent with Draft Plan of Subdivision 21T-10022B	• Somewhat consistent with local and regional planning • Assists with the support of long-term growth in the study area • Limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Potential for inconsistencies with ESA • Potential for inconsistencies with Block 51-1 planning documents. • Potential for inconsistencies with Draft Plan of Subdivision 21T-10022B	• Somewhat Consistent with City planning • Moderately supports growth and intended function in study area • Increased opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Only west road extension will provide limited land development capacity • Misses critical link between Ashby Field Road and Mississauga Road • Potential inconsistencies with ESA • Consistent with Block 51-1 planning documents. • Consistent with Draft Plan of Subdivision 21T-10022B	• Very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Most consistent with local and regional development plans • Supports growth and intended function in study area (North West Brampton is rapidly growing community. City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031 and 2041) • East-west road crossing will provide for better land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus-connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing /road will provide direct connection from community to Mount Pleasant GO and regional retail centre • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. • Likely inconsistent with ESA. • Likely inconsistent with Natural Heritage System in Secondary Plan, Inconsistent with Fish Compensation Plan • Inconsistent with Draft Plan of Subdivision 21T-10022B regarding water crossings.
	○	◔	◐	◔	●
Compatibility with Existing and Proposed Developments • Potential to support development of lands served by Mississauga Road, Bovaird Drive, Heritage Road, and mid-block connection between Mount Pleasant GO Station and developments west of Mississauga Road	• Low potential to support existing and future development in the study area • Does not provide additional multi-modal capacity and other infrastructure required in support of existing and future development • Lack of infrastructure improvements may delay development interests	• Low potential to support existing and future development in the study area • Does not provide required capacity and restricts provision of major infrastructure improvements required for development • Lack of infrastructure improvements in the study area may delay development interests	• Moderate potential to support existing and future development in the study area • May improve traffic operations for the short term but does not provide required capacity and restricts provision of major infrastructure improvements required for future development • Lack of infrastructure improvements in the study area may delay development interests	• Moderately high potential to support existing and future development in the study area • Provides additional capacity and accommodates infrastructure improvements required for development • Infrastructure improvements will support development	• High potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development • Infrastructure improvements will support development • Ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties
	○	○	◐	◔	●

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo for comparison purposes)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
Potential sustainability improvements to the community, including greenhouse gas emission • Improve local sustainability by providing alternative transportation modes in order to reduce auto dependency	• No potential for sustainability improvements to the community	• Low potential for improving local sustainability, by providing alternative transportation modes in order to reduce auto dependency	• low potential for sustainability improvements to the community	• Increased potential to improve local sustainability as the extension west of Mississauga Road will provide some opportunity for multi-modal travel (i.e. car, bus, cycling, pedestrian)	• Increased potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)
	○	◔	◔	◔	●
Noise Impacts • Potential to increase noise in Noise Sensitive Areas (NSAs) (e.g. residential properties backing onto the roadway)	• High potential to increase noise in association with increased traffic volumes/congestion • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Potential reduction in travel demand would not be sufficient to offset the traffic congestion increases over time; therefore, moderate potential to increase noise would be expected • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels for the short term, but increased traffic volumes/congestion in the long term will increase noise levels • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Potential for higher public transit ridership thus reducing number of vehicles on the road • Noise mitigation measures can be implemented in accordance with City's Noise Policy
	○	◔	◔	◐	◔
Property Impacts • Potential impacts to property	• No impact to property in the study area • Potential of impact to property related to improvements in the road network in the vicinity of the study area.	• Potential impacts on private property to accommodate pedestrian facilities (e.g. sidewalks) and commuter parking lots outside of the City's right-of-way • Temporary disruption to driveways/access	• Potential to impact property in localized areas due to additional right-of-way width required to accommodate auxiliary turn lanes • Temporary disruption to driveways/access	• Moderately high potential to impact property due to additional property required for new roadway • High potential to affect accessing adjacent properties during construction • High potential for requiring private property	• High potential for impacts on private properties to accommodate the new east-west connection • Very high potential to affect accessing adjacent properties during construction • Very high potential for requiring private property
	◔	◐	◔	◐	◔

LEGEND	○	◔	◐	◔	●
	Least Preferred			**Most Preferred**	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
	No changes made within the Study Area (status quo for comparison purposes)	**Introduce TDM strategies to reduce demands on Mississauga Road & Bovaird Drive (i.e. shift demand to time periods outside of the congestion periods)**	**Introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west.**	**Continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road**
NATURAL ENVIRONMENT (Refer to footnote 'a')					
Vegetation • Potential impact to vegetation communities	• If East-West collector road is not constructed, there will not be impact to natural areas, habitats or SAR. However, there will be requirement for road network improvements in the study area, which may have potential impact on natural areas or SAR.	• Minimal potential to impact natural areas • Although the Huttonville Creek valley through this reach is lacking diverse veg communities, etc. over time this area will be enhanced and the veg communities, biodiversity, etc. should improve	• Moderate potential to impact natural areas due to its proximity to potential intersection improvements	• Low potential to impact natural areas at the Huttonville Creek due to the new roadway • Low to moderate potential to impact existing woodlots and the Peel Core greenlands.	• High potential for altering associated supporting vegetation in the meander belt, since proposed east-west connection will be crossing Huttonville Creek tributaries. • Moderate potential to impact existing woodlots High potential for Impacts on the future enhancements for the expanded Natural Heritage System in approved block plan 51-1.
	◔	◔	◑	◑	○
Wildlife • Potential impact to wildlife habitats and movement corridors	• If East-West collector road is not constructed, there will not be impact to natural areas, habitats or SAR. However, there will be requirement for road network improvements in the study area, which may have potential impact on wildlife habitats.	• Minimal potential to impact wildlife habitats	• Low to moderate potential to impact wildlife habitats due to its proximity to potential intersection improvements	• Low to moderate potential to impact wildlife habitats in the existing woodlot and Peel Core greenlands	• Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • High potential for Impacts on the future enhancements for the expanded Natural Heritage System in approved block plan 51-1.
	◔	◔	◑	◑	◔
Water Resources • Potential impact to watercourses	• No impact to watercourses	• Minimal potential to impact watercourses as the only significant feature is the Huttonville Creek • Minor improvements could be sited to avoid the creek	• Low potential to impact watercourses as the only significant feature is the Huttonville Creek	• Low potential to impact watercourses • Low potential to impact surface water quality downstream of Huttonville Creek.	• Moderate-high related effects on downstream surface water quality.
	◔	◔	◔	◑	◔
Fisheries • Potential impact to fisheries habitat	• No impact to fisheries habitat	• Minimal potential to impact fisheries habitat as the only significant feature is the Huttonville Creek • No impact to fish passage at Huttonville Creek	• Low potential to impact fisheries habitat as the only significant feature is the Huttonville Creek	• Low potential to impact fisheries habitat.	• High potential to impact fisheries habitat, since proposed east-west connection will be crossing Huttonville Creek tributaries.
	◔	◔	◔	◑	○

LEGEND	○	◔	◑	◔	●
	Least Preferred			**Most Preferred**	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
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Potential to impact Species at Risk (SAR). Redside Dace Crossings Requirements per 'Best Management Practice - Guidance for Development in Redside Dace Habitat' 1. Stream crossings should be minimized and generally limited to one per km of stream; 2. New stream crossings should avoid reached known to be occupied by Redside Dace; 3. New stream crossings should cross over straight sections of the stream where there is less likelihood of bank erosion; **4.** Crossings should be done in areas that have already been disturbed	1. No new stream crossings are proposed. BMP met. 2. No new stream crossings are proposed. BMP met. 3. No new stream crossings are proposed. BMP met. 4. No new stream crossings are proposed. BMP met.	1. No new stream crossings are proposed. BMP met. 2. No new stream crossings are proposed. BMP met. 3. No new stream crossings are proposed. BMP met. 4. No new stream crossings are proposed. BMP met.	1. No new stream crossings are proposed. BMP met. 2. No new stream crossings are proposed. BMP met. 3. No new stream crossings are proposed. BMP met. 4. No new stream crossings are proposed. BMP met.	1. No new stream crossings are proposed. BMP met. 2. No new stream crossings are proposed. BMP met. 3. No new stream crossings are proposed. BMP met. 4. No new stream crossings are proposed. BMP met.	1. Other existing stream crossings in the Study Area within 1 km. BMP not met. 2. Huttonville Creek is occupied habitat. BMP not met. 3. Straight sections selected and examined in evaluation of alternative alignments. BMP can be met. 4. Areas around Mississauga Road are already disturbed. BMP partially met.
	●	●	◕	◑	◔

LEGEND	○	◔	◑	◕	●
	Least Preferred			**Most Preferred**	

Evaluation Criteria and Sub-Factors	ALTERNATIVE SOLUTION 1: Do Nothing	ALTERNATIVE SOLUTION 2: Transportation Demand Management (TDM)	ALTERNATIVE SOLUTION 3: Improve Transportation Operations along other Roads in the Network	ALTERNATIVE SOLUTION 4: Construct road west of Mississauga Road only	ALTERNATIVE SOLUTION 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road
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COST / IMPLEMENTATION					
Costs • Relative cost in terms of capital costs, property costs and maintenance costs	• Lowest capital costs • Keeping status quo without road network improvements in the area and building east-west road to Mount Pleasant GO station will: ➢ increase overall travel time for all modes of transportation ➢ require road network improvements in the vicinity of the study area	• Low capital costs • Potential costs associated with transit infrastructures and implementation of TDM measures	• Moderate to high capital costs • Moderate costs associated with operational improvements	• Moderate to high capital costs • Limited opportunities to fulfill objectives for to development and economic growth due to grid-like network (not in conformances with Heritage Heights TMP and latest Brampton TMP) with no direct east-west direct link to Mount Pleasant GO Station	• Efficient operating cost for transit • Higher capital costs to road and associated structures construction and maintenance • Increased opportunities to fulfill objectives for to development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road will: ➢ reduce overall travel time for all modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs ➢ ultimately reduce overall cost and negative impact to the economy
	◔	◐	◐	◐	◐

LEGEND	○	◔	◐	◔	●
	Least Preferred			Most Preferred	

OVERALL RANK (g)	○	◐	◕	◔	●
Ranking of Alternative Solutions	**This alternative solution is not recommended for the following reasons:** • **Does not address current and future traffic operations issues and multi-modal transportation needs.** • **Results in delays and safety concerns associated with increased traffic along other east-west and north-south roadways in the study area in the longer term.** • **Does not support the land use policies and future development plans for Mobility Hub which in order to create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus-connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit** • **Does not provide connectivity for multi modal transportation options that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. (Currently there is no direct access from the Mount Pleasant GO Station, which can provide an important alternative route for bus transit vehicles and GO patrons accessing the station).** **This alternative solution does not address problems and opportunities for the project and therefore is not recommended.** **Roadway capacity and intersection operations will deteriorate without improvements therefore:** **With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.**	**This alternative solution is not recommended for the following reasons:** • **Adds partial transportation capacity but insufficient for future growth when considered as a stand-alone strategy.** • **No environmental impacts are expected as a result of this alternative.** • **It responds rather weakly against the social-cultural criteria as on its own, it does not support future development plans.** • **As far as cost criteria this option is expected to involve average costs compared to other alternatives.** **This alternative solution does not address problems and opportunities for the project and therefore is not recommended.** **Roadway capacity and intersection operations will deteriorate without improvements therefore:** **With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.**	**This alternative solution is not recommended for the following reasons:** • **Provides minimal additional transportation capacity but the projected capacity problem would still exist with local improvements only.** • **Minimal environmental impacts are expected as a result of this alternative.** • **It responds weakly against the social-cultural criteria as on its own, it does not support future development plans.** • **As far as cost criteria this option is expected to involve average costs compared to other alternatives.** **This alternative solution does not address problems and opportunities for the project and therefore is not recommended.** **Roadway capacity and intersection operations will deteriorate without improvements therefore:** **With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.**	**This alternative solution is not recommended for the following reasons:** • **Provides modest additional transportation capacity and access.** • **It poorly responses against the social-cultural criteria as it can highly impact area businesses and properties.** • **This option is expected to involve higher capital costs.** **Although Alternative # 4 may provide some relief to the east-west traffic future connections but it does not fully support the land use policies and future development plans. It does not fully address the problem statement.** **Roadway capacity and intersection operations will deteriorate without improvements therefore:** **With planned roadway improvements and without the future east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.** **Although this alterative solution is not recommended but it is carried forward to design alternative evaluation for further analysis.**	**Recommended to carry forward** **This alternative solution is recommended for the following reasons:** • **Improves current and future traffic conditions.** • **Provides additional transportation capacity and access.** • **Improved traffic operation safety.** • **Improves local sustainability.** • **Facilitate direct travel for all modes of travel including transit, walking and cycling, and reduce the reliance on vehicles and the associated congestion/pressure placed on Bovaird Drive and Mississauga Road and their intersection.** • **Provides connectivity to support more sustainable transportation options/trips and to integrate local neighborhoods creating compact development and active uses along complete streets in the neighbourhood.** • **Provide a mid-block crossing and pedestrian-friendly community collector to facilitate multi-modal transportation users (pedestrians, cyclists, local and regional transit users).** • **It best responds to the social- cultural criteria as it supports the land use policies and future development plan of the Mount Pleasant and Heritage Heights Community and supports potential commuters from communities north and/or west of Brampton.** • **This option is expected to involve highest capital costs.** • **Provides strategic multi-modal connections linking future planned destinations including higher density land uses, employment lands and higher order transit corridors.** • **Increased opportunities to fulfill objectives for complete, compact communities and economic growth due to supporting a grid-like road network (proposed as part of Heritage Heights TMP) with intercommunity connections and better direct link to Mount Pleasant GO Station** • **Despite highest capital costs this option best addresses the problem statement.** • **Technically preferred alternative solution.**

NOTE:

a) Natural Environment: Component that evaluates the potential effects on the natural and physical aspects of the environment, including natural heritage/environmentally sensitive areas.

b) Social/Economic & Cultural Environment: Component that evaluates the potential effects on residents, neighbourhoods, businesses, community character, social cohesion and community features, in addition to municipal development objectives, the potential effects on historical/archaeological and built heritage resources.

c) Technical Considerations (Transportation and Engineering): Component that evaluates the technical suitability and other engineering aspects of the road network system.

5.3 EVALUATION RESULTS

The following planning alternatives were developed to represent a full range of options, including those which would decrease automobile demand as well as those which would increase the capacity of the transportation system.

5.3.1 ALTERNATIVE 1: DO NOTHING

This alternative would have no change to the existing conditions.

Transportation

This alternative would maintain the existing roadway network and would not address the problem and opportunity statement. Maintaining the existing operational and capacity levels in North West Brampton will cause the roads to lose their abilities to handle traffic flow demands at acceptable operational level of service. Congested conditions on Bovaird Drive are more likely to produce undesirable consequences and generated traffic spillover to adjacent roadways and further reduce intersection level of services, particularly at Mississauga Road. Congested regional intersections including Mississauga Road and Bovaird Drive would create delays and more driver frustration and aggressive behaviour. There will be low potential to improve emergency service response times due to increased roadway congestion and associated travel times along Mississauga Road and Bovaird Drive.

This alternative is inconsistent with the planned function of the corridor identified in the City's Transportation Master Plan and Heritage Heights Draft TMP. It does not support the land use policies and future development plans. Also, does not integrate transportation and land use planning to build complete communities that are well-connected and accessible. The existing roadway cannot adequately accommodate pedestrians and /or cyclists. However, this alternative is consistent with the negotiated transportation network of the Mount Pleasant Secondary Plan Natural Heritage System.

In general, this alternative solution has a low potential to accommodate future multi-modal travel demands and multi-modal connectivity in the study area to support a healthy built environment.

Engineering Considerations – Constructability

This alternative does not impact existing utilities and there is no construction impact. However, there is no opportunity to improve existing drainage/stormwater management.

Cultural

As there is no ground disturbance required for this alternative, there is no risk to archaeological resources and no impact to existing built environment.

Socio-economic Environment

This alternative is inconsistent with local and regional planning. It does not support growth in the study area. There are limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton. There are high impacts to community and goods movement as a result of congestion. Also, there is a high potential to increase noise in association with increased traffic volumes/congestion along Mississauga Road and Bovaird Drive.

This alternative has low potential to support existing and future development in the study area. It does not provide additional multi-modal capacity and other infrastructure required in support of existing and future development. The lack of infrastructure improvements may delay development interests.

Natural Environment

This alternative would result in no negative effects on the physical environment including the terrestrial and vegetative features, as well as on the watercourses in the study area (e.g. Huttonville Creek). This alternative would have no impact on ESA regulated habitat for endangered Redside Dace. With the exception of future urban development, there would not be additional runoff into the flood plain.

Capital Cost / Implementation

This alternative has the lowest capital costs. However, keeping status quo without road network improvements in the area and building east-west road to Mount Pleasant GO Station will increase overall travel time for all modes of transportation, increased congestion and greenhouse gas emission cost and ultimately increase overall cost and negative impact to the economy.

Summary

This alternative would have no impact on ESA regulated habitat for endangered Redside Dace. A 17 2(c) permit under the Endangered Species Act would not be required.

Although this alternative would have negligible direct effects on the natural, social-cultural and economic environments, this alternative does not address the current and future traffic operations issues and multi-modal transportation needs. It could have intangible impacts such as increased congestion, which could lead to the potential increase in air emissions and traffic noise due to idling. It will result in delays and safety concerns associated with increased traffic along other east-west and north-south roadways in the study area in the longer term.

The Mount Pleasant GO commuter train station is to act as a Mobility Hub connecting inter-regional GO rail and bus service between Toronto, Georgetown, Guelph, Kitchener and Brampton local transit. There is currently no direct access from Mount Pleasant GO Station, which can provide an important alternative route for bus transit vehicles and GO patrons accessing the station. This alternative does not support the land use policies and future development plans for the Mobility Hub. It does not provide connectivity for multi-modal transportation options that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.

Under the “Do Nothing” alternative solution, improvements would be limited to on-going regular maintenance only for existing east-west roadways in the study area. This alternative will not accommodate the projected east-west travel demand growth anticipated to 2031 and beyond in Northwestern Brampton and it does not address the problems and opportunities for the project.

Therefore, this alternative was not carried forward for further consideration.

5.3.2 ALTERNATIVE 2: TRANSPORTATION DEMAND MANAGEMENT (TDM)

This alternative would improve the current operation of the transportation system by managing travel demand independent of expanding or constructing new infrastructure (e.g. shift demand to time periods outside of the congestion periods). TDM initiatives include such things as variable work hour programs, carpool matching services, and telecommuting programs.

Transportation

This alternative has low potential to accommodate future multi-modal travel demands and multi-modal connectivity in the study area to support a healthy built environment. On its own, this alternative does not adequately address the long-term road capacity issues anticipated from the continued growth in the study area. Therefore, in areas where the road results in poor levels of services, additional capacity via new roadway is required.

This alternative may reduce some auto use, with some improved operations and slightly reduce the potential for collisions. Potential reductions in travel demand would not be sufficient to offset the traffic congestion

increases over time; therefore, this alternative solution has low potential to improve emergency service response times.

This alternative supports the City's and Region's intent to provide a variety of travel choices, it provides opportunities for improved sidewalks and bike lanes to encourage and promote alternative modes of transportation. However, it is inconsistent with the identified need for additional east-west connection. The potential reductions in travel demand would not be sufficient to offset the traffic congestion increases over time. This alternative is consistent with the transportation network of the negotiated Mount Pleasant Secondary Plan Natural Heritage System.

Engineering Considerations – Constructability

This alternative does not support planned sewer service and/or utility upgrades for Mississauga Road and Bovaird Drive. It does not provide opportunities to improve existing drainage/stormwater management.

Cultural

There is no archaeological impact or risk to built heritage anticipated.

Socio-economic Environment

This alternative does not completely meet the objectives outlined in the programmed or approved provincial, regional, or City of Brampton initiatives. It does not effectively support long term growth in the study area. There are limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton. There are high impacts to community and goods movement as a result of congestion.

This alternative has low potential to support existing and future development in the study area. It does not provide additional multi-modal capacity and other infrastructure required. The lack of infrastructure improvements may delay development interests.

This alternative would provide users of the road with transportation choices. Potential reduction in travel demand would not be sufficient to offset the traffic congestion increases over time; therefore, with this alternative solution, moderate potential to increase noise would be expected.

Natural Environment

This alternative would result in no potential impacts on known terrestrial/vegetation and watercourses (e.g. Huttonville Creek), as there are no infrastructure components.

Capital Cost / Implementation

This alternative has low capital costs.

Summary

This alternative would have minor effects on the social and economic environment. It responds rather weakly against the social-cultural criteria on its own as it does not support future development plans.

Technically, this alternative can provide opportunities for transportation choices and pedestrian facilities but would not provide the most efficient options for users and would not address capacity issues over the long term. It can only add partial transportation capacity but insufficient for future growth when considered as a stand-alone strategy.

This alternative solution does not address the problems and opportunities for the project. Roadway capacity and intersection operations will deteriorate without planned roadway improvements and future east-west connection. The roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.

Therefore, this alternative was not carried forward for further consideration.

5.3.3 ALTERNATIVE 3: IMPROVE TRANSPORTATION OPERATIONS ALONG OTHER ROADS IN THE NETWORK

This alternative would introduce operational improvements such as restricting turning movements, localized widening to accommodate dedicated turn lanes, intersection improvements, continuous left turn lanes, and/or signal timings, etc.

By upgrading the parallel east-west roadways, traffic congestion at Bovaird Drive could be slightly alleviated. However, the traffic volume projections developed for Northwestern Brampton within the study area already assume other road network improvements will be undertaken in the area.

This alternative solution does not address the problem and opportunity statement and therefore is not considered a reasonable solution.

Transportation

This alternative has moderate potential to accommodate future travel demand and connectivity in the study area. It may address operational deficiencies, but capacity deficiencies are imminent. Existing infrastructure upgrades will only address the short-term improvements. This type of improvement will not address the long-term road capacity issues anticipated from the continued growth and connectivity in the study area. The planned roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031.

The improved traffic operations may reduce congestion and the potential for collisions for the short term, but it does not completely meet the objectives outlined in the planned or approved provincial, regional, or local municipal initiatives. The auxiliary turn lanes and traffic signal improvements do not provide opportunities for improved public facilities such as sidewalks and bike lanes, to promote alternative modes of transportation. This alternative is focused on creating improvements for vehicles, and the improvements would be localized. It does not completely meet the objectives outlined in the planned or approved Provincial, Regional, or City initiatives for sustainable mobility that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community.

This alternative is consistent with the transportation network negotiated in the Mount Pleasant Secondary Plan Natural Heritage System.

Engineering Considerations – Constructability

This alternative has moderate potential to impact existing services/utilities such as planned sewer services and utility upgrades. It has high potential to temporarily impact existing traffic operations throughout the study area. A traffic management plan would be required. There may be increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution.

Cultural

There is no archaeological impact or risk to build heritage anticipated.

Socio-economic Environment

This alternative partially meets the objectives outlined in the programmed or approved Provincial, Regional, or City initiatives. It supports long term growth in the study area. There are limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton.

This alternative has moderate potential to support existing and future development in the study area. It does not provide additional multi-modal capacity required. It may improve traffic operations for the short term but does not provide required capacity and restricts provision of major infrastructure improvements required for future development. The lack of infrastructure improvements may delay development interests.

This alternative would have potential impacts in localized areas due to additional right-of-way width required to accommodate auxiliary turn lanes. This alternative would have potential impacts on private property as well as temporary disruption during construction to driveways to accommodate turning lanes.

Natural Environment

This alternative would result in moderate potential impacts on known terrestrial/vegetation and watercourses (e.g. Huttonville Creek), species and habitats to accommodate the additional lanes that are outside of the Region's current right-of-way. There is moderate potential to impact the flooding and erosion due to increased paved surface area.

This alternative would have a potential moderate impact on ESA regulated habitat for endangered Redside Dace.

Capital Cost / Implementation

This alternative has moderate to high capital cost.

Summary

This alternative would have minor effects on the natural environment. Technically, this alternative would provide minimal additional transportation capacity, so the projected capacity problem would still exist with local improvements only. It responds weakly against the socio-economic criteria on its own and it does not support future development plans. This alternative is expected to involve average costs compared to other alternatives.

By upgrading the parallel east-west roadways, traffic congestion at Bovaird Drive could be slightly alleviated. However, the traffic volume projections developed for Northwestern Brampton within the study area already assume other road network improvements will be undertaken in the area. Roadway capacity and intersection operations will deteriorate without planned roadway improvements and future east-west connection. The roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond. It has a marginal improvement to the congestion issues at the intersections but would not address the capacity issues over the long term (10-25 years). Furthermore, this alternative would not provide opportunities for pedestrian facilities or transportation choices other than vehicle use along this corridor.

This alternative would have a potential moderate impact on ESA regulated habitat for endangered Redside Dace. A 17 2(c) permit under the Endangered Species Act may be required.

This alternative does not address the problem and opportunity statement but does minimize potential impact on ESA regulated habitat and therefore this alternative was not carried forward for further consideration.

5.3.4 ALTERNATIVE 4: CONSTRUCT ROAD WEST OF MISSISSAUGA ROAD ONLY

This alternative would provide east-west connection starting at Mississauga Road, extending to the west. It will not connect Mississauga Road with Mount Pleasant GO Station.

Transportation

This alternative goes not provide direct access from the Mount Pleasant GO Station, which is needed as an important alternative route for bus transit vehicles and GO patrons accessing the station. The missing connection east of Mississauga Road to the GO Station will require additional travel time by transit. There would not be direct east-west connection as the existing GO Station access road cannot connect west of Mississauga Road. Thus, Bovaird Drive will still be heavily used. The increased operational pressure on intersections at Bovaird Drive and Mississauga Road will impact negatively affect the other major intersections in the area.

Higher traffic volumes at the Mississauga Road and Bovaird Drive intersection will create operational impact and delays, more driver frustration and aggressive behaviour, which will increase traffic congestion, reduce travel safety, and increase the potential for collisions.

This alternative is inconsistent with the planned function of the corridor identified in the City's Transportation Master Plan and Heritage Heights Draft TMP which identified east-west connection needs. However, this alternative is consistent with the transportation network negotiated in the Mount Pleasant Secondary Plan Natural Heritage System.

This alternative allows for incorporation of improvements for cyclists, pedestrians, transit and streetscaping at the new roadway. It also allows for limited opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries.

Engineering Considerations – Constructability

This alternative can accommodate future improvements to services/utilities within the corridor in the new right-of-way. There will be limited temporary impact on existing traffic operations throughout study area. A traffic management plan may be required. There may be increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution.

Cultural

This alternative may impact archaeological resources, built heritage features, or cultural landscapes since construction would be outside the City's current right-of-way on undisturbed lands.

Socio-economic Environment

This alternative partially meets the objectives outlined in the programmed or approved provincial, regional, or local municipal initiatives. It supports long term growth in the study area. There are increased opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton. However, only west road extension will provide limited land development capacity.

This alternative has moderately high potential to support existing and future development in the study area. It may provide additional capacity and accommodates infrastructure improvements required for development. There would be increased potential to improve local sustainability as the extension west of Mississauga Road will provide opportunity for multi-modal travel.

This alternative would have high potential to impact private properties due to additional property required for new roadway. It may affect access to adjacent properties during construction.

Natural Environment

This alternative would result in moderate potential for impacting existing watercourses with a potential watercourse crossing at Huttonville Creek.

This alternative could have a potential high impact on ESA regulated habitat for endangered Redside Dace. A 17 2(c) permit under the Endangered Species Act would be required if a road crossing is contemplated within the regulated area. Alternative locations to avoid impacting regulated habitat would be further explored.

This alternative would also result in moderate potential impacts on known terrestrial/vegetation, species and habitats to accommodate the new road outside of the Region's current right-of-way. There is moderate potential to impact the flooding and erosion due to increased paved surface area.

Capital Cost / Implementation

This alternative has moderate to high capital cost.

There are limited opportunities to fulfill objectives for development and economic growth due to grid-like network which is not in conformances with Heritage Heights TMP and the latest Brampton TMP. There is no direct east-west direct link to Mount Pleasant GO Station.

Summary

This alternative would provide modest additional transportation capacity and access. It poorly responds against the socio-economic criteria as it can highly impact area businesses and properties. This option is expected to involve higher capital costs. Although this alternative may provide some relief to the east-west traffic future connections, it does not fully support the land use policies and future development plans. It does not fully address the problem statement.

Roadway capacity and intersection operations will deteriorate without planned roadway improvements and future east-west connection. The roadway network in the immediate area will not be able to fully accommodate the east-west travel demand growth anticipated to 2031 and beyond as there is no direct connection between Mississauga Road and Mount Pleasant GO Station access road.

This alternative is to be carried forward for further consideration.

5.3.5 ALTERNATIVE 5: EXTEND LAGERFELD DRIVE FROM CREDITVIEW ROAD TO WEST OF MISSISSAUGA ROAD

This alternative provides a new roadway with continuation of the existing Mount Pleasant GO Station access road to lands west of Mississauga Road.

Transportation

This alternative has the highest improvement of Level of Services out of all alternative solutions. Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic congestion issues. The overall performance of the transportation network will improve with the additional road capacity. This alternative support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. It provides an important direct access for bus transit vehicles and GO patrons accessing the Mount Pleasant GO Station. The east-west road and direct link to GO Station will reduce traffic congestion, improve travel safety, and reduce the potential for collisions.

This alternative is consistent with the planned function of the corridor identified in the City's Transportation Master Plan and Heritage Heights Draft TMP which identified east-west connection needs. It addresses the anticipated capacity deficiencies and provides needed roadway connectivity and multi-modal capacity. It facilitates direct travel for all modes and reduces the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road. It provides a mid-block crossing and pedestrian-friendly community collector that can attract pedestrians, cyclists, local and regional transit users. It connects major destinations with multi-modal access, enhancing the connectedness, successful development of Mount Pleasant Village. It also allows for opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries.

This alternative is not consistent with the transportation network negotiated in the Mount Pleasant Secondary Plan Natural Heritage System.

Engineering Considerations – Constructability

This alternative can accommodate future improvements to services/utilities within the corridor in the new right-of-way. There will be limited temporary impact on existing traffic operations throughout study area. A traffic management plan may be required. In comparison with alternative solution 4, there will be increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution.

Cultural

This alternative may impact archaeological resources; however, impact can be mitigated through artifact documentation and recovery.

Socio-economic Environment

This alternative support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. This alternative has very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton. It is most consistent with local and regional development plans and supports growth and intended function in study area

East-west road crossing will provide for better land development capacity in the study area. Create Value around Mount Pleasant GO commuter train station, which acts as a mobility hub connecting inter-regional GO service (rail and bus-connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit. Full east west crossing /road will provide direct connection from community to Mount Pleasant GO and Mixed-use centre.

This alternative solution will provide high potential to support existing and future City and Regional development plans for North Brampton, provides additional capacity and accommodates infrastructure improvements required for development.

It may provide additional capacity and accommodates infrastructure improvements required for development. It will provide the ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties. There would be increased potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian).

Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal.

This alternative would have high potential to impact private properties due to additional property required for new roadway. It may affect access to adjacent properties during construction.

Natural Environment

This alternative would result in highest impact to natural areas and ESA regulated habitat within the Huttonville Creek stream corridor due to the new roadway and need for up to two stream crossings.

Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. New culverts could impede fish passage. This alternative solution has potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and potential need for culvert improvements and crossing the valley.

As there is ESA regulated habitat for the endangered Redside Dace on both the east and west branches of Huttonville Creek, this alternative would have the highest degree of impact. Since the proposed east-west connection will be crossing Huttonville Creek tributaries, there is a high potential for altering associated supporting vegetation in the Natural Heritage System. Moderate tohigh related effects on downstream surface water quality which can be mitigated through SWM controls and best management practices. There is moderate potential to impact flooding and erosion due to increased paved surface area. It can be mitigated through stormwater management and/or erosion control measures.

Capital Cost / Implementation

This alternative has the highest capital costs to road construction and maintenance. There will be efficient operating cost for transit and increased opportunities to fulfill objectives for development and economic growth due to better direct link to Mount Pleasant GO Station. Opportunities exist to fulfill objectives for to development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station.

The new east-west road will reduce overall travel time for all modes of transportation, reduce congestion and greenhouse gas emission impact and mitigation costs and ultimately reduce overall cost and negative impact to the economy.

Summary

A new east-west connection addresses the capacity and functional deficiencies associated within the study area. This alternative would have the highest adverse effects on the terrestrial/vegetation (e.g. Huttonville Creek) and, species and regulated habitat in addition to the impacts on the social and economic environments to accommodate a new roadway outside of the Region's and City's right-of-way. However, constructing a new roadway tying the residential communities in the northwestern Brampton area to Mount Pleasant GO Station could improve current and future traffic conditions, improve the operation and capacity of the area, facilitate direct ravel for all modes of travel including transit, walking and cycling. It can also reduce the reliance on vehicles and the associated congestion/pressure placed on Bovaird Drive, Mississauga Road and their intersections.

The new roadway can fully realize the arterial function as stated in the Region and Brampton's Official Plans. It provides connectivity to support more sustainable transportation options and to integrate local neighborhoods creating compact development and active uses along complete streets in the neighbourhood. It provides a mid-block crossing and pedestrian friendly community collector to facilitate multi-modal transportation users. However, this alternative is not consistent with the transportation network negotiated in the Mount Pleasant Secondary Plan Natural Heritage System. This alternative is also not consistent with the Guidance for Development Activities in Redside Dace Protected Habitat (MNRF, 2016)

Although this option rate poorly against environments criteria, the environmental impacts ca be mitigated through engineering best practices that will address RSD regulatory requirements and achieve an overall net benefit. It best responds to the socio-economic criteria as it supports the land use policies and future development plan of the Mount Pleasant and Heritage Heights Community and supports potential commuters from communities north and/or west of Brampton. It provides strategic multi-modal connections linking future planned destinations including higher density land uses, employment lands and higher order transit corridors.

Despite higher capital costs this option best addresses the problem statement. Based on the evaluation summary shown in Table 5-3 and above, the technically preferred alternative solution is identified as Alternative 5: Extend Lagerfeld Drive from Creditview Road to west of Mississauga Road.

5.4 CONFIRM PREFERRED SOLUTION

The evaluation process including the various discipline's experience, knowledge and input on the alternative solutions concluded that the preferred solution to solve the current congestion, capacity and operational deficiencies should be Alternative Solution 5 – Extend Lagerfeld Drive to west of Mississauga Road. Although Alternative Solution 4 – Construct road west of Mississauga Road only is not preferred, alternative solution 4 was also recommended by MNRF to carry forward to the next phase for further evaluation.

5.5 CONFIRM PROJECT SCHEDULE SELECTION

In accordance with Appendix 1, Item 20 of the Municipal Class EA, the Preferred Solution will result in a Schedule 'C' undertaking because the anticipated construction costs for the extension of Lagerfeld Drive from Creditview Road and west of Mississauga Road are expected to be greater than $2.4M, the appropriate Schedule is 'C' (less than $2.4M would be a Schedule 'B' undertaking).

6 ALTERNATIVE DESIGN CONCEPTS OF THE PREFERRED SOLUTION

6.1 IDENTIFICATION AND DESCRIPTION OF ALTERNATIVE DESIGN CONCEPTS

A series of initial design concepts were developed for the preferred solution at a preliminary level of detail to properly assess the potential impacts and benefits associated with each alternative. The alignments were generated along the entire corridor such that the public and property owners can provide meaningful input on the alternatives.

Five alternative design concepts were generated with sub-options for the crossing abutments to beyond or within the 30-metre regulated habitat. These alignments are shown in **Figure 6-1** to **Figure 6-5**.

The alternative design concepts that were developed and evaluated are shown in **Table 6-1** below.

Table 6-1: Alternative Design Concepts

Alternative Design Concepts	Description
Alternative 1A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment passes through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments beyond 30m Redside Dace regulated habitat)
Alternative 1B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment passes through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments within 30m Redside Dace regulated habitat)
Alternative 2	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment passes through Mississauga Road at approximately 240m offset from Bovaird Drive centreline.
Alternative 3A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment passes through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments beyond 30m Redside Dace regulated habitat)
Alternative 3B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment passes through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments within 30m Redside Dace regulated habitat)
Alternative 4A	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilizes a proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments beyond 30m Redside Dace regulated habitat)
Alternative 4B	Continuation of Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilizes a proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments within 30m Redside Dace regulated habitat)

Alternative 5	East-west connection will start at Mississauga Road, extending to the west, at 419m offset from Bovaird Drive centreline. No connection of Mississauga Road to the Mount Pleasant GO Station.

6.2 EVALUATION OF ALTERNATIVE DESIGN CONCEPTS

6.2.1 EVALUATION CRITERIA

Consistent with the approach to evaluate and select the preferred solution, the above alternative design concepts were evaluated against the criteria described below in **Table 6-2.**

Table 6-2: Criteria for Evaluating Alternative Design Concepts

Component	Evaluation Criteria
Transportation	• Traffic Operations and Accommodation of Future Travel Demand: – Potential to accommodate long-term vehicular travel demands; – Potential to serve transit travel demand; – Direct Multi-modal connections connection between Mobility Hub and Retail/High Density development and lands beyond; – Improve east-west transportation capacity and accessibility to existing and future developments and to support alternative modes of travel (i.e., transit, walking and cycling). • Traffic Safety: – Potential to improve traffic safety based on the opportunity to reduce congestion and potential for collisions. • Road Network Compatibility/Connectivity: – Consistent with the proposed transportation system and function of roads in the long term (i.e. City of Brampton Transportation Master Plan Update (2015); Heritage Heights Transportation Master Plan (HHTMP); Mount Pleasant Secondary Plan Transportation Master Plan; Mississauga Road Municipal Class EA; – Create an efficient and comprehensive transportation network for the City and contribute to the Regional road network. • Accommodation of Pedestrians/Cyclists: – Ability to address walking and cycling objectives in the corridor (sidewalks, bike lanes, on-road routes, etc.); – Opportunities for transportation choices other than vehicle use; – Address the challenges associated with new growth in the City, and provide a multi-modal vision of “sustainable mobility” that can accommodate

	vehicles, transit, cyclists and pedestrians in a healthy community. • Response Times/Access for Emergency Vehicles: – Potential to improve response time/accessibility for emergency vehicles due to changes in travel time.
Engineering Considerations – Constructability	• Services/Utilities: – Potential impact to services or utilities within the corridor; – Accommodation of planned services/utilities. • Structural: – Compatibility with proposed bridge/structure at Mississauga Road. • Construction Staging: – Impact to existing traffic operations during construction. • Drainage/Stormwater Management: – Potential increase in flooding risk in the creeks; – Potential to increase stormwater run-off (water quantity); – Increase in pollutants to receiving watercourses (water quality), • Flooding Hazards. • Erosion Hazards.
Cultural Environment	• Archaeological resources: – Potential to impact archaeological resources (previously undisturbed areas with high potential for recovery of artifacts). • Built Heritage Resources: – Potential to impact known built heritage resources (i.e. listed/designated under Part IV or V of the Ontario Heritage Act and/or identified as 'culturally significant' by the Municipality).
Social/Economic Environment	• Sustainability and City/ Regional Planning: – Consistency with local and regional planning (i.e. Heritage Heights Secondary Plan, Mount Pleasant Secondary Plan, Mississauga Road EA); – Development objectives and economic growth. • Compatibility with Existing and Proposed Documents: – Potential to support development of lands served by Mississauga Road, Bovaird Drive, Heritage Road, and mid-block connection between Mount Pleasant GO Station and developments west of Mississauga Road. • Potential sustainability improvements to the community, including greenhouse gas emissions: – Improve local sustainability by providing alternative transportation modes in order to reduce auto dependency. • Noise Impacts: – Potential to increase noise in Noise Sensitive Areas (NSAs) (e.g. residential properties backing onto the roadway).

	• Property Impacts: – Potential impacts to property.
Natural Environmental	• Vegetation and Wildlife: – Potential impact to natural areas and habitats. • Potential to impact plant and/or animal Species at Risk (SAR). • Potential impact to Provincially Significant Wetland (PSW). • Provincial Best Management Practices for Redside Dace: Planning of Crossings: – Stream crossings should be minimized and generally limited to one per km of stream; – New stream crossings should avoid reached known to be occupied by Redside Dace; – New stream crossings should be chosen to minimize the width of the crossings; – New stream crossings should cross over straight sections of the stream where there is less likelihood of bank erosion; – Crossings should be done in areas that have already been disturbed. • Provincial Best Management Practices for Redside Dace: Construction and Design: – For new crossings in confined valleys, stream crossing should be bridge that spans the valley with piers placed outside the meander belt; – For new crossings in unconfined valleys, stream crossings should be open bottom culverts designed to span the meander belt of the stream; – For the extension of existing structures, the footprint of the structure should be minimized by using retaining walls where feasible to minimize disruption of riparian habitat; – Closed bottom culverts to be installed so that the invert is embedded a minimum of 20% of the culvert diameter below the stream bed to facilitate fish passage by ensuring culvert is not perched; – Slopes of culverts should mimic the natural stream bed.
Capital Cost/ Implementation	• Costs: – Relative cost in terms of capital costs, property costs and maintenance costs.

Table 6-3 presents the evaluation of alternative design concepts including a summary of how expected impacts differ from each alternative. The evaluation of alternatives is based on a matrix that provides brief text describing the evaluation of each alternative against each criterion. **A descriptive qualitative evaluation was used to consider the suitability and feasibility. Trade-offs considering the advantages or disadvantages of each alternative to address the problem and opportunity statement with the least environmental effects and the most technical benefits forms the rationale for the identification of the preferred solution.**

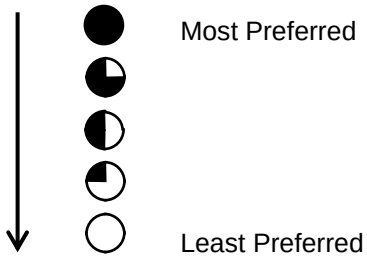

Figure 6-1: Alignment 1

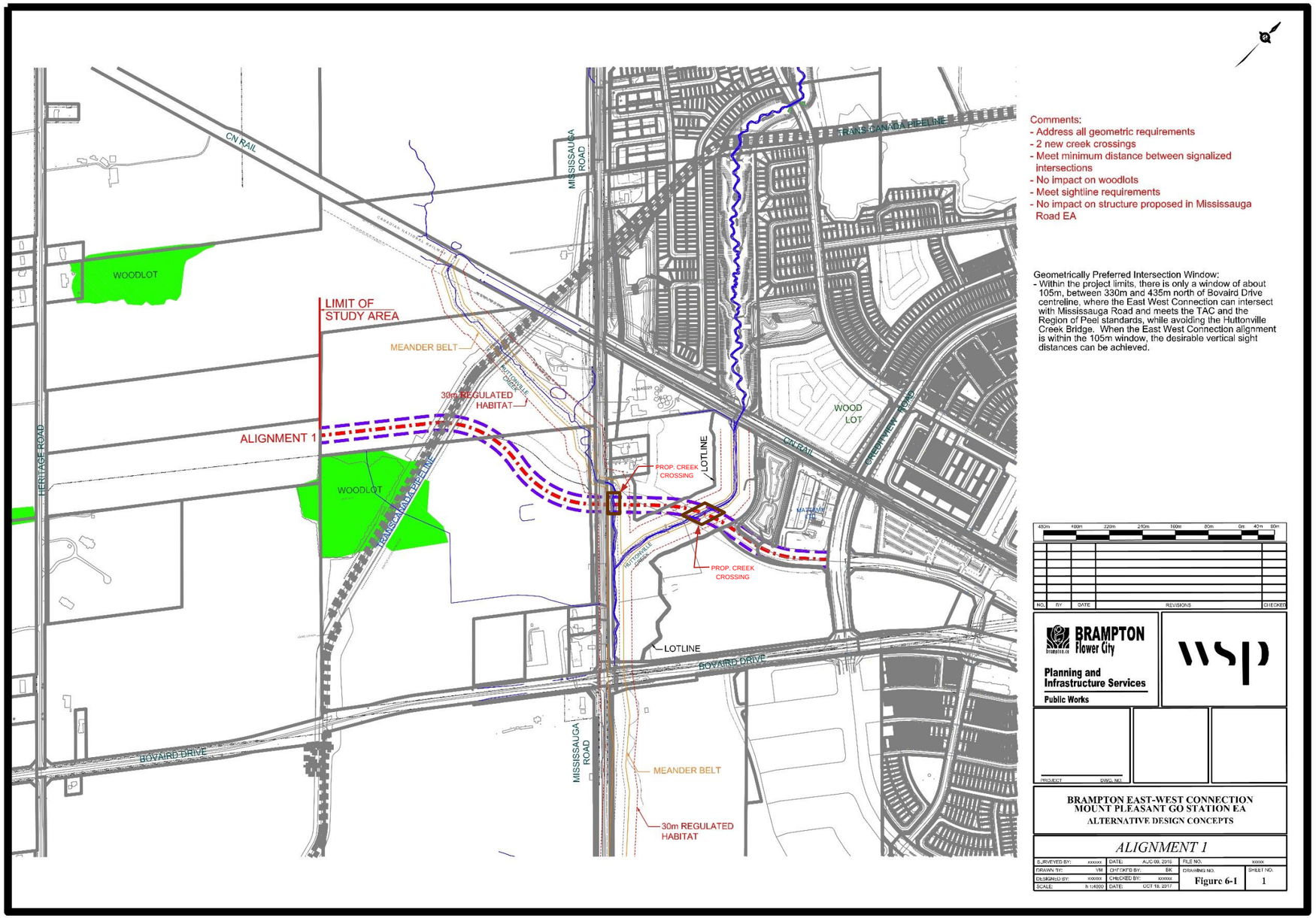

Figure 6-2: Alignment 2

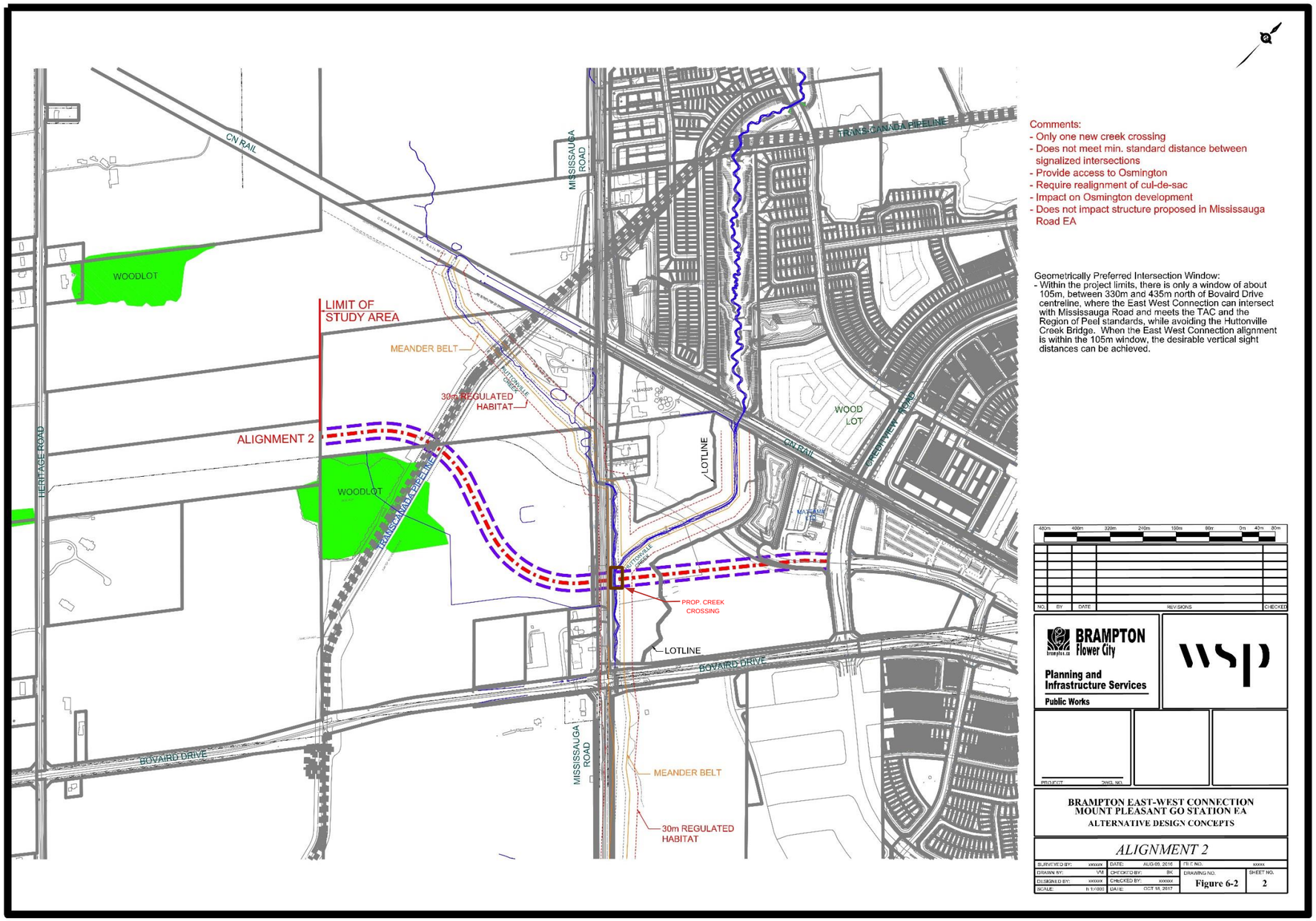

Figure 6-3: Alignment 3

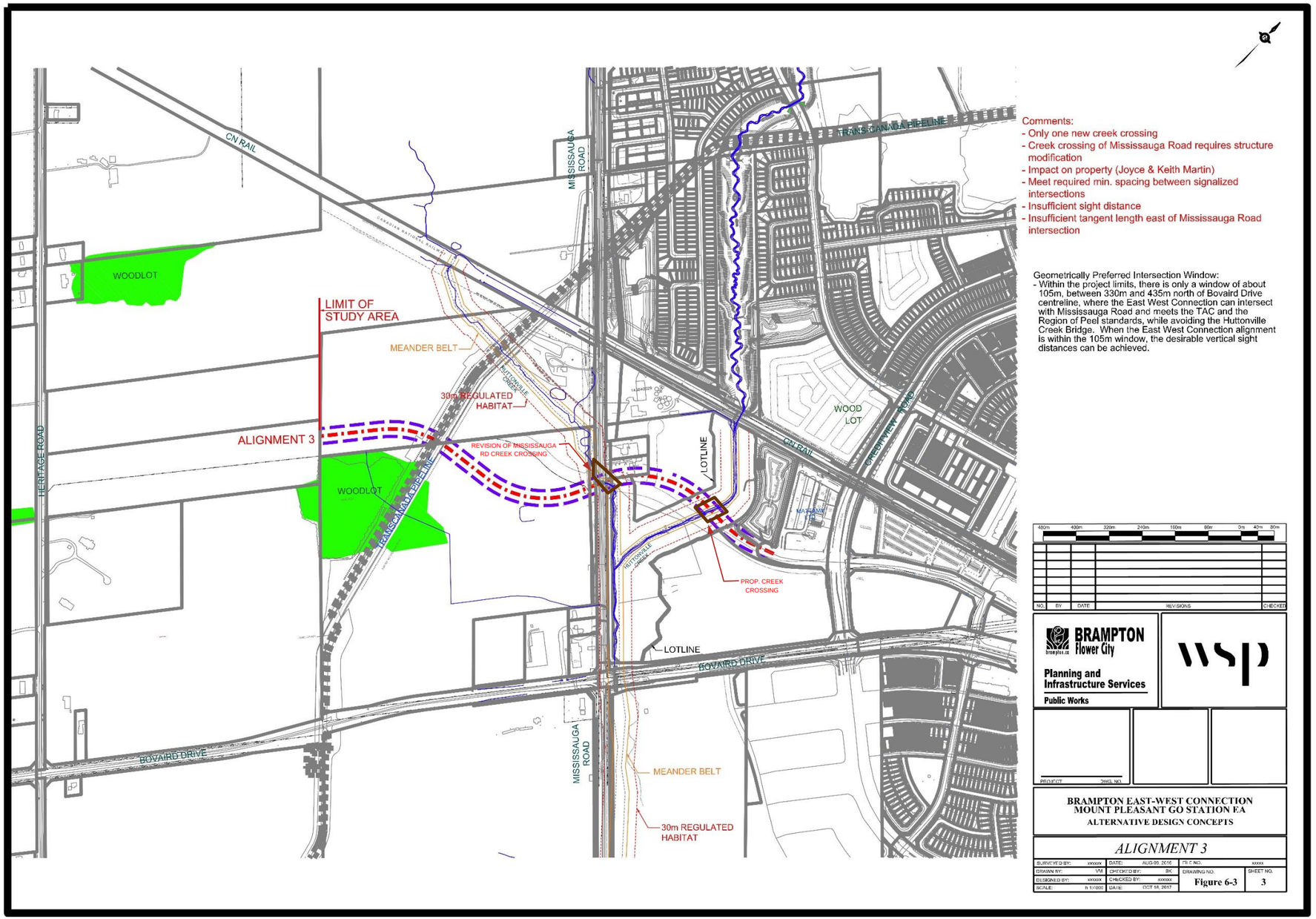

Figure 6-4: Alignment 4

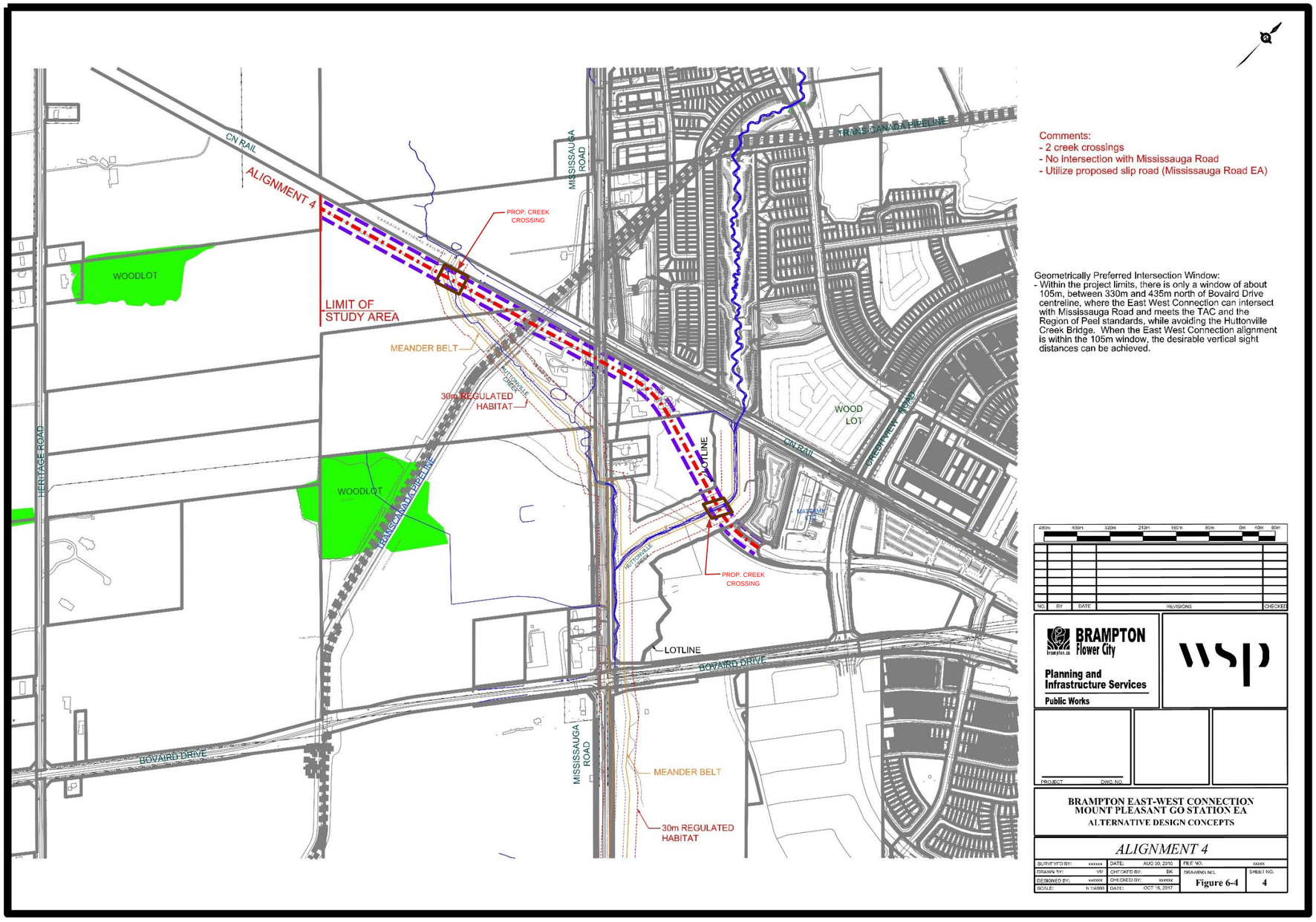

Figure 6-5: Alignment 5

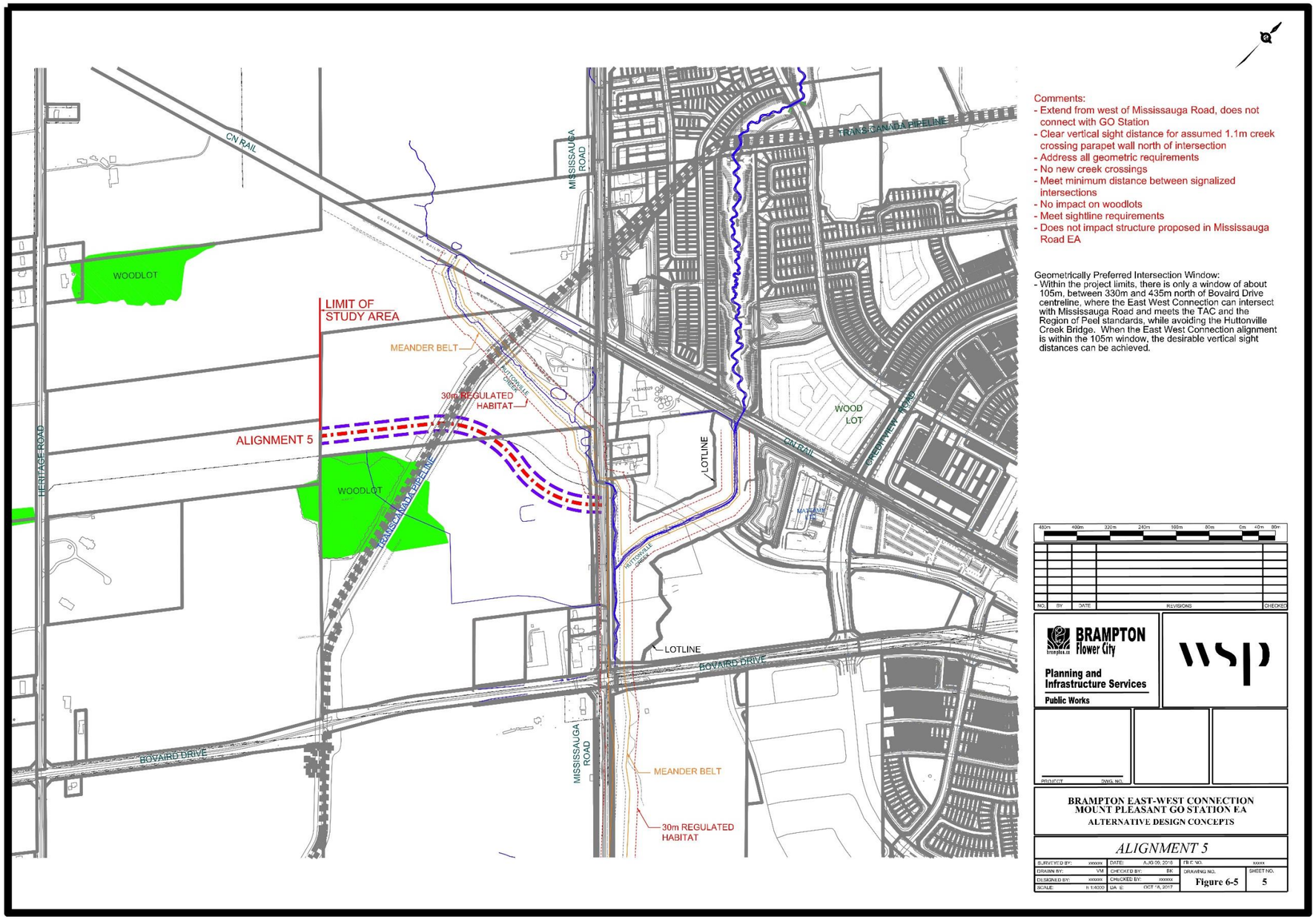

Table 6-3: Comparative Evaluation Matrix for Alternative Design Concepts

Evaluation Criteria and Sub-Factors	DESIGN ALTERNATIVE 1A	DESIGN ALTERNATIVE 1B	DESIGN ALTERNATIVE 2	DESIGN ALTERNATIVE 3A	DESIGN ALTERNATIVE 3B	DESIGN ALTERNATIVE 4A	DESIGN ALTERNATIVE 4B	DESIGN ALTERNATIVE 5
	Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at approximately 240m offset from Bovaird Drive centreline.**	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)**	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)**	**Continuation of the existing Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west, at 419m offset from Bovaird Drive centreline.**
TRANSPORTATION (Refer to footnote 'c')								
Traffic Operations and Accommodation of Future Travel Demand • Potential to accommodate long-term vehicular travel demands • Potential to serve transit travel demand • Direct Multi-modal connections connection between Mobility Hub and Retail/High Density development and lands beyond. • Improve east-west transportation capacity and accessibility to existing and future developments and to support alternative modes of travel (i.e., transit, walking and cycling)	• Meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Will not have queuing issue (southbound queues along Mississauga Road) as there is sufficient storage distance between Bovaird Drive and the new connection for left turning vehicles onto Bovaird Drive. • Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas. • Improved Level of Services (LOS) for all modes of transportation. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area • The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that	• Meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Will not have queuing issue (southbound queues along Mississauga Road) as there is sufficient storage distance between Bovaird Drive and the new connection for left turning vehicles onto Bovaird Drive. • Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas. • Improved Level of Services (LOS) for all modes of transportation. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area • The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that	• Do not meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Will have queuing issue for left turning vehicles (southbound queues along Mississauga Road) at Bovaird Drive with reduced intersections distance between Bovaird Drive and the new connection. • Provide access to mixed-use retail centre development but has impacts on retail centre and other developments layout. • Reduced the function of the connection as an alternative to connect between Mount Pleasant GO Station and Heritage Road and to alleviate traffics along Bovaird Drive. • Some improvement to the Level of Services (LOS) for all modes of transportation. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area	• Meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Combining the connection access with Huttonville Creek Bridge at Mississauga Road, reduce sight distance issues that may arise from the bridge's parapet walls. • Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas. • Improved Level of Services (LOS) for all modes of transportation. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area • The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban	• Meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Combining the connection access with Huttonville Creek Bridge at Mississauga Road, reduce sight distance issues that may arise from the bridge's parapet walls. • Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas. • Improved Level of Services (LOS) for all modes of transportation. • Continuing existing GO Station access road to west of Mississauga Road will improve the short and long-term traffic operations in the area • The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban	• This design concept will not fully address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a full direct E-W link to the transportation hub. • Will not intersect with Mississauga Road, do not have concern with intersection spacing or sightlines along Mississauga Road. • Since not intersecting with Mississauga Road, cannot alleviate traffic congestion at intersection of Mississauga Road and Bovaird Drive. • Moderately improved Level of Services (LOS) for some modes of transportation. • Design alignment 4 may also be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor. • Do not passed through the major developments, reduced the function of the East-West Connection. • The overall performance of the transportation	• This design concept will not fully address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a full direct E-W link to the transportation hub. • Will not intersect with Mississauga Road, do not have concern with intersection spacing or sightlines along Mississauga Road. • Since not intersecting with Mississauga Road, cannot alleviate traffic congestion at intersection of Mississauga Road and Bovaird Drive. • Moderately improved Level of Services (LOS) for some modes of transportation. • Design alignment 4 may also be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor. • Do not passed through the major developments, reduced the function of the East-West Connection. • The overall performance of the transportation	• This design concept will not address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a full direct E-W link to the transportation hub. • Does not provide direct access from the Mount Pleasant GO Station, which needed as an important alternative route for bus transit vehicles and GO patrons accessing the station • Based that there is no connection east of Mississauga Road and due to the significant amount of traffic that would be diverted, the intersections of Bovaird Drive at Mississauga Road and Bovaird Drive at James Potter Road would operate significantly over capacity for future traffic conditions. • Missing connection east of Mississauga Road to GO Station will require additional travel time by transit and active transportation, which may reduce use of transit and cycling modes of transportation

	include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station • Preferred from a stop spacing, service design and route coverage perspective. Would allow for realignment of Züm service, including potential Züm Stations at Mississauga Road and Lagerfeld Drive.	include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station • Preferred from a stop spacing, service design and route coverage perspective. Would allow for realignment of Züm service, including potential Züm Stations at Mississauga Road and Lagerfeld Drive.	• The overall performance of the transportation network will improve with the additional road capacity • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station • Somewhat impacts stop spacing and route coverage, but would still allow for realignment of Züm Service and stations	Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station • Allow for realignment of Züm Service and stations • Alignment geometrics may negatively impact operations and location of Züm Stations	Core around Mount Pleasant GO Station • Provide direct access from the Mount Pleasant GO Station, which will provide an important route for bus transit vehicles and GO patrons accessing the station • Allow for realignment of Züm Service and stations • Alignment geometrics may negatively impact operations and location of Züm Stations	network will have very limited improvement with the additional road capacity. • Does not support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. • Reduces overall transit route coverage and efficiency of service delivery. Züm service would not be extended further north on Mississauga Road	network will have very limited improvement with the additional road capacity. • Does not support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station. • Reduces overall transit route coverage and efficiency of service delivery. Züm service would not be extended further north on Mississauga Road	• No direct east-west connection, Bovaird Drive will still be heavily used. • Increase operational pressure on intersection at Bovaird Drive and Mississauga Road will impact Level of Services on other major intersections in the area, which will generate additional congestion, and increase travel time. • Significantly reduces overall transit route coverage and efficiency of service delivery. Züm service would not be extended further north on Mississauga Road • Moderately improved Level of Services (LOS)
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Traffic Safety • Potential to improve traffic safety based on the opportunity to reduce congestion and potential for collisions	• High potential to improve traffic safety because East –West road and direct link to GO Station will reduce traffic congestion, improve intersection operations and reduce the potential for collisions	• High potential to improve traffic safety because East –West road and direct link to GO Station will reduce traffic congestion, improve intersection operations and reduce the potential for collisions	• Moderate potential to improve traffic safety because East –West road and direct link to GO Station, but with sub-standard intersection spacing, will reduce traffic congestion, slightly improve intersection operations and reduce the potential for collisions	• High potential to improve traffic safety because East –West road and direct link to GO Station will reduce traffic congestion, improve intersection operations and reduce the potential for collisions	• High potential to improve traffic safety because East –West road and direct link to GO Station will reduce traffic congestion, improve intersection operations and reduce the potential for collisions	• Moderate potential to improve traffic safety in the study area because the East-West road is not connected to Mississauga Road. • Improved road capacity may reduce congestion and slightly reduce the potential for collisions • Higher traffic volumes at the Mississauga Road and Bovaird Drive intersection will create operational impact and delays, more driver frustration and aggressive behaviour, which will increase traffic congestion, reduce travel safety, and increase the potential for collisions • Design alignment 4 may also be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor.	• Moderate potential to improve traffic safety in the study area because the East-West road is not connected to Mississauga Road. • Improved road capacity may reduce congestion and slightly reduce the potential for collisions • Higher traffic volumes at the Mississauga Road and Bovaird Drive intersection will create operational impact and delays, more driver frustration and aggressive behaviour, which will increase traffic congestion, reduce travel safety, and increase the potential for collisions • Design alignment 4 may also be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor.	• Higher potential to improve traffic safety in the study area • Higher traffic volumes at the Mississauga Road and Bovaird Drive intersection will create operational impact and delays, more driver frustration and aggressive behaviour, which will increase traffic congestion, reduce travel safety, and increase the potential for collisions
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Road Network Compatibility/Connectivity	• Consistent with the planned function of the	• Consistent with the planned function of the	• Not consistent with the planned function of the	• Consistent with the planned function of the	• Consistent with the planned function of the	• Not consistent with the planned function of the	• Not consistent with the planned function of the	• Not consistent with the planned function of the

• Consistent with the proposed transportation system and function of roads in the long term (i.e. City of Brampton Transportation Master Plan Update (2015); Heritage Heights Transportation Master Plan (HHTMP); Mount Pleasant Secondary Plan Transportation Master Plan; Mississauga Road Municipal Class EA • Create an efficient and comprehensive transportation network for the City and contribute to the Regional road network	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Addresses anticipated capacity deficiencies • Provide needed roadway connectivity, and multi-modal capacity • Facilitate direct travel for all modes, and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Addresses anticipated capacity deficiencies • Provide needed roadway connectivity, and multi-modal capacity • Facilitate direct travel for all modes, and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Will not fully addresses anticipated capacity deficiencies • Provide some needed roadway connectivity, and multi-modal capacity • Facilitate direct travel for all modes, and moderately reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Addresses anticipated capacity deficiencies • Provide needed roadway connectivity, and multi-modal capacity • Facilitate direct travel for all modes, and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Addresses anticipated capacity deficiencies • Provide needed roadway connectivity, and multi-modal capacity • Facilitate direct travel for all modes, and reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road • Support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Generally, the connection will improve road network connectivity, and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Do not addresses anticipated capacity deficiencies • Do not provide needed roadway connectivity, and multi-modal capacity • Do not facilitate direct travel for all modes, but only slightly reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road. • Do not support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide some relief to the east-west traffic connections but it does not fully support the land use policies and the future development plans in the area • Design alignment 4 may also be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor.	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Do not addresses anticipated capacity deficiencies • Do not provide needed roadway connectivity, and multi-modal capacity • Do not facilitate direct travel for all modes, but only slightly reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road. • Do not support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide some relief to the east-west traffic connections but it does not fully support the land use policies and the future development plans in the area •	corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs • Do not addresses anticipated capacity deficiencies • Do not provide needed roadway connectivity, and multi-modal capacity • Do not facilitate direct travel for all modes, but only slightly reduce the reliance/pressure placed on intersections at Bovaird Drive and Mississauga Road. • Do not support the City's endorsed Community Design Principles that include Transit-Oriented Development in an Urban Core around Mount Pleasant GO Station • Provide some relief to the east-west traffic connections but it does not fully support the land use policies and the future development plans in the area
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Accommodation of Pedestrians/Cyclists • Ability to address walking and cycling objectives in the corridor (sidewalks, bike lanes, on-road routes, etc.) • Opportunities for transportation choices other than vehicle use • Address the challenges associated with new growth in the City, and provide a multi-modal vision of "sustainable mobility" that can accommodate vehicles,	• Provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users) • Provides opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation (e.g. walking, cycling)	• Provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users) • Provides opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation (e.g. walking, cycling)	• Provide opportunities for improved public facilities (e.g. sidewalks, bike lanes) to encourage and promote alternative modes of transportation (e.g. walking, cycling) • Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village	• Provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users) • Provides opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation (e.g. walking, cycling)	• Provide a mid-block crossing and pedestrian-friendly community collector that can attract an array of multi-modal transportation users (pedestrians, cyclists, local and regional transit users) • Provides opportunities for improved public facilities (e.g. sidewalks, bike lanes) to promote alternative modes of transportation (e.g. walking, cycling)	• Allow for incorporation of improvements for cyclists, pedestrians, transit and streetscaping on some parallel roadways • Provides some opportunities for transportation choices other than vehicle use • Provides limited opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries	• Allow for incorporation of improvements for cyclists, pedestrians, transit and streetscaping on some parallel roadways • Provides some opportunities for transportation choices other than vehicle use • Provides limited opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries	• Allow for incorporation of improvements for cyclists, pedestrians, transit and streetscaping on some parallel roadways • Provides limited opportunities for transportation choices other than vehicle use • Provides limited opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries

transit, cyclists and pedestrians in a healthy community	• Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village • Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of “sustainable mobility” that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community	• Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village • Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of “sustainable mobility” that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community	• Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of “sustainable mobility” that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community	• Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village • Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of “sustainable mobility” that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community	• Provides opportunities for transportation choices other than vehicle use • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village • Provides opportunities for east-west active transportation facilities to connect with the north-south trails that follow watershed tributaries • Provide a multi-modal vision of “sustainable mobility” that can accommodate vehicles, transit, cyclists and pedestrians in a healthy community			
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Response Times/Access for Emergency Vehicles • Potential to improve response time/ accessibility for emergency vehicles due to changes in travel time	• Highest potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	• Highest potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	• Moderate potential to improve emergency service response times as the somewhat mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	• Highest potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	• Highest potential to improve emergency service response times as the mid-block connection will allow for a faster route, reducing the dependence on major arterial roadways • Connection will improve road network connectivity and will result in better response times for emergency service vehicles (fire, police, and ambulance). Furthermore, overall public safety is positively impacted by the ability of emergency vehicles to provide more timely responses due to the direct connection of communities east and west of Mississauga Road.	• Moderate potential to improve emergency service response times • Not having direct access from Mississauga Road will reduce emergency response communities south of this alignment	• Moderate potential to improve emergency service response times • Not having direct access from Mississauga Road will reduce emergency response communities south of this alignment	• Not having direct access from Mississauga Road will reduce emergency service response times as the mid-block connection will not allow for a faster route, reducing the dependence on major arterial roadways
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LEGEND	○	◔	◐	◔	●
	Least Preferred			Most Preferred	

ENGINEERING CONSIDERATIONS – CONSTRUCTABILITY (Refer to footnote 'c')									
Services/Utilities • Potential impact to services or utilities within the corridor • Accommodation of planned services/utilities	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Past through TransCanada Pipeline	• New right-of-way accommodates future improvements to services/utilities within the corridor • Moderate potential to impact existing minor and major services/utilities • Past through TransCanada Pipeline
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Structural • Compatibility with proposed bridge/structure at Mississauga Road • Cost implications of structure selection. • Impacts to Huttonville Creek (See Appendix N for Huttonville Creek crossings sketches)	• Alignment at the East Huttonville Creek crossing is on a slight skew. • Option A proposed for east crossing: ➢ 3-span precast 1.0m girder bridge (38m-40m-33m) totalling 111m ➢ High structure construction cost (~$15M) ➢ Bridge length is excessive for the crossing • Crossing proposed at Huttonville Creek just east of Mississauga Road: ➢ 2-span precast 1.0m girder bridge (24m-23m) totalling 47m ➢ The west abutment of the single span structure is in close proximity to the water course. Based on preliminary assessment the abutments are located within the meander belt to maintain a reasonable span length. ➢ Moderate structure construction cost: ~$6.0M • Bridge at Mississauga Road will not be impacted	• Alignment at the East Huttonville Creek crossing is on a slight skew. • Option B proposed for east crossing: ➢ 1-span 38m precast 1.0m girder bridge ➢ Lower structure construction cost (~$4M) ➢ More reasonable fit, with abutment centrelines outside of the meander belt • Crossing proposed at Huttonville Creek just east of Mississauga Road: ➢ 2-span precast 1.0m girder bridge (24m-23m) totalling 47m ➢ The west abutment of the single span structure is in close proximity to the water course. Based on preliminary assessment the abutments are located within the meander belt to maintain a reasonable span length. ➢ Moderate structure construction cost: ~$6.0M • Bridge at Mississauga Road will not be impacted	• Crossing proposed at Huttonville Creek just east of Mississauga Road: ➢ 2-span precast 1.2m girder bridge (36m-27m) totalling 63m ➢ The west abutment of the single span structure is in close proximity to the water course. Based on preliminary assessment the abutments are located within the meander belt to maintain a reasonable span length. ➢ Moderate structure construction cost: ~$7.2M • Bridge at Mississauga Road will not be impacted	• Alignment at the East Huttonville Creek crossing is on a slight skew. • Option A proposed for east crossing: ➢ 3-span precast 1.0m girder bridge (24m-30m-24m) totalling 78m ➢ High structure construction cost (~$9M) ➢ Bridge length is excessive for the crossing • Crossing proposed at Huttonville Creek at Mississauga Road: ➢ Revise Mississauga Road EA design to 69m two spans bridge ➢ Require changing Mississauga Road bridge at the intersection from the EA approved design to two span bridge (length increased from 42m to 69m) ➢ RSS wall system proposed on top of sheet pile wall at creek side (NW and SE quadrants) ➢ Fill with RSS wall system for the two approaches to Mississauga Road from the EW Connector ➢ Bridge length is designed so that there will be openings for air at the four corners, so the creek will not be completely enclosed. ➢ Drastic changes to Huttonville Creek	• Alignment at the East Huttonville Creek crossing is on a slight skew. • Option B proposed for east crossing: ➢ 1-span 26m precast 1.0m girder bridge ➢ Low structure construction cost (~$3M) ➢ More reasonable fit, with abutment centrelines at 3m offset from meander belt • Crossing proposed at Huttonville Creek at Mississauga Road: ➢ Revise Mississauga Road EA design to 69m two spans bridge ➢ Require changing Mississauga Road bridge at the intersection from the EA approved design to two span bridge (length increased from 42m to 69m) ➢ RSS wall system proposed on top of sheet pile wall at creek side (NW and SE quadrants) ➢ Fill with RSS wall system for the two approaches to Mississauga Road from the EW Connector ➢ Bridge length is designed so that there will be openings for air at the four corners, so the creek will not be completely enclosed. ➢ Drastic changes to Huttonville Creek	• Option A proposed for East Huttonville Creek crossing: ➢ 3-span precast 1.0m girder bridge (24m-30m-24m) totalling 78m ➢ High structure construction cost (~$10M) ➢ Bridge length is excessive for the crossing • Option A proposed for West Huttonville Creek crossing: ➢ 3-span precast 1.2m girder bridge (33m-35m-33m) totalling 101m ➢ High structure construction cost (~$11.7M) ➢ Bridge length is excessive for the crossing • Bridge at Mississauga Road will not be impacted	• Option B proposed for East Huttonville Creek crossing: ➢ 1-span 25m precast 1.0m girder bridge ➢ Low structure construction cost (~$2.8M) ➢ More reasonable fit, with abutment centrelines at 3m offset from meander belt • Option B proposed for West Huttonville Creek crossing: ➢ 1-span 38m precast 1.2m girder bridge ➢ Lower structure construction cost (~$4.6M) ➢ More reasonable fit, with abutment centrelines at 3m offset from meander belt • Bridge at Mississauga Road will not be impacted	• This design alternative will not cross Huttonville Creek, therefore no structure is proposed.

				Bridge design and creek alignment ➢ Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek bridge and align creek without interrupting existing traffic operations ➢ High maintenance is expected as the bridge is at the intersection connected to solid ground for the east and west legs. The high vibration will lead to need for expansion joint replacement as frequent as every 10 years or less ➢ Structural cost for RSS wall system and difference between existing design and design proposed here is ~$5.35M	Bridge design and creek alignment ➢ Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek bridge and align creek without interrupting existing traffic operations ➢ High maintenance is expected as the bridge is at the intersection connected to solid ground for the east and west legs. The high vibration will lead to need for expansion joint replacement as frequent as every 10 years or less ➢ Structural cost for RSS wall system and difference between existing design and design proposed here is ~$5.35M			
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Construction Staging • Potential impact to existing traffic operations during road/lane closure construction	• Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required • Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek crossing and realign creek without interrupting existing traffic operations.	• Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required • Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek crossing and realign creek without interrupting existing traffic operations.	• Low potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Low potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required	• Slightly Moderate potential to temporarily impact existing traffic operations throughout study area • A traffic management plan would be required
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Drainage/Stormwater Management • Potential increase in flooding risk in the creeks • Potential to increase stormwater run-off (water quantity) • Increase in pollutants to receiving watercourses (water quality)	• Alternative 1 would result in 4.44 ha increase in impervious area and hence, considerable increase in the run-off volumes and flow rates and pollutants. • Will require considerable mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 1 would result in 4.44 ha increase in impervious area and hence, considerable increase in the run-off volumes and flow rates and pollutants. • Will require considerable mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 2 would result in 3.61 ha increase in impervious area and hence, moderate increase in the run-off volumes and flow rates and pollutants. • Will require moderate mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 3 would result in 3.11 ha increase in impervious area and hence, less increase in the run-off volumes and flow rates and pollutants. • Will require less mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 3 would result in 3.11 ha increase in impervious area and hence, less increase in the run-off volumes and flow rates and pollutants. • Will require less mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 4 would result in 3.52 ha increase in impervious area and hence, moderate increase in the run-off volumes and flow rates and pollutants. • Will require moderate mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alternative 4 would result in 3.52 ha increase in impervious area and hence, moderate increase in the run-off volumes and flow rates and pollutants. • Will require moderate mitigation measures through provision of storm water management facilities which would also treat existing runoff	• Alignment 5 is the shortest alignment, which would result in 1.94 ha increase in the run-off volumes and less increase in flow rates and pollutants. • Will require minimal mitigation measures through provision of storm water management facilities which would also treat existing runoff
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Flooding Hazards	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • Three spans for a total width of 111 m • Piers are on the floodplain • 270 mm maximum increase in flood elevations at the face of the bridge and 80 mm at distance 80 m upstream. • Slight decrease in flow velocity <u>For Huttonville Creek Crossing:</u> • Two spans for a total of 47 m • Pier and abutments are on the floodplain • 310 mm decrease in flood elevations at the face of the bridge. • Increase in flow velocity - Can be mitigated through erosion control measures • Alignment 1A is preferred as it has less impact on floodplain and velocity levels.	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • One span of 38 m • Abutments are slightly on the floodplain • 230 mm maximum increase in flood elevations at the face of the bridge and 90 mm at distance 80 m upstream. • Insignificant increase in flow velocity <u>For Huttonville Creek Crossing:</u> • Two spans for a total of 47 m • Pier and abutments are on the floodplain • 310 mm decrease in flood elevations at the face of the bridge. • Increase in flow velocity - Can be mitigated through erosion control measures • Alignment 1B is preferred as it has similar impact on floodplain and velocity levels as Alignment 1A.	• Crossing Huttonville Creek at one (1) new locations. <u>Huttonville Creek Crossing:</u> • Two spans totalling 63 m • Pier and abutments are on the floodplain • No increase in flood elevations • No increase in flow velocity • Alignment 2 is preferred as it has no impact on floodplain and velocity levels and it involves only one crossing.	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • Three spans for a total of 78 m • Piers are on the floodplain • 60 mm decrease in flood elevations at the face of the bridge. • Insignificant change in flow velocity <u>For Huttonville Creek Crossing:</u> • Two-span for a total of 69 m. • Pier and abutments are on the floodplain • 3740 mm decrease in flood elevations compared to the existing Mississauga crossing culvert. • Considerable increase in flow velocity • Alignment 3A is preferred as it has no impact on flood elevations and velocity levels.	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • One span of 26 m • Abutments are on the floodplain • 160 mm increase in flood elevations at the face of the bridge • Insignificant increase in flow velocity <u>For Huttonville Creek Crossing:</u> • Two-span for a total of 69 m. • Pier and abutments are on the floodplain • 850 mm decrease in flood elevations compared to the existing Mississauga crossing culvert. • Considerable increase in flow velocity • Alignment 3B is not preferred as it has noticeable impact on flood elevations and velocity levels.	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • Three spans for a total of 78 m • Piers are on the floodplain • 20 mm increase in flood elevations • Insignificant increase in flow velocity <u>For Huttonville Creek Crossing:</u> • Three spans for a total of 101 m • Piers are slightly on the floodplain • No negative impact on flood elevations • No negative impact on flow velocity • Option 4A is preferred as it has less impact on floodplain and velocity levels.	• Crossing Huttonville Creek and East Huttonville Creek at two (2) new locations. <u>For East Huttonville Creek crossing:</u> • One span of 25 m • Abutments are on the floodplain • 340 mm increase in flood elevations • Insignificant increase in flow velocity <u>For Huttonville Creek Crossing:</u> • One span of 38 m • Abutments are on the floodplain • 250 mm increase in flood elevations • Insignificant increase in flow velocity • Option 4B is not preferred as it has considerable impact on floodplain and velocity levels.	• No additional water crossings are needed under this alignment and hence, will not increase potential for flood elevations • Low potential to impact flooding and erosion due to the slight increase in the paved surface area
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Erosion Hazards	• RGA assessment suggests both reaches are in transition while the RSAT ranks the channels as Poor, which indicates the stability of the reach is low but not extreme. • Alternative 1 received the second highest from a fluvial geomorphic perspective.	• RGA assessment suggests both reaches are in transition while the RSAT ranks the channels as Poor, which indicates the stability of the reach is low but not extreme. • Alternative 1 received the second highest from a fluvial geomorphic perspective.	• Reach 3 is the most stable of the Study Area reaches according to the RSAT and RGA scores and in addition the crossing intersects perpendicularly with the channel. • Alternative 2 ranks the highest from a fluvial geomorphic perspective.	• The RGA for Reach 2 and Reach 3 are transitional while the RSAT results for these reaches are Poor, which indicates the stability of the reach is low, but again not extreme. • Alternative 3 is the least favourable from a fluvial geomorphic perspective.	• The RGA for Reach 2 and Reach 3 are transitional while the RSAT results for these reaches are Poor, which indicates the stability of the reach is low, but again not extreme. • Alternative 3 is the least favourable from a fluvial geomorphic perspective.	• The RGA and RSAT results for Reach 2 are noted in Alternative 1 and 3 while the results for Reach 4 show a stable channel for the RGA and a Fair ranking for the RSAT. • Alternative 4 ranks the second highest along with Alternative 1 from a fluvial geomorphic perspective.	• The RGA and RSAT results for Reach 2 are noted in Alternative 1 and 3 while the results for Reach 4 show a stable channel for the RGA and a Fair ranking for the RSAT. • Alternative 4 ranks the second highest along with Alternative 1 from a fluvial geomorphic perspective.	• No impacts anticipated.
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LEGEND	○	◔	◐	◔	●
	Least Preferred			**Most Preferred**	

CULTURAL (Refer to footnote 'b')								
Archaeological Resources • Potential to impact archaeological resources (previously undisturbed areas with high potential for recovery of artifacts)	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery	• Moderate potential for impacts to known archeological resources. • Impact can be mitigated through artifact documentation and recovery
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Built Heritage Resources • Potential to impact known built heritage resources (i.e. Listed/ Designated under Part IV or V of the Ontario Heritage Act and/or identified as 'culturally significant' by the Municipality)	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features	• Moderate potential for impacts to known heritage and cultural landscape features
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LEGEND	○	◔	◐	◕	●
	Least Preferred			**Most Preferred**	

SOCIO-ECONOMIC ENVIRONMENT (Refer to footnote 'b')								
Sustainability and City/ Regional Planning • Consistency with local and regional planning (i.e. Heritage Heights Secondary Plan, Mount Pleasant Secondary Plan, Mississauga Road EA) • Consistency with development objectives and economic growth • Potential to support development consistent with the City of Brampton 2040 Vision.	• Very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Most consistent with local and regional development plans • Supports growth and intended function in study area (North West Brampton is rapidly growing community. City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031 and 2041) • East-west road crossing will provide for better land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing/ road will provide direct connection from community to Mount Pleasant GO and regional centre • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Most consistent with local and regional development plans • Supports growth and intended function in study area (North West Brampton is rapidly growing community. City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031 and 2041) • East-west road crossing will provide for better land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing/ road will provide direct connection from community to Mount Pleasant GO and regional centre • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Not consistent with local and regional development plans • Not entirely supports growth and intended function in study area (North West Brampton is rapidly growing community. • East-west road crossing at this location will provide moderate land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing/ road at this location will provide direct connection from community to Mount Pleasant GO and regional retail centre • Not entirely support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Most consistent with local and regional development plans • Supports growth and intended function in study area (North West Brampton is rapidly growing community. City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031 and 2041) • East-west road crossing will provide for better land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing/ road will provide direct connection from community to Mount Pleasant GO and regional centre • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Very high opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Most consistent with local and regional development plans • Supports growth and intended function in study area (North West Brampton is rapidly growing community. City of Brampton population and employment will increase by 43% and 73% respectively between 2021, 2031 and 2041) • East-west road crossing will provide for better land development capacity in the study area • Create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • Full east west crossing/ road will provide direct connection from community to Mount Pleasant GO and regional centre • Support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Very low opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Not consistent with local and regional development plans • Not entirely supports growth and intended function in study area (North West Brampton is rapidly growing community. • East-west road without crossing Mississauga Road will provide moderate land development capacity in the study area • Will not create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • East west road at this location will not provide direct connection from community to Mount Pleasant GO and regional retail centre • Not entirely support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Very low opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Not consistent with local and regional development plans • Not entirely supports growth and intended function in study area (North West Brampton is rapidly growing community. • East-west road without crossing Mississauga Road will provide moderate land development capacity in the study area • Will not create Value around Mount Pleasant GO commuter train station, which acts as a MOBILITY HUB connecting inter-regional GO service (rail and bus- connecting Toronto with Georgetown, Guelph and Kitchener) with Brampton local transit • East west road at this location will not provide direct connection from community to Mount Pleasant GO and regional retail centre • Not entirely support the City's endorsed Community Design Principles that include Transit Oriented Development in an Urban Core around Mount Pleasant GO Station.	• Not consistent with City planning • Moderately supports growth and intended function in study area • Limited opportunities to fulfill objectives for development and economic growth in the study area and North West Brampton • Only west road extension will provide limited land development capacity
	●	●	◐	●	●	○	○	◔
Compatibility with Existing and Proposed Developments • Potential to support development of lands served by Mississauga Road, Bovaird Drive, Heritage Road, and mid-block connection between Mount Pleasant GO	• High potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development	• High potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development	• Limited potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development	• High potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development	• High potential to support existing and future City and Regional development plans for North Brampton • Provides additional capacity and accommodates infrastructure improvements required for development	• Very low potential to support existing and future City and Regional development plans for North Brampton • Provides some capacity and accommodates infrastructure improvements required for development	• Very low potential to support existing and future City and Regional development plans for North Brampton • Provides some capacity and accommodates infrastructure improvements required for development	• Moderate potential to support existing and future development in the study area • Provides some additional capacity and accommodates infrastructure improvements required for development

Station and developments west of Mississauga Road	• Infrastructure improvements will support development • Ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• Infrastructure improvements will support development • Ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• Infrastructure improvements will support development • Limited ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• Infrastructure improvements will support development • Ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• Infrastructure improvements will support development • Ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• It will not support developments in the area • Very low ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• It will not support developments in the area • Very low ability to maintain and/or maximize opportunities for improved access into adjacent residential and commercial properties	• Infrastructure improvements will partially support development in the area
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Potential sustainability improvements to the community, including greenhouse gas emission • Improve local sustainability by providing alternative transportation modes in order to reduce auto dependency	• High potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• High potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• Limited potential to improve local sustainability as the extension east-west road crossing at this location at Mississauga Road will allow for better multi-modal travel (i.e. car, bus, cycling, pedestrian)	• High potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• High potential to improve local sustainability as the extension east-west road crossing Mississauga Road will allow for the efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• Very low potential to improve local sustainability as the extension east-west road will not cross Mississauga Road, which will not fully allow for efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• Very low potential to improve local sustainability as the extension east-west road will not cross Mississauga Road, which will not fully allow for efficient multi-modal travel (i.e. car, bus, cycling, pedestrian)	• Moderate potential to improve local sustainability as the extension west of Mississauga Road will provide limited opportunity for multi-modal travel (i.e. car, bus, cycling, pedestrian)
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Noise Impacts • Potential to increase noise on the east side of Mississauga Road between Bovaird Drive and CN Rail Track.	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels, but the new mid-block would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels • New roadway at this location is not close to the noise sensitive areas – improvements will be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Improved traffic flow may decrease noise levels • New roadway at this location is not close to the noise sensitive areas – improvements will be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy	• Limited improvements to the traffic flow may slightly decrease noise levels but the new roadway would put the roadway closer to the noise sensitive areas – improvements may be minimal • Noise mitigation measures can be implemented in accordance with City's Noise Policy
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Property Impacts • Potential impacts to property	• High potential for impacts on private properties to accommodate the new east-west connection • Very high potential to affect accessing adjacent properties during construction • Very high potential for requiring private property	• High potential for impacts on private properties to accommodate the new east-west connection • Very high potential to affect accessing adjacent properties during construction • Very high potential for requiring private property	• High potential for impacts on private properties to accommodate the new east-west connection • Require realigning the roadway to the south in the proximity of the cul-de-sac east of Mississauga Road, cutting into Mattamy's property. • Very high potential to affect accessing adjacent properties during construction	• High potential for impacts on private properties to accommodate the new east-west connection • Will impact a single-unit residential dwelling on the east side of Mississauga Road between Bovaird Drive and CN Rail Track.	• High potential for impacts on private properties to accommodate the new east-west connection • Will impact a single-unit residential dwelling on the east side of Mississauga Road between Bovaird Drive and CN Rail Track.	• Moderate potential for impacts on private properties to accommodate the new east-west connection • High potential to affect accessing adjacent properties during construction • Very high potential for requiring private property	• Moderate potential for impacts on private properties to accommodate the new east-west connection • High potential to affect accessing adjacent properties during construction • Very high potential for requiring private property	• Moderately high potential to impact property due to additional property required for new roadway • High potential to affect accessing adjacent properties during construction • High potential for requiring private property
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LEGEND	○	◔	◐	◕	●
	Least Preferred			**Most Preferred**	

NATURAL ENVIRONMENT (Refer to footnote 'a')								
Vegetation and Wildlife • Potential impact to natural areas and habitats • Potential impact to Provincially Significant Wetland (PSW) Complex within the Study Area	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley. • Potential indirect impacts to the PSW and woodlot on the western portion of the study area. Potential direct impacts along the corridors flanking the branches of Huttonville Creek.	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley. • Potential indirect impacts to the PSW and woodlot on the western portion of the study area. Potential direct impacts along the corridors flanking the branches of Huttonville Creek.	• Moderate impact to natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley. • Potential indirect impacts to the PSW and woodlot on the western portion of the study area. Potential direct impacts along the corridors flanking the branches of Huttonville Creek.	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley. • Potential indirect impacts to the PSW and woodlot on the western portion of the study area. Potential direct impacts along with the corridors flanking the branches of Huttonville Creek.	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley. • Potential indirect impacts to the PSW and woodlot on the western portion of the study area. Potential direct impacts along the corridors flanking the branches of Huttonville Creek.	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley.	• High potential to impact natural areas or habitats at the Huttonville Creek due to the new roadway and need for structures improvements and crossing meander belt • Partial wooded corridors surrounding the branches of Huttonville Creek may act as animal movement corridors and could be impacted by the additional of the new roadway. • Potential to impact future enhancements and improvements to the vegetation biodiversity in the Huttonville Creek valley due to the new roadway and structures to cross the valley.	• Potential indirect impacts to the PSW and woodlot on the western portion of the study area.
	◔	◔	◑	◔	◔	◔	◔	◕
Potential to impact plant and/or animal Species at Risk (SAR)	• Permanent disturbance of Redside Dace habitat at East Crossing Option A ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 28.3 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat • 100-year water level 239.28m • Regional water level 239.59m • Approximate bridge soffit elevation: ○ east end 242.07m ○ west end 240.424m • Limited vertical clearance, creating excessive shaded area. Vegetation will not	• Permanent disturbance of Redside Dace habitat at East Crossing Option B ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 343 m^2; impacts by roadway 3,022 m^2 (including 2:1 slope impacts near proposed structure abutments) • Abutments on Redside Dace 30m regulated habitat • Fills in Redside Dace 30m regulated habitat for roadway • 100-year water level 238.08m • Regional water level 238.45m • Approximate bridge soffit elevation: ○ east end 241.459m ○ west end 240.870m	• Permanent disturbance of Redside Dace habitat at Mississauga Road Huttonville Creek Crossing ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt 9.4 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat east end and within meander belt at west end • 100-year water level 236.67m • Regional water level 237.08m • Approximate bridge soffit elevation: ○ east end 238.022m ○ west end 237.862m • Although a relatively shallow superstructure is	• Permanent disturbance of Redside Dace habitat at East Crossing Option A ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 18.8 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat • 100-year water level 239.09m • Regional water level 239.29m • Approximate bridge soffit elevation: ○ east end 241.083m ○ west end 240.415m • Limited vertical clearance, creating excessive shaded area. Vegetation will not	• Permanent disturbance of Redside Dace habitat at East Crossing Option B ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 252 m^2; impacts by roadway 2,116 m^2 ➢ (including 2:1 slope impacts near proposed structure abutments) • Abutments on Redside Dace 30m regulated habitat • Fills in Redside Dace 30m regulated habitat for roadway • 100-year water level 239.21m • Regional water level 239.51m • Approximate bridge soffit elevation: ○ east end 240.835m ○ west end 240.583m	• Permanent disturbance of Redside Dace habitat at East Crossing Option A ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 18.8 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat • 100-year water level 238.50m • Regional water level 238.75m • Approximate bridge soffit elevation: ○ east end 241.438m ○ west end 240.140m • Limited vertical clearance, creating excessive shaded area. Vegetation will not	• Permanent disturbance of Redside Dace habitat at East Crossing Option B ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 256 m^2; impacts by roadway 1,985 m^2 ➢ (including 2:1 slope impacts near proposed structure abutments) • Abutments on Redside Dace 30m regulated habitat • Fills in Redside Dace 30m regulated habitat for roadway • 100-year water level 238.73m • Regional water level 239.11m • Approximate bridge soffit elevation: ○ east end 240.950m ○ west end 240.487m	• Since this alignment concept will not cross Mississauga Road, there is minimal to no potential impacts to Redside Dace habitat

	sustain under the structure. • Permanent disturbance of Redside Dace habitat at Mississauga Road Huttonville Creek Crossing ➢ In-water 0 m^2 ➢ Meander belt 49.5 m^2 (west abutment beside Mississauga Road) ➢ 30 m regulated habitat from meander belt 5.7 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat east end and within meander belt at west end • 100-year water level 238.13m • Regional water level 238.39m • Approximate bridge soffit elevation: ○ east end 240.538m ○ west end 240.789m • Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure.	• Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure. • Permanent disturbance of Redside Dace habitat at Mississauga Road Huttonville Creek Crossing ➢ In-water 0 m^2 ➢ Meanderbelt 49.5 m^2 (west abutment beside Mississauga Road) ➢ 30 m regulated habitat from meander belt 5.7 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat east end and within meander belt at west end • 100-year water level 238.13m • Regional water level 238.39m • Approximate bridge soffit elevation: ○ east end 240.538m ○ west end 240.789m • Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure.	proposed, the profile of the crossing road forces a low vertical clearance from the creek bed.	sustain under the structure. • Permanent disturbance of Redside Dace habitat at Mississauga Road Crossing ➢ In-water 168 m^2 ➢ Meander belt 454 m^2 ➢ 30 m regulated habitat from meander belt – impacts by road 1,758 m^2 • Require realigning Huttonville Creek to run between 2nd and 3rd pier columns (staging for the realignment will have to be decided) • High risk of erosion with realigned creek flows in between bridge piers at Mississauga Road	• Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure. • Permanent disturbance of Redside Dace habitat at Mississauga Road Crossing ➢ In-water 168 m^2 ➢ Meander belt 454 m^2 ➢ 30 m regulated habitat from meander belt – impacts by road 1,758 m^2 • Require realigning Huttonville Creek to run between 2nd and 3rd pier columns (staging for the realignment will have to be decided) • High risk of erosion with realigned creek flows in between bridge piers at Mississauga Road	sustain under the structure. • Permanent disturbance of Redside Dace habitat at West Crossing Option A ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 18.8 m^2 (impact of piers) • Piers within the Redside Dace regulated habitat • Abutments outside of 30m Redside Dace regulated habitat • 100-year water level 242.21m • Regional water level 242.44m • Approximate bridge soffit elevation: ○ east end 243.943m ○ west end 243.537m • Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure. • Permanent disturbance of Redside Dace habitat West Crossing Option B ➢ In-water 0 m^2 ➢ Meander belt 128 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 110 m^2; impacts by roadway 2,619 m^2	• Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure. • Permanent disturbance of Redside Dace habitat at West Crossing Option B ➢ In-water 0 m^2 ➢ Meander belt 0 m^2 ➢ 30 m regulated habitat from meander belt – impacts by bridge 110 m^2; impacts by roadway 2,619 m^2 ➢ (including 2:1 slope impacts near proposed structure abutments) • Abutments on Redside Dace 30m regulated habitat • Fills in Redside Dace 30m regulated habitat for roadway • 100-year water level 242.26m • Regional water level 242.47m • Approximate bridge soffit elevation: ○ east end 243.830m ○ west end 243.640m • Limited vertical clearance, creating excessive shaded area. Vegetation will not sustain under the structure.	
	◐	◔	◕	○	◔	◐	◔	●
Provincial Best Management Practices for Redside Dace: Planning of Crossings 1. Stream crossings should be minimized and generally limited to one per km of stream; 2. New stream crossings should avoid reached known to be occupied by Redside Dace;	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP partially met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP partially met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP met. BMP met. Alignment of alternative is	1. BMP not met. Existing crossings at Mississauga Road, Bovaird Drive West, CNR track are all within 1 km. 2. BMP not met. Reported to be occupied by MNRF. 3. BMP met. Alignment of alternative is as perpendicular as possible to watercourse 4. BMP partially met. t. Alignment of alternative is	1. BMP met. No new crossings planned. 2. BMP met. Redside Dace habitat avoided. 3. BMP met. No new crossing planned. 4. BMP met. No new crossings planned. 5. BMP met. No new crossings planned.

3. New stream crossings should be chosen to minimize the width of the crossings; 4. New stream crossings should cross over straight sections of the stream where there is less likelihood of bank erosion; 5. Crossings should be done in areas that have already been disturbed	as perpendicular as possible.to watercourse. 5. BMP partially met. Reach adjacent to Mississauga Road has been disturbed.	as perpendicular as possible.to watercourse. 5. BMP partially met. Reach adjacent to Mississauga Road has been disturbed.	as perpendicular as possible.to watercourse. 5. BMP partially met. Reach adjacent to Mississauga Road has been disturbed.	as perpendicular as possible.to watercourse. 5. BMP partially met. Reach adjacent to Mississauga Road has been disturbed. Utilizes a modified bridge structure from proposed new Huttonville Bridge from Mississauga Road Class EA	as perpendicular as possible.to watercourse. 5. BMP partially met. Reach adjacent to Mississauga Road has been disturbed. Utilizes a modified bridge structure from proposed new Huttonville Bridge from Mississauga Road Class EA	as perpendicular as possible.to watercourse. 5. BMP partially met. Crossing near CNR is already disturbed.	as perpendicular as possible.to watercourse. • BMP partially met. Crossing near CNR is already disturbed.	
	◔	◔	◔	◔	◔	◔	◔	◕
Provincial Best Management Practices for Redside Dace: Construction and Design. 1. For new crossings in confined valleys, stream crossing should be bridge that spans the valley with piers placed outside the meander belt. 2. For new crossings in unconfined valleys, stream crossings should be open bottom culverts designed to span the meander belt of the stream. 3. For the extension of existing structures, the footprint of the structure should be minimized by using retaining walls where feasible to minimize disruption of riparian habitat. 4. Closed bottom culverts to be installed so that the invert is embedded a minimum of 20% of the culvert diameter below the stream bed to facilitate fish passage by ensuring culvert is not perched. 5. Slopes of culverts should mimic the natural stream bed.	1. Option A East Crossing: Piers for span bridge are outside of the meander belt. Mississauga Road crossings piers are located outside of the meander belt. BMP met. 2. BMP not applicable. 3. Sheet pilings needed to connect E-W connector to Mississauga Road. BMP met. 4. BMP not applicable. 5. BMP not applicable.	1. Option B East Crossing: Abutments for bridge are located within the meander belt. Mississauga Road crossings piers are located outside of the meander belt. BMP partially met. 2. BMP not applicable. 3. Sheet pilings needed to connect E-W connector to Mississauga Road. BMP met. 4. BMP not applicable. 5. BMP not applicable	1. Option A East Crossing: Piers for span bridge are outside of the meander belt. Mississauga Road crossings piers are in the channel of the meander belt. BMP partially met. 2. BMP not applicable. 3. Footprint minimized to the extent possible of the proposed creek crossing from the Mississauga Road EA. BMP met by using RSS wall on East side of Mississauga road. 4. BMP not applicable. 5. BMP not applicable.	1. Option A East Crossing: Piers for span bridge are outside of the meander belt. Mississauga Road crossings piers are in the channel of the meander belt. BMP partially met. 2. BMP not applicable. 3. Footprint minimized to the extent possible of the proposed creek crossing from the Mississauga Road EA. BMP met by using RSS wall on East side of Mississauga road. 4. BMP not applicable. 5. BMP not applicable.	1. Option B East Crossing: Abutments inside the meander belt. Mississauga Road crossings piers are located in the channel of the meander belt. BMP not met. 2. BMP not applicable. 3. Footprint minimized to the extent possible of the proposed creek crossing from the Mississauga Road EA. BMP met by using RSS wall on East side of Mississauga road. 4. BMP not applicable. 5. BMP not applicable.	1. Option A East Crossing: Piers for span bridge are outside of the meander belt. West Crossing: 5 of 6 piers are located within the meander belt. BMP Partially met. 2. BMP not applicable. 3. BMP not applicable. 4. BMP not applicable. 5. BMP not applicable.	1. Option B East Crossing: Abutments are located in the meander belt. West crossing. Meander belt impacts from bridge and road. BMP Not met. 2. BMP not applicable. 3. BMP not applicable. 4. BMP not applicable. 5. BMP not applicable.	1. BMP not applicable. 2. BMP not applicable. 3. BMP not applicable. 4. BMP not applicable. 5. BMP not applicable.
	◐	◐	◐	◐	◐	◐	◐	◕

LEGEND	○	◔	◑	◕	●
	Least Preferred			Most Preferred	

COST / IMPLEMENTATION								
Costs • Relative cost in terms of capital costs, property costs and maintenance costs	• Efficient operating cost for transit • Higher capital costs to road construction and maintenance • Capital costs will be further defined as the study moves forward. Due to the two water crossings required (108m 4-span bridge at East Huttonville Creek crossing and 51m 2-span bridge at Huttonville Creek crossing just east of Mississauga Road), will most likely result in relatively higher costs. • Increased opportunities to fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road will: ➢ reduce overall travel time for all modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Efficient operating cost for transit • Higher capital costs to road construction and maintenance • Capital costs will be further defined as the study moves forward. Due to the two water crossings required (35m 1-span bridge at East Huttonville Creek crossing and 51m 2-span bridge at Huttonville Creek crossing just east of Mississauga Road), will likely result in moderately high costs. • Increased opportunities to fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road will: ➢ reduce overall travel time for all modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Efficient operating cost for transit • Higher capital costs to road construction and maintenance • Capital costs will be further defined as the study moves forward. Due to the anticipated water crossings required (63m 2-span bridge at Huttonville Creek crossing just east of Mississauga Road), will most likely result in high costs. • Moderate opportunities to fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road at this location will: ➢ reduce overall travel time for some modes of transportation ➢ slightly reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Efficient operating cost for transit • Higher capital costs to road construction and maintenance • High maintenance cost for bridge at Mississauga Road intersection • Capital costs will be further defined as the study moves forward. Due to the anticipated water crossings required (78m 3-span bridge at East Huttonville Creek crossing), will most likely result in fairly high costs. • Increased opportunities to fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road will: ➢ reduce overall travel time for all modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Efficient operating cost for transit • Higher capital costs to road construction and maintenance • High maintenance cost for bridge at Mississauga Road intersection • Capital costs will be further defined as the study moves forward. Due to the anticipated water crossings required (26m 1-span bridge at East Huttonville Creek crossing), will most likely result in fairly high costs. • Increased opportunities to fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road will: ➢ reduce overall travel time for all modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Higher capital costs to road construction and maintenance • Capital costs will be further defined as the study moves forward. Due to the anticipated water crossings required (78m 3-span bridge at East Huttonville Creek crossing and 101m 3-span bridge at West Huttonville Creek crossing), will most likely result in high costs. • Will not fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road as per this alignment will: ➢ moderately reduce overall travel time for some modes of transportation ➢ moderately reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Higher capital costs to road construction and maintenance • Capital costs will be further defined as the study moves forward. Due to the anticipated water crossings required (25m 1-span bridge at East Huttonville Creek crossing and 38m 1-span bridge at West Huttonville Creek crossing), will most likely result in high costs. • Will not fulfill objectives for development and economic growth due to grid-like network (proposed as part of Heritage Heights TMP) with better direct link to Mount Pleasant GO Station • East-west road as per this alignment will: ➢ moderately reduce overall travel time for some modes of transportation ➢ moderately reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy	• Moderate to high operating costs • Limited opportunities to fulfill objectives for development and economic growth due to grid-like network (not in conformances with Heritage Heights TMP and latest Brampton TMP) with no direct east-west direct link to Mount Pleasant GO Station • East-west road as per this alignment will: ➢ moderately reduce overall travel time for some modes of transportation ➢ reduce congestion and greenhouse gas emission impacts and mitigation costs • ultimately reduce overall cost and negative impact to the economy
	◔	◕	◐	○	◔	◔	◕	●

LEGEND	○	◔	◐	◕	●
	Least Preferred			Most Preferred	

Evaluation Criteria and Sub-Factors	DESIGN ALTERNATIVE 1A	DESIGN ALTERNATIVE 1B	DESIGN ALTERNATIVE 2	DESIGN ALTERNATIVE 3A	DESIGN ALTERNATIVE 3B	DESIGN ALTERNATIVE 4A	DESIGN ALTERNATIVE 4B	DESIGN ALTERNATIVE 5
	Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at 419m offset from Bovaird Drive centreline. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at approximately 240m offset from Bovaird Drive centreline.**	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)**	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment past through Mississauga Road at the proposed Huttonville Creek bridge location, at an 70° angle, approximately 473m offset from Bovaird Drive centreline. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments *beyond* 30m Redside Dace regulated habitat)**	**Continuation of the Lagerfeld Drive to lands west of Mississauga Road. Alignment does not intersect with Mississauga Road but utilize proposed slip road north of Huttonville Creek crossing, just south of CN Rail. (Crossing abutments *within* 30m Redside Dace regulated habitat)**	**Not connecting Mississauga Road with Mount Pleasant GO Station. East-west connection will start at Mississauga Road, extending to the west, at 419m offset from Bovaird Drive centreline.**
OVERALL RANK (f)	●		◐	◔		○		◔
Ranking of Design Alternatives	This design alternative is not recommended for the following reasons: • Evaluation for Design Alternative 1A is similar to Alternative 1B. • The difference in proposed structures for East Huttonville Creek crossing differentiate the two options. • For design alternative 1A, abutments for East Huttonville Creek crossing are beyond the 30m Redside Dace regulated habitat. • For design alternative 1A, abutments for East Huttonville Creek crossing are beyond the 30m Redside Dace regulated habitat. • 250mm increase in flood elevations at East Huttonville Creek crossing. • 390mm increase in flood elevations at Huttonville Creek crossing, just east of Mississauga Road. • Less impact on floodplain and velocity levels. • 28.3m^2 of 30m Redside Dace habitat regulated	**<u>Recommended to carry forward</u>** This design alternative is <u>recommended</u> for the following reasons: • Met minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road. • Will not have queuing issue (southbound queues along Mississauga Road) as there is sufficient storage distance between Bovaird Drive and the new connection for left turning vehicles onto Bovaird Drive. • Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas. • Continuing Lagerfeld Drive to west of Mississauga Road which improve traffic operations in the area. • Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for	This design alternative is not recommended for the following reasons: • do not meet the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for crossing at Mississauga Road • Will have queuing issue for southbound left turning vehicles along Mississauga Road at Bovaird Drive with reduced intersections distance between Bovaird Drive and the east-west connection. • Not consistent with the planned function of the corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs. • Will not fully addresses anticipated capacity deficiencies. • Splitting regional retail centre property into two halves, affecting the original development concepts.	This design alternative is not recommended for the following reasons: • Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek crossing and realign creek without interrupting existing traffic operations. • High maintenance cost for bridge at Mississauga Road intersection • Major changes to the Huttonville Creek crossing bridge at Mississauga Road intersection are proposed in design alternative 3. As the project for Mississauga Road roadway improvements is already at the later stage of detailed design, Peel Region does not desire any alterations to the Huttonville Creek crossing bridge proposed at EA as it will delay the progress.	This design alternative is not recommended for the following reasons: • Technically challenging to remove existing culvert at Mississauga Road Huttonville Creek crossing and realign creek without interrupting existing traffic operations. • High maintenance cost for bridge at Mississauga Road intersection • Major changes to the Huttonville Creek crossing bridge at Mississauga Road intersection are proposed in design alternative 3. As the project for Mississauga Road roadway improvements is already at the later stage of detailed design, Peel Region does not desire any alterations to the Huttonville Creek crossing bridge proposed at EA as it will delay the progress. • With proposed crossing structures, major increase in flood elevations expected. • Abutments of the crossing structures are on the floodplain.	This design alternative is not recommended for the following reasons: • This design alternative will not address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a reasonable spaced direct E-W link to the transportation hub. • Not intersecting with Mississauga Road, cannot alleviate traffic congestion at intersection of Mississauga Road and Bovaird Drive. • May be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor. • Do not passed through the major developments, reduced the function of the east-west connection. • Does not support the City's endorsed Community Design Principles that include Transit Oriented	This design alternative is not recommended for the following reasons: • This design alternative will not address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a reasonable spaced direct E-W link to the transportation hub. • Not intersecting with Mississauga Road, cannot alleviate traffic congestion at intersection of Mississauga Road and Bovaird Drive. • May be problematic given its proximity to the rail corridor and conflict with the proposed new layover facility at Heritage Road on the south side of the corridor. • Do not passed through the major developments, reduced the function of the east-west connection. • Does not support the City's endorsed Community Design Principles that include Transit Oriented	This design alternative is not recommended for the following reasons: • This design alternative will not address the Problem/Opportunity statement and provide a wider benefit to the future developments and community by providing a direct E-W link to the transportation hub. • Although design alternative 5 may provide some relief to the east-west traffic future connections but it does not fully support the land use policies and future development plans. • With planned roadway improvements and without the full east-west connection, the roadway network in the immediate area will not be able to accommodate the east-west travel demand growth anticipated to 2031 and beyond.

	habitats impacted by the bridge piers. • This option has fewer natural impacts, but the structural capital costs are higher than design alternative 1B.	successful development of Mount Pleasant Village. • 230mm increase in flood elevations at East Huttonville Creek crossing • 310 decrease in flood elevations at Huttonville Creek crossing, just east of Mississauga Road. • This option is expected to involve much lower structural capital costs than Design Alternative 1A. • This option best addresses the problem statement.				Development in an Urban Core around Mount Pleasant GO Station. • Not consistent with the planned function of the corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs. • Zum service would not be extended further north on Mississauga Road.	Development in an Urban Core around Mount Pleasant GO Station. • Not consistent with the planned function of the corridor identified in the City's TMP, Heritage Heights TMP, and the identified east-west connection needs. • Zum service would not be extended further north on Mississauga Road. • With proposed crossing structures, major increase in flood elevations expected. • Abutments of the crossing structures are on the floodplain.	

NOTE:

a) Natural Environment: Component that evaluates the potential effects on the natural and physical aspects of the environment, including natural heritage/environmentally sensitive areas.
b) Social/Economic & Cultural Environment: Component that evaluates the potential effects on residents, neighbourhoods, businesses, community character, social cohesion and community features, in addition to municipal development objectives, the potential effects on historical/archaeological and built heritage resources.
c) Technical Considerations (Transportation and Engineering): Component that evaluates the technical suitability and other engineering aspects of the road network system.

6.2.2 PREFERRED ALTERNATIVE DESIGN CONCEPT

Based on the scoring shown in the matrix above, a sensitivity analysis was prepared (see Appendix Q) with various sensitivity weighting factors. Out of the five different scenarios, Alternative 1B ranked first in three out of five scenarios.

The preferred road alignment is Alternative 1B. Rationale for this alternative includes the following:

- Meets the minimum intersection offset from Bovaird Drive intersection as specified in City's standards (300m) for the crossing at Mississauga Road;
- Will not have queuing issue (southbound queues along Mississauga Road) as there is sufficient storage distance between Bovaird Drive and the new connection for left turning vehicles onto Bovaird Drive;
- Passing Mississauga Road at approximately the midpoint between Bovaird Drive and CN Rail, evenly splitting the areas;
- Continuing Lagerfeld Drive to west of Mississauga Road which improve traffic operations in the area;
- Connects major destinations with multi-modal access, enhancing the connectedness, and provide opportunity for successful development of Mount Pleasant Village;
- 230mm increase in flood elevations at East Huttonville Creek crossing;
- 310mm decrease in flood elevations at Huttonville Creek crossing, just east of Mississauga Road. This is based on model with existing culvert at Huttonville Creek crossing at Mississauga Road;
- This option is expected to involve much lower structural capital costs than Design Alternative 1A. Although Alternative 1 (specifically Alternative 1A) is described in the Meander Beltwidth Assessment (Appendix H) as the best alternative amongst the five alternatives proposed, based on the result of the sensitivity analysis, Alternative 1B is preferred over Alternative 1A with the best balance amongst all evaluation criteria.

This option best addresses the problem statement.

7 DESCRIPTION OF PREFERRED DESIGN

7.1 MAJOR FEATURES OF THE RECOMMENDED PLAN

The preferred alternative for Lagerfeld Drive extension is to provide a basic 4 lane urban cross-section with auxiliary lanes for turning movements at Mississauga Road. On-street bike lanes are proposed on both sides. There are two structures proposed for Huttonville Creek crossings.

The alignment of the East Crossing proposed is on a slight skew. It is a 1-span 38m precast 1.0m girder bridge with abutment centrelines outside of the meander belt. The bridge will impact 142 m^2 of the Redside Dace regulated habitat area. See Figures 7-1 and 7-2 for area impacts and preliminary general arrangement for the East Crossing.

Another crossing is proposed at Huttonville Creek just east of Mississauga Road. It will be a 2-span precast 1.0m girder bridge with a total length of 47m. It will not impact the bridge proposed at Mississauga Road under Peel Region's Mississauga Road widening project. West side of creek is already disturbed with Mississauga Road Improvements so the road impacts will not be included. There will only be piers impacting the Redside Dace regulated habitat area. See Figure 7-3 and Figure 7-4 for area impacts and preliminary general arrangement for the Mississauga Road Crossing.

7.1.1 DESIGN CRITERIA

The proposed design criteria for Lagerfeld Drive extension, based on a design speed of 60 km/h, is shown in **Table 7.1**.

Table 7-1: Design Criteria

Classification	Design Standards	Actual Proposed
General		
Road Classification	UCU 60 (Major Collector)	UCU 60 (Major Collector)
Jurisdiction	City of Brampton	City of Brampton
Posted Speed (km/h)	50	50
Design Speed (km/h)	60	60
Design Vehicle	MSU	I-Bus
Normal Crown (-0.02 m/m) R_{min} (m)	-0.02	-0.02
Curve Radius with Superelev. R_{min} for e=0.06 (m)	120	N/A
Reverse Crown (+0.02 m/m) R_{min} for e=0.06 (m)	220	225
Stopping Sight Distance (m)	85	85
Right Turn Taper	50 - 60	55
Left Turn Taper	55 - 125	55
Left & Right Turn Parallel (min)	40	40
Min. Tangent Length at Intersections (m)	50	28

Cross Section Elements			
Lane Widths (m)	Through Lane Width	3.3 - 3.7	3.5
	Left Turn Lane Width	3.0 – 3.5	3.3 - 3.5
	Right Turn Lane Width	3.0 – 3.5	3.3 - 3.5
	Curb Lane Width	3.5	3.5
	Cycling Lane Width	1.5	1.5
Kill/Splash Strip Width (m)		1.0	1.0
Boulevard Width (m)		6.0	6.0
Sidewalk Width (m)		1.5	1.5
Tangent Section Cross Fall (%)		2.0	2.0
Sidewalk Cross Fall (%)		4.0 max.	2.0
Maximum Grade		6.0%	3.0%
Minimum Grade		0.5%	0.5%
Sag Vertical Curve K_{min}		8 - 9	25
Crest Vertical Curve K_{min}		11	30
Radius of Curbs at Intersections			
Arterial to Local		15	N/A
Arterial to Collector		18	12-18
Arterial to Arterial		18	N/A
Right-of-Way (ROW) Width (m)		36	36

The City of Brampton criteria is applied in all cases. Where the City standard is not available, the TAC standard is applied.

7.1.2 HORIZONTAL ALIGNMENT

To accommodate the proposed westerly extension of Lagerfeld Drive extension, the proposed alignment has been designed to cross over Huttonville Creek at two locations and intersect Mississauga Road at south of the proposed Huttonville Creek bridge. The location of the bridge is as per Mississauga Road capital project for Mississauga Road improvements. The alignment at west of Mississauga Road will bend northerly to provide the 30m property line offset required to clear the PSW at the west side of TransCanada Pipeline. Subject to CVC approval, the standard for the required offset may be relaxed to 10m between the PSW boundary and the proposed property line. Final alignment and right-of-way for the road segment west of Mississauga Road are subject to future development planning and will be finalized through detailed design of subdivision without the need to amend the Environmental Study Report.

7.1.3 VERTICAL ALIGNMENT

The proposed vertical alignment follows the existing centerline elevation from Creditview Road to the end of the cul-de-sac west of the intersection. The vertical alignment of Lagerfeld Drive at the intersections of Mississauga Road will be further reviewed during detailed design in coordination with Peel Region to match the elevations of the widened Mississauga Road that is currently under detailed design stage. The vertical alignment was developed and will be refined in detailed design to minimize property purchase requirements.

Figure 7-1: East Crossing - Areas of Redside Dace Habitat Effects

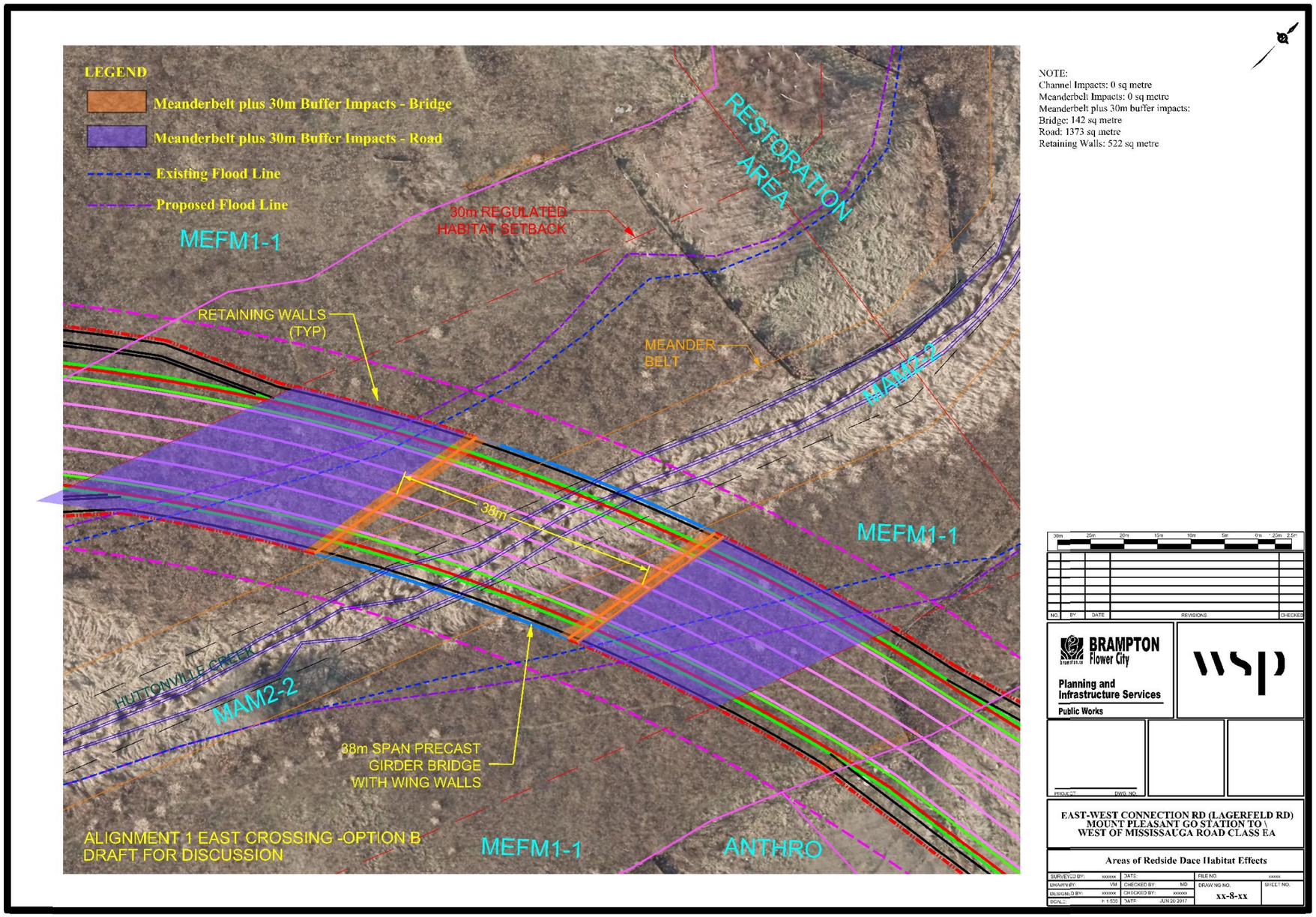


Figure 7-2: East Crossing - Bridge General Arrangements Drawing

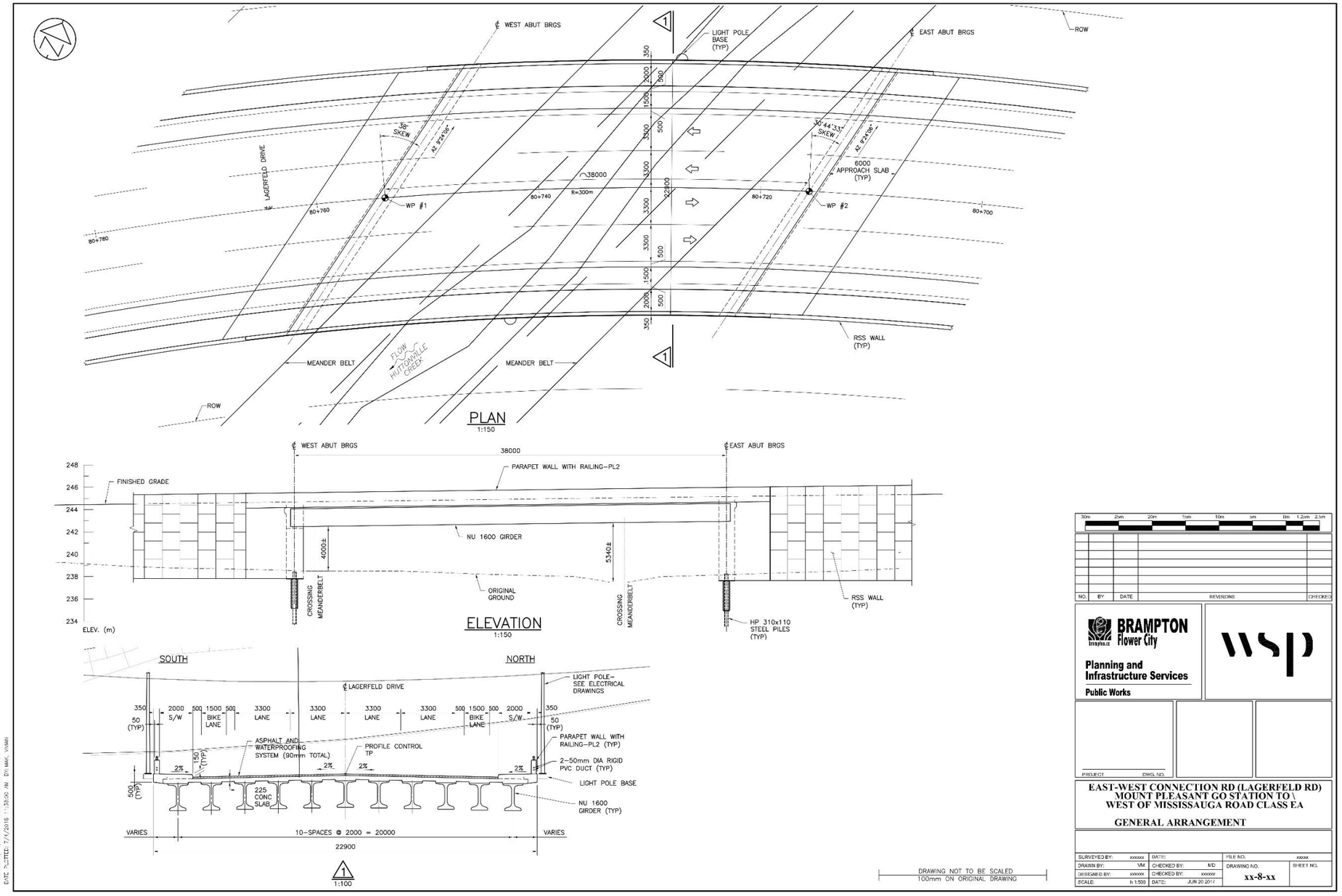


Figure 7-3: Mississauga Road Crossing - Areas of Redside Dace Habitat Effects

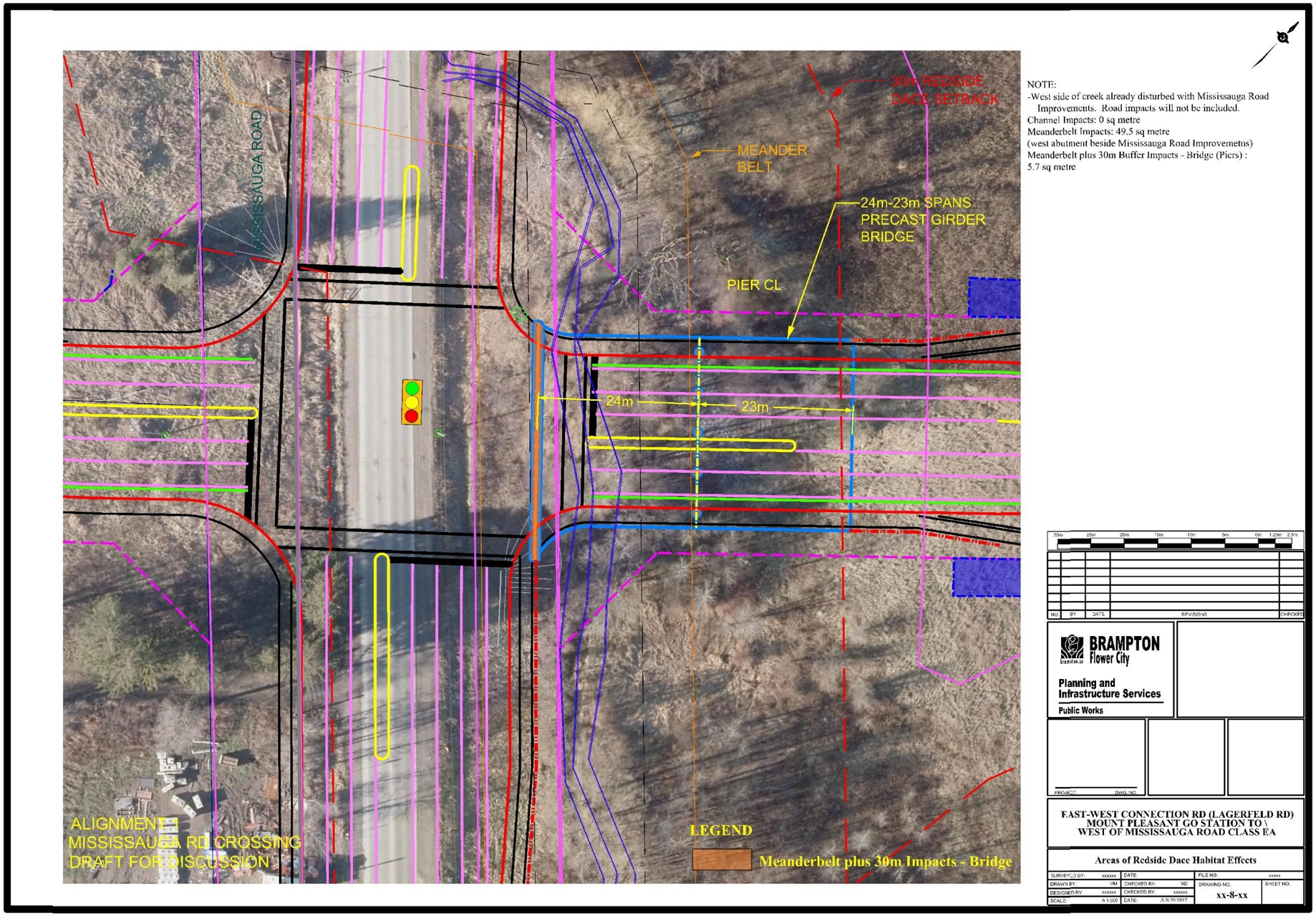
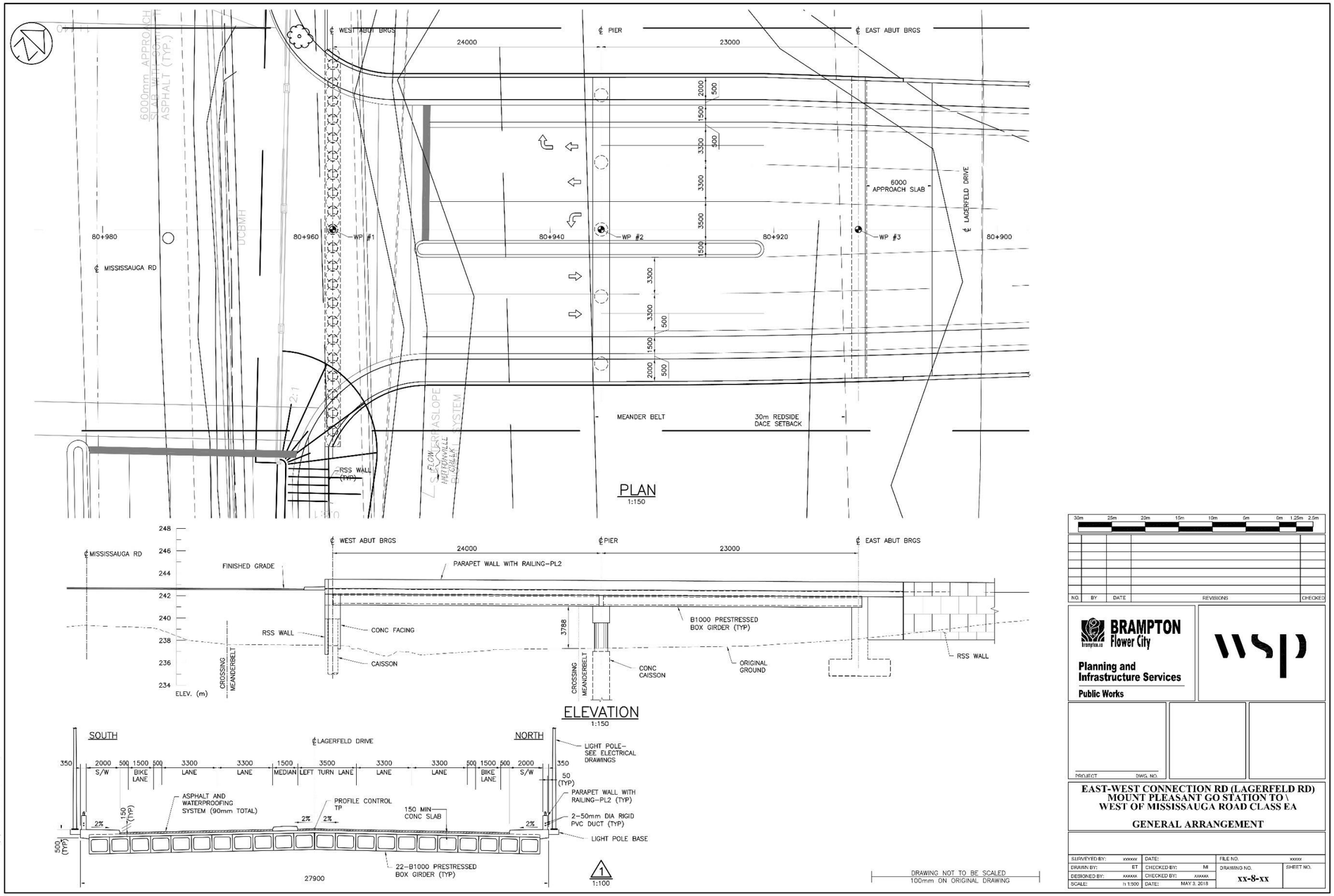


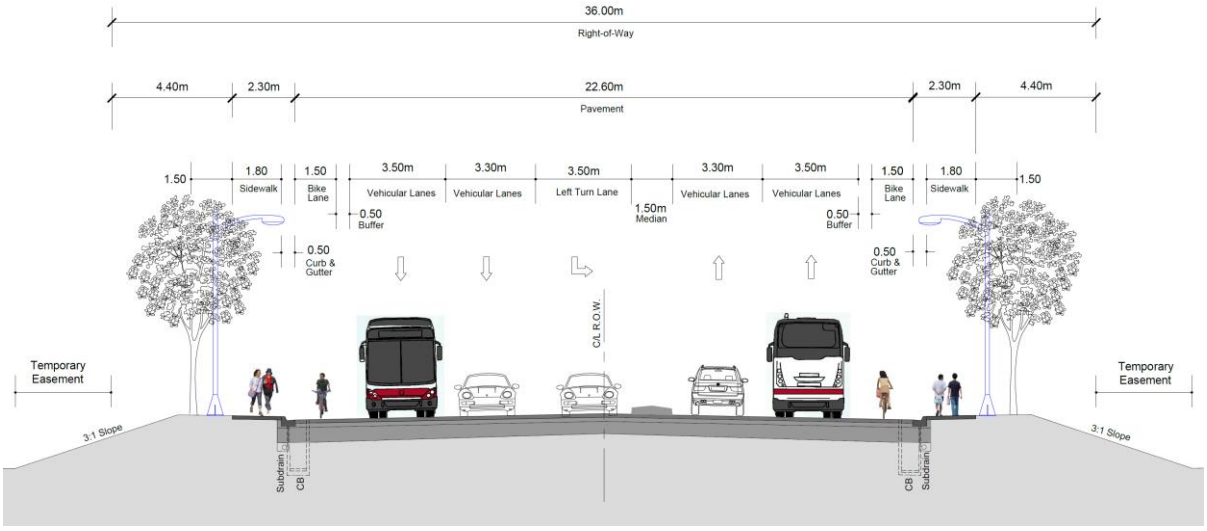
Figure 7-4: Mississauga Road Crossing - Bridge General Arrangement Drawing



7.1.4 TYPICAL CROSS SECTIONS

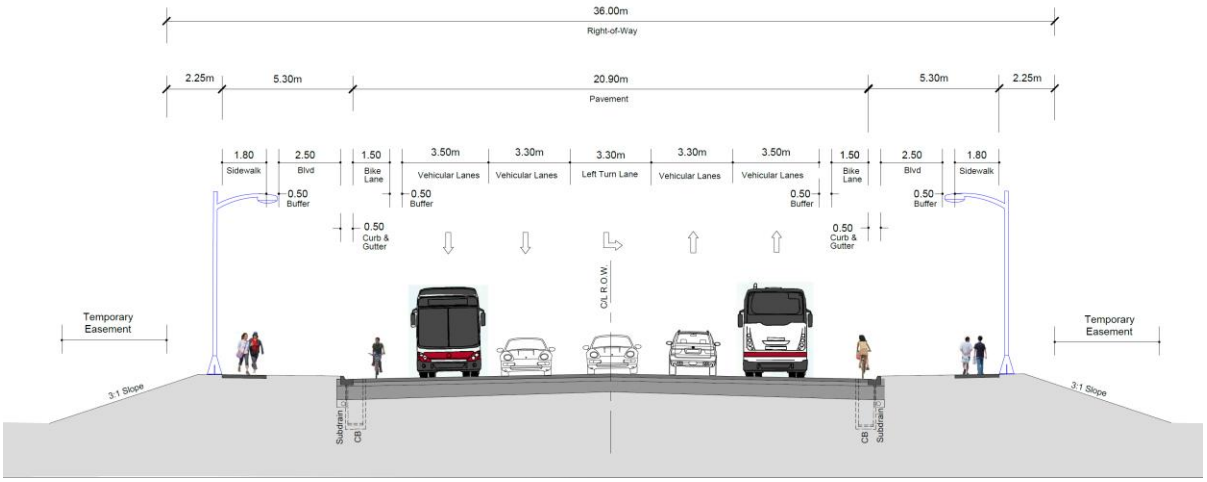
The typical cross sections proposed for Lagerfeld are illustrated in **Figures 7-5** to **Figure 7-10**. Key elements of the proposed cross section include the following:

- Concrete curb and gutter;
- 3.5m curb lanes;
- 3.3m inner lanes;
- 3.5m left turn lanes adjacent to island (at intersection);
- 1.5m raised median at signalized intersections;
- 1.5m on street bike lanes;
- 1.5m wide sidewalk;
- Illumination on both sides, behind the sidewalks;
- Bioretention set up at specified locations;
- RSS Retaining wall where the fill depth is greater than 2m.



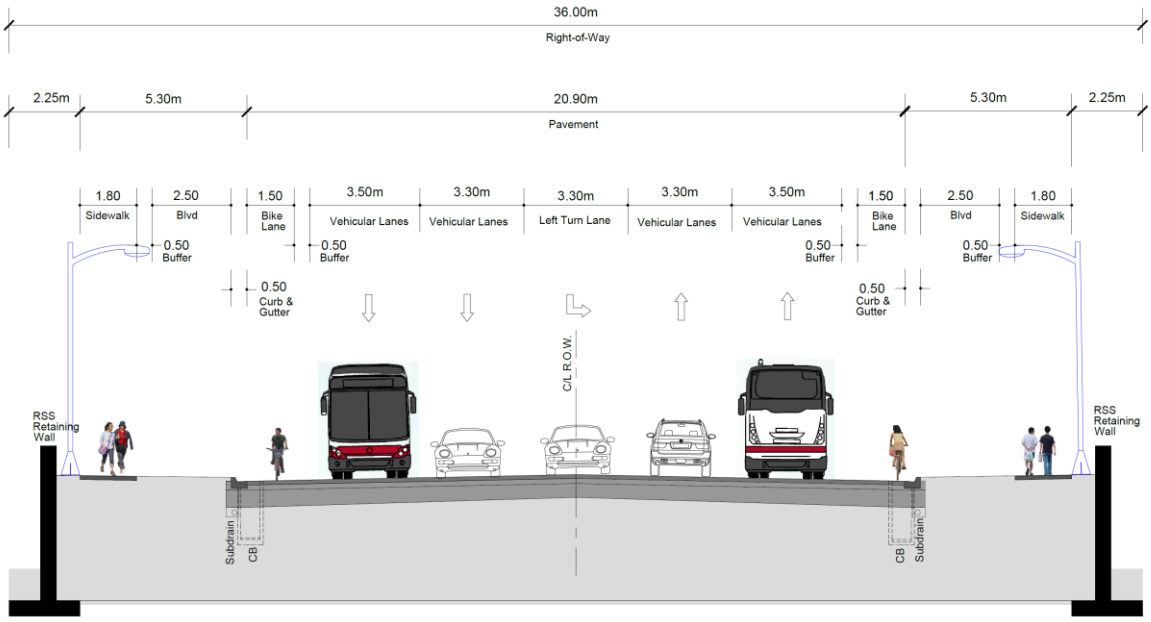
Lagerfeld Drive
Mississauga Road intersection (west side) with dedicated left turn lane

Figure 7-5: Typical Section 1



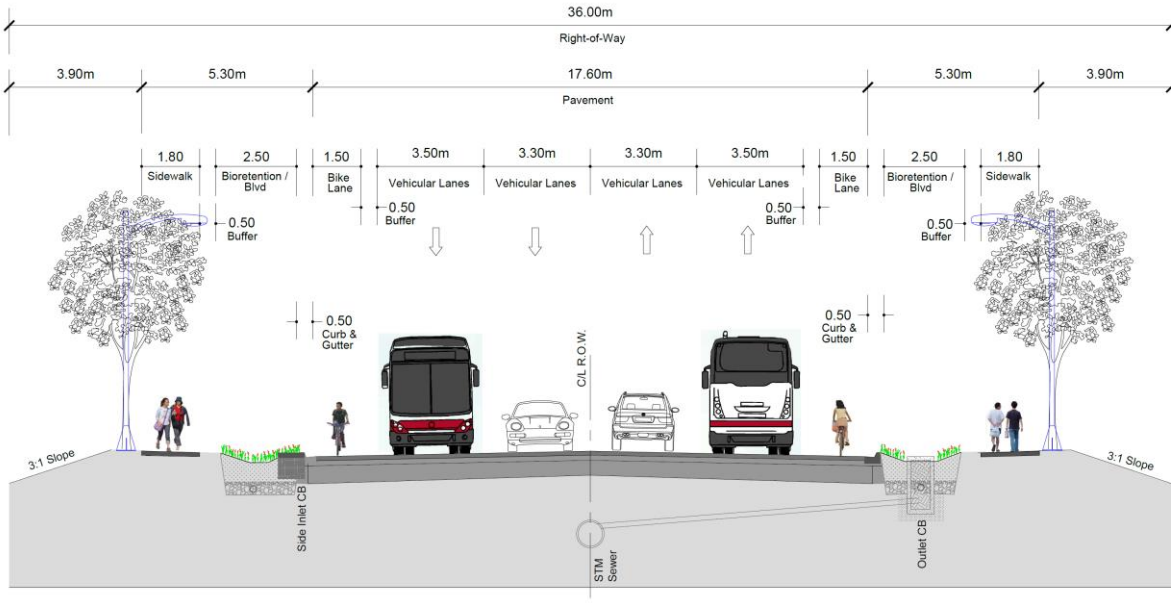
Lagerfeld Drive
Mid-Block – Station 80+830 to 80+890 (Between 2 Bridges)

Figure 7-6: Typical Section 2



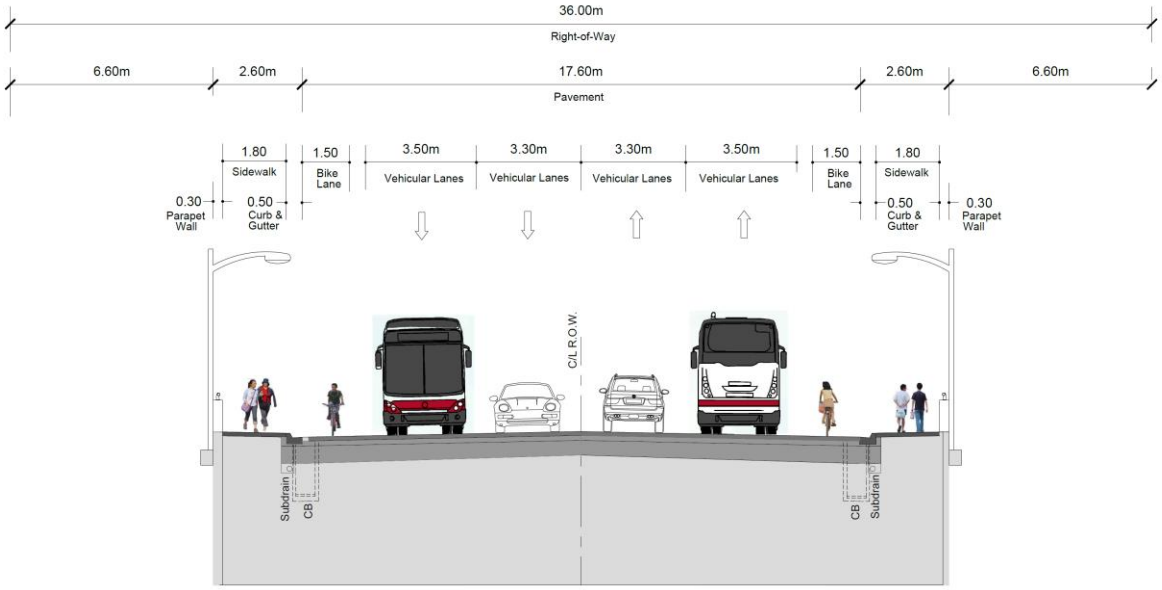
Lagerfeld Drive
Mid-Block – Station 80+755 to 80+830; 80+890 to 80+912 (with RSS Retaining Walls)

Figure 7-7: Typical Section 3



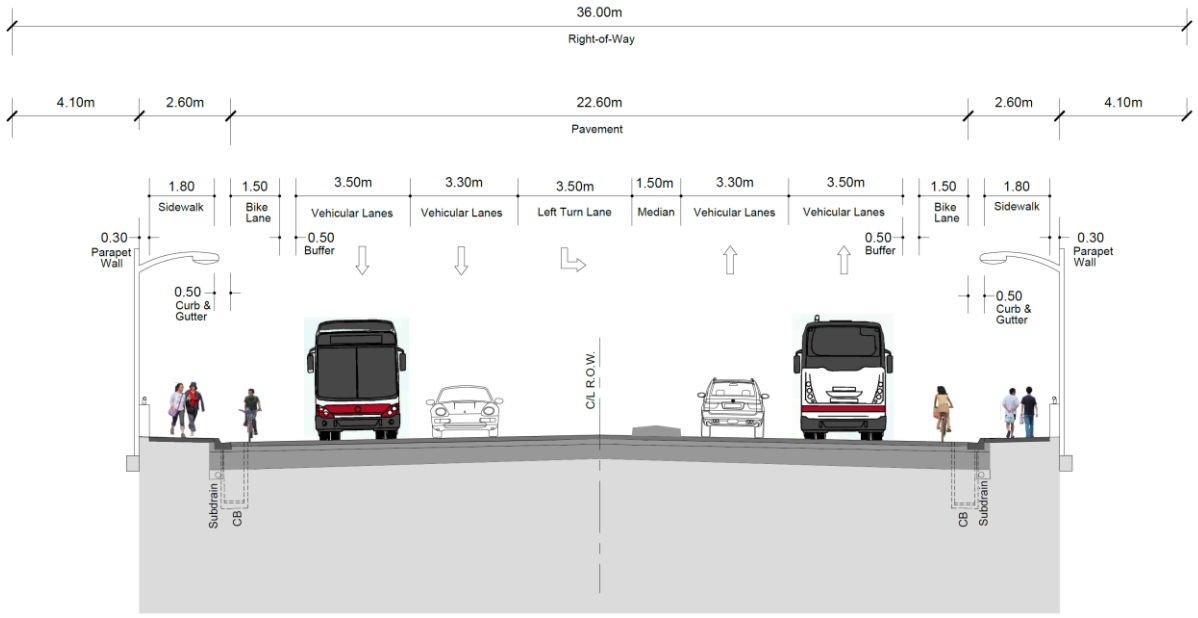
Lagerfeld Drive
Mid-Block (with Bioretention)

Figure 7-8: Typical Section 4



Lagerfeld Drive
at East Bridge

Figure 7-9: Typical Section 5



Lagerfeld Drive
At West Bridge just east of Mississauga Road

Figure 7-10: Typical Section 6

7.1.5 INTERSECTION

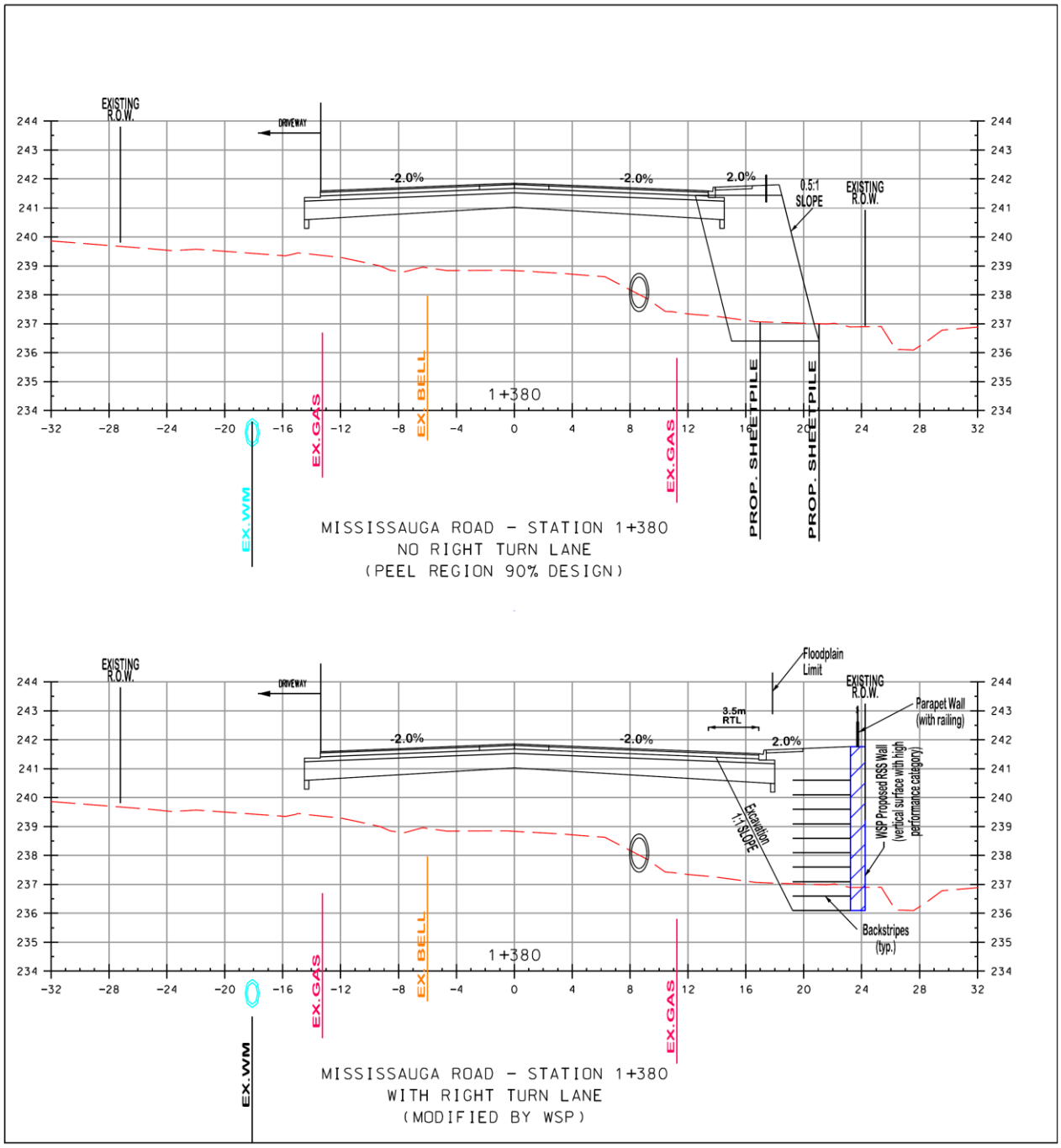
Intersection design has been developed to provide an acceptable level of service at the intersection. Storage lengths were calculated based on 95th percentile queue lengths (ref. **Appendix C** Traffic Study). Required turning lanes and corresponding storage lengths are shown on the Preliminary Preferred Plan and Profile Roll Plan found in **Appendix N**.

WSP reflects the Region 90% design for Mississauga Road Improvements. There is no specific AODA standard for sidewalk width at crosswalk locations. 1.8m minimum is specified in Peel Region standard "5-2-16A Concrete sidewalk with depressed curbs at signalized intersections". Further investigation will be needed at detailed design to confirm if more property will be needed to accommodate traffic signals set up while maintaining accessibility and safety.

The eastbound and westbound sightline may be blocked by Huttonville Creek bridge parapet walls depending on the stopping location of the right turning vehicle. For safety reasons, a turning restriction for "No Right On Red" should be recommended.

In order to accommodate the northbound right turn lane recommended in the Traffic Study found in Appendix C, an RSS retaining wall with backstripes will be used as mitigation to protect Huttonville Creek from erosion and sediment control issue. The retaining wall is recommended to be kept as far away from the creek channel, to minimize direct channel impacts and disturbance. Comparative cross sections at Station 1+380 of Mississauga Road 90% Detailed Design alignment with and without the northbound right turn lane is shown below in Figure 7-11.

Figure 7-11: Mississauga Road Comparative Cross Sections at Station 1+380



7.1.6 VEHICLE TURNING MOVEMENTS

Intersection turning movements were reviewed for the signalized intersection. The design vehicle is an I-Bus.

The turning movements at the intersections are limited by the intersection layout and property restrictions. Further review of the turning movements will be completed during detailed design, at which time additional adjustments to the intersections may be completed to determine if turning movements of larger design vehicles can be accommodated.

7.1.7 PROPERTY REQUIREMENTS

Temporary easements may be required between the two bridges east of Mississauga Road at where accesses to future subdivisions may be. Preliminary easement requirements are shown in **Appendix N** for the Preliminary Preferred Plan and Profile Roll Plan. The Profile Roll Plan also shows the grading limits and limits of temporary protection. Temporary easements may be required for establishing construction protection limits such as erosion and sedimentation control measures. Property requirements will be confirmed during the detailed design phase.

7.1.8 ACTIVE TRANSPORTATION FACILITIES

Active transportation facilities proposed for Lagerfeld Drive include 1.5m on-street Bicycle Lanes at each side with 0.5m buffer between the curb lane and the bicycle lane. Pedestrians and cyclists will be guided to cross at the intersections where traffic control will be in place to allow for safe movements.

7.1.9 PAVEMENT DESIGN

A preliminary pavement investigation was completed by WSP (ref. **Appendix K** Geotechnical Investigation Report). The pavement design recommendations contained in this report were used for preliminary design and estimating purposes.

Pavement recommendations for extension of Lagerfeld Drive are presented in **Table 7.2**.

Table 7-2: Preliminary Asphalt Pavement Structure Design

HMA

Type	Thickness (mm)
Asphaltic Concrete OPSS HL-1	50 mm
Asphaltic Concrete OPSS HL-8	100 mm (2 lifts)
Base Course OPSS 1010 Granular ‘A’	150 mm
Subbase Course OPSS 1010 Granular ‘B’ Type 1	450 mm

The western leg of the proposed Lagerfeld Drive extension is proposed to cross a TC Energy (formerly Trans-Canada) pipeline. The presence of the pipeline is not expected to affect the proposed pavement structure. However, TC Energy may require modifications to provide a thicker pavement structure where the proposed road crosses the pipeline. WSP should be consulted to review any modified pavement structure.

7.1.9.1 EMBANKMENT CONSTRUCTION

A significant grade raise is proposed along the eastern portion of the Lagerfeld Drive extension. It is imperative that the subgrade beneath the embankment be inspected and proof-rolled, in the presence of the Geotechnical Engineer, prior to the placement of any fill to ensure that any and all loose, settlement prone material is removed.

It is recommended that all embankment slopes be constructed with a slope of 3 horizontal to 1 vertical or shallower. Any sections with proposed slopes greater than 3:1 should be analyzed for slope stability based on slope profile or designed with a suitable earth stabilization or retention system.

Erosion control should be provided on side slopes and other sensitive areas by use of an erosion control blanket such as Terrafix 5100 or approved equivalent. Straw bale flow check dams and, where flow velocity is high rock flow check dams may be used. All side slopes and where exposed soils will be left for greater than 30 days should be hydro seeded to promote vegetation growth.

To minimize settlement potential, it is recommended that the embankment fill be placed as early as possible in the construction process and left exposed to construction traffic. Prior to placing the proposed base and subbase course of granular it is recommended that the surface of the embankment fill be proof-rolled as well.

7.1.10 CREEK CROSSINGS

7.1.10.1 *FOUNDATION DESIGN*

It is recommended that proposed creek crossing structures be supported on concrete footings, placed directly on compact to dense native till, or engineered fill placed directly on such soils.

For design purposes, the recommended geotechnical resistance at Ultimate Limit States (ULS) (factored) and geotechnical reaction at Serviceability Limit States (SLS) for shallow spread footing foundations bearing on compact to dense till (or engineered fill placed directly on such material), are 225 kPa and 150 kPa, respectively. The geotechnical reaction at SLS is based on a total allowable settlement of 25 mm and maximum differential settlement of 15 mm.

Engineered fill upon which footings are placed must be at least 300 mm in thickness.

Prior to forming, all foundation excavations must be inspected and approved by a Geotechnical Engineer. Inspections should address foundation bearing material preparation, including subgrade soil stabilization, and that exposed soils are consistent with expectations. Under no circumstances should the foundation be placed directly on organic material, loose or frozen subgrade, construction debris, or within ponded water.

Higher bearing capacities may be achieved if foundations are extended deeper into the till. Groundwater controls and a shoring system may be required for deeper foundation construction below the water table. Alternatively, to avoid excavations extending into the groundwater, deep foundation solutions may be utilized. These may include, but no necessarily be limited to, driven piles, augered piles, or helical piers. Foundation systems extending down into the dense till could achieve geotechnical resistance at ULS (factored) and geotechnical reaction at SLS on the order of 400 to 550 kPa and 250 to 350 kPa, respectively. Bearing capacities for deep foundations are based on the selected methodology, and depth and size of the deep foundation. Should it be established in detailed design that an ULS greater than 225 kPa and/or a SLS of 150 kPa is required, WSO should be consulted for additional recommendations including sizing options of deep foundation systems.

7.1.10.2 *ABUTMENTS*

It is recommended that a free draining, non-frost susceptible granular material, such as Granular ‘B’ (OPSS Form 1010), be utilized as backfill to the structure abutments. The backfill should extend horizontally from the back of the abutment for a minimum distance of 1.5 m. Provision for drainage of the backfill should be implemented.

Constructability:

- The existing corridor is sufficient to construct both the bridges namely the Mississauga Crossing and the East Crossing. There is space available within the proposed right-of-way (ROW), a clearance of 3.8m at Mississauga Crossing and 6.3m at East crossing between the bridge and the ROW, to construct the bridge;

- The Mississauga Crossing bridge is recommended to be built first and to construct the abutments access is proposed from Mississauga Road for the west abutment and Credit View Road for the east abutment using a temporary crossing of the Huttonville Creek;
- The East Crossing bridge is recommended to be built second.

7.1.11 GROUNDWATER

Groundwater observations were made within the open boreholes upon completion. Groundwater accumulation was observed in three of the boreholes at depths ranging from approximately 1.8 to 3.4m below ground level. Groundwater levels are subject to seasonal fluctuations, specifically in response to extreme precipitation events and the spring thaw. As such, variable levels should be anticipated, and groundwater could be encountered during excavations, depending on site location and depth.

7.1.12 PRELIMINARY STREETLIGHTING DESIGN

The City of Brampton is responsible for the street lighting requirements and as such has adopted the American National Standard Practice for Roadway Lighting "ANSI/ IESNA RP-8-14". This lighting standard serves as the basis for design and provides recommended practices for roadway illumination. The client requested that Mississauga Road be classified as a "Major" road with a "Medium" nighttime pedestrian conflict level and Lagerfeld Road be classified as a "Collector" road with a "Medium" nighttime pedestrian conflict level.

Based on the proposed roadway geometry, lighting calculations were calculated utilizing the MTO approved Auto Lux software. The results are outlined on the photometric calculation found in Appendix R. Note that the photometrics provided are not based on the street lighting pole locations shown on the preliminary design and a new photometric calculation will need to be completed during detailed design.

Preliminary illumination design for Mississauga Road utilizes 143W LED luminaires on 3.7m brackets attached to 15.2m direct buried concrete poles. Poles to be installed in a staggered formation at a typical spacing of 50m.

Preliminary illumination design for Lagerfeld Road utilizes 92W LED luminaires on 2.4m brackets attached to 12.0m direct buried concrete poles. Poles to be installed in a staggered formation at a typical spacing of 50m.

7.1.13 UTILITIES

Utility companies were contacted at the commencement of the study and again in June 2019 with updated preliminary preferred roadway design. Required drawings showing existing and proposed utilities are shown on the Preliminary Preferred Plan and Profile found in **Appendix N**.

Based on a preliminary review, relocation or protection of various utilities will be required as per **Error! Reference source not found.**:

Table 7-3: Lagerfeld Drive Utilities

Utility	Plant
Telus	Telus has cable in 360GT's leased ducts and vaults, close to the proposed route or area, along railway tracks. Please refer to 360GT's drawings. Facilities do not affect proposed roadway corridor.
Bell	There is existing underground Bell plant on both sides of Lagerfeld Drive in the boulevard up to the west end of the existing cul-de-sac. There is also existing Bell plant along Mississauga Road at the west side. Relocation of the Bell facilities are not expected.

Rogers	Rogers has existing buried fibre cable along the east side of Creditview Road, along the south side of the CN Rail corridor and cable along east side of Mississauga Road from 40m south of the cable at CN Rail corridor extending northerly. Existing aerial fibre cable is found along the east side of Mississauga Road where Lagerfeld Drive intersects. There are no existing Rogers facilities along the proposed Lagerfeld Drive extension. Relocation of the Rogers facilities are not expected.
Enbridge	There is an existing Enbridge gas line running along west side of Mississauga Road at the intersection of Lagerfeld Drive extension. Relocation of the Enbridge facilities are not expected.
Alectra	Alectra has a project that is set for construction in 2019 along Mississauga Road in the area where Lagerfeld Drive extension will meet. The only Alectra conflicts identified on the Lagerfeld Drive extension is at the intersection of Mississauga Road and Lagerfeld Drive. Alectra does not have any overhead or underground plant within the balance of the Lagerfeld Drive proposed extension therefore an easement will not be required as Alectra has already taken care of the conflict area by planning the pole placement accordingly and therefore no relocation design will be necessary in the future. Hydro designs to support any adjacent development will be underground and shall be the responsibility of developers.
TransCanada Pipeline (TCPL)	Refer to the Utility Conflict Report for a letter from MHBC, an authorized Commenting Agency for TransCanada, in **Appendix O**.
Peel Region Infrastructure	• Watermain and Sanitary works are planned in the budget for 2022 along Lagerfeld Drive but the work can be scheduled to another year to align with the road construction. • The retaining wall for the bridge will end very close to the existing 375mm Sanitary (Wastewater Main ID SMH6556323-SMH6556295). Need detailed assessment of impacts and whether it would need to be moved. • The eastern side of the project will cross our 375mm sewer segments, and the intersection at Mississauga Road will cross a 1200mm trunk encased in a 2400mm tunnel. • The Mississauga Road crossing will cross over a 1200 and 750mm transmission mains. • Peel Region has easement rights over the sewer that will be impacted. Potential implications for any cost sharing agreement if the infrastructure needs to be moved.

7.2 PRELIMINARY CAPITAL COSTS

The overall preliminary construction cost estimate provided for this project is $32,287,266. The estimate cost for works affecting Mississauga Road is approximately $1,096,000 and is included in the overall cost estimate. The preliminary cost estimate is provided in **Appendix P** – Preliminary Cost Estimate.

8 PERMITS AND APPROVALS

DFO

A DFO Request for Review (RfR) will be required. A subsequent fisheries authorization may be required.

CVC

A permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

ESA Permit

Endangered Species Act permit for impacts to Redside Dace Habitat, Environmental Activity and Sector Registry (EASR) and/or Permit to Take Water (PTTW) under the Ontario Water Resources Act based on the required water takings.

MECP

"In December of 2017, a preliminary preferred alignment for the road was recommended and presented to commenting agencies. Ministry of Natural Resources and Forestry (MNRF) supported the alignment in principal but suggested a phased approached. MNRF email dated December 11, 2017 is reproduced below.

MNRF can support defining the Right-of-Way east of Mississauga Road to allow adjacent landowners the ability to develop their draft plans or site plans. MNRF can support road alignment west of Mississauga Road. East of Mississauga Road is subjected to further negotiations and conditions below due to existing negotiated agreements, approvals, provincial policies and legislation."

MNRF Suggested approach for the Right-of Way east of Mississauga Road:

1. Secure location and width of ROW east of Mississauga Road in the EA
2. Region of Peel to continue their detailed design of for the Mississauga Road 4 lane project;
3. Region of Peel to apply for an ESA permit for item 2
4. City of Brampton to monitor traffic patterns and volumes post ultimate construction of Bovaird Drive (6 lanes) and Mississauga Road (6 lanes), in the immediate vicinity of the East to West Connector. If ultimate build out of Regional roads cannot address traffic demands, reassess need for linkage to Mount Pleasant Station. Engage MNRF and DFO in consultation.

MNRF suggested phased approach for development of the road link west of Mississauga Road first, is in contradiction with the City's current development plans and build out which is progressing from east to west in the western part of the City. There are a number of development projects in progress east of Mississauga Road that need access from the proposed East-West Connector sooner that the construction of Mississauga Road and Bovaird Drive. Therefore, the road link east of Mississauga Road takes priority over the west portion.

With the administration of the endangered species being transferred to the Ministry of the Environment, Conservation and Parks (MECP) in early 2019, the City met with MECP on July 19, 2019 to further discuss the initial MNRF suggested approach and to determine appropriate mitigation measures, recognizing that there cannot be complete avoidance of potential impacts to Redside Dace habitat.

During the alternative assessment, reasonable alternatives were considered. Based on the preliminary preferred design, some impacts to Redside Dace habitat are unavoidable. Subject to provincial policies including Guidance for

development activities in Redside Dace protected habitat (MNRF, 2016), an Overall Benefit Permit per the Endangered Species Act will be required at the detailed design phase of the project. Based on discussions between MECP and the City at the July 19, 2019 meeting, the following was determined:

- During the detailed design phase of the project, the City will apply for an Overall Benefit Permit that is expected to be above and beyond the normal requirements. Details of the Permit will be subject to additional discussions with MECP.
- The requirement for this Overall Benefit permit supersedes the previous MNRF suggested phased approach (item#4 above). MECP agrees in principle for the City to proceed with the project implementation as per the preliminary preferred design and based on its current development and transportation needs.
- Other standard permitting requirements still apply.

Environmental Compliance Approval (ECA) will be required from MECP for stormwater management facilities and storm sewers.

Permit to Enter (PTE) Agreement

Permission to Enter Agreements or construction easements.

MHSTCI

MHSTCI archaeological concurrence based on findings from subsequent archaeological assessments.

9 RECOMMENDED MITIGATING MEASURES

9.1 PRINCIPLES

Based on the preferred design concept it is recognized that the Project will result in some impacts on the existing environment. In order to address the effects, the following approach was taken:

- Avoidance: The first priority is to prevent the occurrence of adverse environmental effects associated with the implementation of the Project;
- Mitigation: Where adverse environmental effects cannot be avoided, it will be necessary to develop the appropriate mitigation strategies and measures to eliminate or reduce the negative effects associated with implementing the alternative; and
- Enhancement or Compensation: In situations where appropriate mitigation measures are not available, cannot be implemented, or significant net adverse effects will remain, enhancement or compensation measures may be required to offset the negative effect through replacement in kind, or provision of a substitute or reimbursement.

9.2 MITIGATION STRATEGIES

The following mitigation strategies are recommended to ensure that any disturbances are managed by the best available methods. These measures will be further developed during detailed design.

Environmental Commitments				
NO.	**Environmental Components**	**Potential Environmental Effects**	**#**	**Mitigation Measures**
1.0	**Drainage and Stormwater Management**	– Potential increase in flooding risk in the creeks – Potential to increase stormwater run-off (water quantity) – Increase in pollutants to receiving watercourses (water quality) – Flooding and Erosion Hazards – Increase in storm water runoff volumes due to increase in paved surface areas and associated salt distribution.	1.1	– All infrastructure (specifically storm outlets) must be located outside of the local erosion hazard associated with the regulated watercourses. – The proponent is responsible for the submission and ultimate implementation of a comprehensive ESC plan for each stage of construction.
		– Potential stream degradation	1.2	– Erosion protection measures will be provided at storm sewer outfalls for the Lagerfeld Drive extension to dissipate energy and encourage sheet flow.
		– Sensitive species will be impacted during Road salting	1.3	– Special salt mix can be part of the solution to mitigate salt impact if there are sensitive species identified as part of the wetland environmental assessments during detail design stage – Further assessment through wetland environmental assessments in detail designs
2.0	**Natural Heritage Features and Vegetation**	– Impacts to the general vegetation within the Study Area will be restricted to the proposed Lagerfeld Drive right-of-way. – The majority of the impacts will be to agricultural lands and cultural meadows with limited ecological value, though minor removals are anticipated in cultural woodland and wetland vegetation communities associated with the riparian corridors of the East and West branches of Huttonville Creek. – Potential indirect impacts to vegetation include damage to vegetation outside the work zone. – Sedimentation, spills of contaminants / fuels, root pruning, damage to limbs, and soil compaction.	2.1	– Minimize vegetation clearing where possible. – Install silt fencing or other temporary fencing prior to site grading to delineate the work zone and prevent direct damage to adjacent retained vegetation (i.e. mechanical damage, root damage, soil compaction). This fencing will remain until construction is complete. – Stabilize and re-vegetate exposed surfaces as soon as possible upon completion of works. – Tree and vegetation protection are recommended for trees and vegetation to be retained. Tree protection should be outlined in a Tree Protection Plan (TPP). Vegetation protection measures should be detailed on contract drawings and implemented to ensure encroachment is limited to the construction footprint. – A mitigation /compensation strategy to address removal of trees should be developed through consultation with regulatory agencies during the detailed design phase.
		– Direct impacts to the significant woodland are not anticipated.	2.2	*Significant Woodland at western limit of the Study Area* – Maintain a minimum 30 m buffer between the proposed works and the dripline of the significant woodland.

		– A minimum setback of approximately 33 m occurs between Lagerfeld Drive and the significant woodland. – Indirect impacts to the woodland may include damage to vegetation outside the work zone, sedimentation, spills of contaminants / fuel, root pruning, and soil compaction. – Change in land use from agricultural to right-of-way may result in increased anthropogenic disturbance, degradation to the woodland over time, and increased development pressure.		– Clearly delineate vegetation clearing zones and vegetation retention zones (i.e. using silt fencing or other temporary fencing) on both the construction drawings and in the field with the Contractor prior to clearing and grading. – Equipment, materials and other construction activities will not be permitted in vegetation retention zones. Ensure that a spills management plan is in effect for the construction area. – Avoid all unnecessary traffic, dumping and storage of materials over tree root zones adjacent to the proposed works. – Enhance the buffer to the significant woodland to the extent possible, by planting native trees and shrubs.
		– Direct impacts to the SWD1/SWD3 communities within the Significant Woodland are not anticipated as the proposed development is approximately 33 m from the northern extent of this wetland unit. The ESC Plan will address potential construction-related impacts to the PSW. – Direct impacts to the PSW associated with the West Huttonville Creek, immediately west of Mississauga Road may occur as a result of the Mississauga Road Widening and Improvement Project; however, a setback of approximately 9.8 m exists between this unit and the limit of grading associated with construction of Lagerfeld Drive. – The unmapped MAM2-2 vegetation unit is associated with the riparian corridor of the East Branch of Huttonville Creek. Direct impacts to this wetland unit and its ecological functions will largely be avoided as abutments have been located outside the meander belt; however, reduced sun exposure under the bridge may result in changes to approximately 530.1 sq.m. of this community over time. – The unmapped MAM2-10 vegetation unit is associated with the West Branch of Huttonville Creek in the vicinity of the proposed West Crossing. The central piers will result in a permanent loss of approximately 5.7 m^2 of this wetland unit. Reduced sun exposure to the portion under the bridge may result in changes to the community over time (approximately 505.0 sq. m.). – Temporary disturbance associated with construction (grading, movement of heavy machinery, etc.) may occur. – Direct impacts are expected to include temporary construction related effects (construction dewatering, erosion and sedimentation, noise, dust, etc.). – Indirect impacts to wetlands may include changes to water quality and quantity in response to changes in grade, fuel spills, removal of vegetation, increases in impervious surfaces, erosion and sedimentation effects, and short-term water takings to support construction activities. These impacts if prolonged could result in changes in species assemblages and community composition. – Other indirect or long-term effects include potential impacts associated with increased input of road salts into the PSW and potential alteration to drainage patterns (groundwater and/or surface water flows).	2.3	*Huttonville Creek and Area PSW - Unmapped wetlands east of Mississauga Road* – Maintain a minimum 30 m buffer between proposed works and the edge or dripline of the PSW wetland units at the western limit of the study area. – Minimum buffers of 15 m should be provided to other wetlands, where possible. – Minimize vegetation clearing within wetland buffer areas to the extent possible. Clearly delineate vegetation clearing zones and vegetation retention zones (i.e. using silt fencing or other temporary fencing) on both the construction drawings and in the field with the Contractor prior to clearing and grading. – Minimize changes to drainage patterns to reduce/eliminate potential for changes to the existing wetland moisture regime and site hydrology. – A mitigation and/or compensation strategy to address anticipated temporary and permanent impacts to unevaluated wetlands should be developed through consultation with regulatory agencies during the detailed design phase. It is expected that areas temporarily disturbed during construction will be restored and/or enhanced, whereas, areas that may be permanently impacted, either directly or indirectly by the bridge construction, may be addressed by enhancing wetlands elsewhere in the study area or offset through feature replacement. Opportunities for habitat enhancement, restoration, and/or offsetting may be explored and implemented as part of the Overall Benefit Permit. – Stormwater management plans must ensure that surface water and/or ground water inputs to the PSW are balanced between pre- and post-construction and that appropriate water quality controls are in place. – Ensure that a spills management plan is in effect for the construction area. – Implement an Erosion and Sedimentation Control (ESC) plan to minimize the risk of potential impacts from sedimentation on the water quality and quantity within wetlands and surface water features. – The use of alternative de-icing products / application methods should be considered to reduce the input of road salts into the wetlands and watercourses.
		– Crossings are proposed over East and West Huttonville Creeks. – The East Crossing has been designed to span the meander belt of East Huttonville Creek but impacts to vegetation within the valleyland and 30 m buffer to the meander belt are anticipated. – The west abutment of the West Crossing will impact approximately 49.5 m^2 of the area within the meander belt of	2.4	– Measures to mitigate impacts to related natural heritage features (woodlands, wildlife habitat, habitat for species at risk, fish habitat, etc.), will provide additional protection to the valley corridors and their functions. – Crossing designs should consider requirements for wildlife movement through the landscape, particularly as valley corridors will become critical movement corridors with increased urbanization of the area over time. More specifically, crossing structure should be designed to facilitate movement by terrestrial and aquatic wildlife within the structure, as per the guidance provided in the CVC's Fish and

		West Huttonville Creek and the central piers will result in permanent impacts to approximately 5.7 m^2 of vegetation the 30 m buffer to the meander belt. – Huttonville Creek runs parallel to Mississauga Road and will not be impacted by the proposed works. – Direct impacts to the valleylands are associated with impacts to the natural features and functions associated with each valley feature. Mitigation measures and compensation proposed for other features / species throughout this table, will provide benefit to the valley features of which they are a part. – In addition to the functions provided by other natural heritage features associated with valleylands (i.e., watercourses and woodlands), valleylands act as critical linkages between habitats and natural areas within the urban landscape.		Wildlife Passage Guidelines (2017). Specifically, crossings should be designed to facilitate passage by large mammals, such as deer and coyote. – Implementation of a spills management plan, and erosion and sedimentation control plan should be completed to address construction-related impacts at each site.
3.0	**Wildlife**	– Impacts to wildlife are directly associated with impacts to vegetation, which encompasses their habitat. Vegetation removal within the ROW will result in loss of habitat. – Noise, dust and vibrations associated with construction activities have the potential to cause short-term disturbance to wildlife and may cause certain wildlife to abandon or avoid the area. – Long-term impacts to wildlife may include habitat fragmentation, interruption of movement patterns, and increased road mortality.	3.1	– Exclusion fencing (i.e., temporary siltation fencing) is recommended to prevent species from entering the construction area. Once work is completed, fencing should be removed. – Wildlife incidentally encountered during construction shall not knowingly be harmed and shall be allowed to move away from the construction area on its own. Photos for identification should be taken of animals observed onsite, if possible. In the event that wildlife encountered during construction does not move from the construction zone, MNRF shall be contacted. – Though not anticipated, if a Threatened or Endangered species is discovered during site preparation or construction, activities will stop or be modified to avoid negative impacts to Species at Risk until further direction is provided by the MECP.
		– Migratory birds are protected under the Migratory Birds Convention Act (MBCA; Government of Canada, 1994). – Vegetation removal and minor tree removal will be required for road and bridge construction. – Removal of vegetation has the potential to impact breeding birds, nests, eggs and young if clearing occurs during the nesting period. – Noise, dust and vibration associated with construction activities have the potential to cause short-term disturbance and may cause birds to temporarily abandon or avoid the area.	3.2	– No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of bird species protected under the MBCA and / or Regulations under that Act. – To comply with the MBCA, avoid vegetation clearing (including grubbing) during the bird nesting season (approximately April 1 to August 31). – Should removal of vegetation during this period prove necessary, a qualified avian biologist must be retained to complete a search of the areas for nests.
4.0	**Species at Risk**	– As a Threatened species, Barn Swallow individuals and their nesting habitat are protected under the Endangered Species Act (ESA). – Barn Swallows were observed on both survey dates and were often seen in groups of three to five birds, flying over the Study Area. – Approximately seventeen (17) cup nests were observed within the concrete box culvert located under Mississauga Road. – As the box culvert will be replaced as part of Peel Region's Mississauga Road Widening and Improvement Project, it is expected that anticipated impacts to Barn Swallow and/or their habitat would be addressed as part of that project.	4.1	– To protect all breeding birds, including Barn Swallow, avoid vegetation clearing (including grubbing) during the bird nesting season (approximately April 1 to August 31). – It is recommended that a qualified avian biologist survey for nesting evidence on structures, including culverts, prior to demolition to ensure compliance with the ESA and MBCA. – Should active Barn Swallow nests be identified, provisions in Ontario Regulation 242/08 of the ESA allow for nest removal and building demolition provided specific conditions are followed. Species-specific mitigation such as nest site replacement (e.g. a barn swallow kiosk) may be required for alterations to existing structures (e.g., demolition), if nesting occurs on the structure.
		– The Eastern Wood Pewee is listed as Special Concern and does not receive habitat protection under the ESA, 2007. – Eastern Wood-pewees were observed on two separate occasions within the vicinity of the Significant Woodland during the 2014 site investigation. – A minimum setback of 33 m is currently proposed between Lagerfeld Drive and the significant woodland. Direct impacts to this species and its habitat are not expected.	4.2	– Special Concern species do not receive habitat protection under the Endangered Species Act; however, opportunities to retain habitat should be considered where possible. – Mitigation provided under Item 3.2 for Migratory Birds will provide protection for this species as well.

		– As an Endangered species, Eastern Small-footed Myotis, Little Brown Bat, Northern Myotis, and Tricolored Bat and their habitat are protected under the Endangered Species Act (ESA). – The significant woodland at the western limit of the Study Area has been identified as candidate habitat for bat species. A minimum setback of approximately 33 m is proposed between Lagerfeld Drive and the Significant Woodland in the western portion of the study area. – Additional trees that may provide limited roosting habitat may also be impacted by minor removals within the CUW along Mississauga Road.	4.3	– Removal of mature trees (over 25 cm in diameter at breast height) should be avoided where possible. For trees to be retained, tree protection fencing should be installed as close to the dripline as possible. – At the detailed design stage, MECP should be consulted to determine if additional surveys are required to further assess potential impacts to roosting habitat for these species. Additional work may include a survey for suitable cavity trees within 6 m of the proposed works (specifically vegetation removal). Mitigation and/or compensation for impacts to bat habitat (if any) will need to be established through consultation with MECP. – In general, tree and vegetation removal must be scheduled when bats are absent or not nursing young (October 1st to March 31st), to reduce the potential for impacts to bat populations. Timing of works is to be confirmed with the MECP.
		– Monarch is listed as Special Concern and does not receive habitat protection under the ESA, 2007. – Habitat for Monarch occurs throughout meadows and roadsides in the Study Area, though impacts to critical habitat are not anticipated. – Impacts to habitat will occur where vegetation removal occurs within the construction footprint; however, these impacts are expected to be minor.	4.4	– Special Concern species do not receive habitat protection under the Endangered Species Act; however, opportunities to retain or restore Monarch habitat should be considered where possible. – Considerations should be given to include Milkweed species in seed mixes used to stabilize and restore disturbed areas, where possible.
		– The Red-headed Woodpecker is listed as Special Concern and does not receive habitat protection under the ESA, 2007. – The significant woodland at the western limit of the Study Area has been identified as potential habitat for this species. – A minimum setback of 33 m is currently proposed between Lagerfeld Drive and the significant woodland. Direct impacts to this species and its habitat are not expected.	4.5	– Special Concern species do not receive habitat protection under the Endangered Species Act; however, opportunities to retain habitat should be considered where possible. – Mitigation provided under Item 3.2 for Migratory Birds will provide protection for this species as well.
		– As an Endangered species listed under the ESA, Redside Dace receives species and habitat protection under the ESA. Habitat regulated by the ESA includes the watercourse, meander belt and 30 m buffer to the meander belt. – Huttonville Creek, East Huttonville Creek and West Huttonville Creek within the Study Area are regulated as ‘occupied habitat’ for Redside Dace – Two crossings are proposed, one on each of the West and East Huttonville Creeks. The East Crossing has been designed so that abutments avoid the meander belt, but unavoidable permanent impacts are anticipated to vegetation within the 30 m vegetation buffer to the meander belt. The West Crossing includes permanent footprints in the meander belt (49.5 m^2) and 30 m buffer to the meander belt (5.7 m^2) associated with the west abutment and central piers, respectively. – Additional temporary impacts associated with vegetation removal and grading may occur within regulated habitat. – In and near water works may also require Fisheries Act Authorization (FAA) to address impacts to the species and its habitat within the study reaches.	4.6	*West, East and Main branches of Huttonville Creek* – Subject to provincial policies including Guidance for development activities in Redside Dace protected habitat (MNRF, 2016), an Overall Benefit Permit per the Endangered Species Act will be required at the detailed design phase of the project. As specified by MECP, the Overall Benefit Permit is expected to be above and beyond the normal requirements. Details of the Permit will be subject to additional discussions with MECP. – Work shall occur during the appropriate in-water construction timing window; July 1st to September 15th of any given year (i.e., no in-water works from September 16th to June 30th). – All staging and access areas should be located outside the Regulated Redside Dace habitat (meander belt + 30 m buffer on either side of the creek). – All site isolation measures including erosion and sediment control, stockpiling methods and spill prevention (as detailed below) should be installed between the work areas and the limits of Regulated Redside Dace Habitat. – Any temporarily stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g., within silt fencing) outside of the regulated Redside Dace occupied habitat. All construction materials, excess materials and debris should be removed and appropriately disposed of following construction. – Exposed soil within 30 m of the West and East branches should be stabilized within 15 days after completion of construction activities. Native plants of suitable height, shall be planted in exposed areas.
		– The Wood Thrush is listed as Special Concern and does not receive habitat protection under the ESA, 2007. – The significant woodland at the western limit of the Study Area has potential to provide habitat for this species.	4.7	– Special Concern species do not receive habitat protection under the Endangered Species Act; however, opportunities to retain habitat should be considered where possible. – Mitigation provided under Item 3.2 for Migratory Birds will provide protection for this species as well.

		– A minimum setback of 33 m is currently proposed between Lagerfeld Drive and the significant woodland. Direct impacts to this species and its habitat are not expected.		
5.0	**Significant Wildlife Habitat**	– Candidate habitat for woodland raptors may occur in the Significant Woodland at the western limit of the Study Area. – Impacts to this habitat are not anticipated as a result of the proposed works. A minimum setback of approximately 33 m is proposed between Lagerfeld Drive and the Significant Woodland in the western portion of the study area.	5.1	– Mitigation proposed in Item 2 Significant Woodlands will provide protection for this feature. – Should a nest site be identified during construction, the MNRF should be notified immediately to determine if additional mitigation or compensation measures are required to avoid, minimize or mitigate impacts to nesting woodland raptors.
		– The significant woodland at the western limit of the Study Area has been identified as candidate maternity roosting habitat for bat species. – Impacts to Bat Maternity Colonies are not anticipated as a result of the proposed works. A minimum setback of approximately 33 m is proposed between Lagerfeld Drive and the Significant Woodland in the western portion of the Study Area.	5.2	– Mitigation proposed in Item 2 Significant Woodlands will provide protection for this feature. – Mitigation proposed in Item 9 Endangered Bat Species will provide protection for roosting bats if they are present in the general area. In particular: – Tree removal must be scheduled when bats are absent or not nursing young (October 1st to March 31st), to reduce the potential for impacts to bat populations. Timing of works is to be confirmed with the MECP.
6.0	**Fish and Fish Habitat**	– Two bridges will be constructed over West and East Huttonville Creeks as part of the Lagerfeld Drive extension. There are no crossings proposed for the Main Branch of Huttonville Creek, and direct impacts are not anticipated. – These watercourses, meander belts and 30 m buffers are regulated habitat for Redside Dace. Impacts to the meander belt of the West Branch and 30 m buffer to the meander belts of the East and West Branches are anticipated and as such, an Overall Benefit Permit under the ESA will be required for these works. – Indirect impacts from construction may include erosion and sedimentation impacts, construction dewatering, fuel spills, and shading of riparian vegetation under bridges, which over time may result in reduced vegetative riparian cover, and/or changes in the composition of these vegetation communities.	6.1	*East, West, and Main Branches of Huttonville Creek* – Any construction works within 30 m of a watercourse will require a self-assessment to be completed using the DFO Projects Near Water guide to ensure compliance with the Fisheries Act. – General measures for construction design, Erosion and Sedimentation Control measures, Spill Management Control Plans are to be implemented to further minimize impacts associated with construction. These measures must be in accordance with Guidance for development activities in Redside Dace protected habitat (MNRF, 2016). – All standard operating procedures for machinery near / in-water will be implemented (e.g., maintenance in good working order free of leaks, cleaning and re-fueling in designated contained areas at least 30 m from the water, regular inspection). – All construction-related activities will be controlled to prevent entry of any petroleum products, debris or other potential contaminants / deleterious substances, in addition to sediment as outlined above, to the watercourses. – The construction access, work areas and associated requirements for removal of riparian vegetation should be minimized to the extent required for the construction activities, and these areas will be delineated in the field using properly installed protective silt fencing. All temporarily disturbed areas will be re-stabilized following construction using appropriate means. – Monitor water levels in areas of open trench and dewater as required by following standard construction dewatering methods (e.g., discharge water through a suitable filtration device a minimum of 30 m from watercourses and wetlands). – Ensure appropriate approvals are in place prior to dewatering activities, and do not exceed permitted withdrawal rates of water sources, unless otherwise approved by Provincial authorities. – Direct water to an approved area, at a rate that promotes infiltration of the ground surface (if applicable). Protect the ground at the discharge locations to prevent scouring and/or erosion. Discharge water through an appropriate sediment filtering medium, to minimize potential sedimentation and turbidity. – Monitor the water discharge site to ensure that erosion, saturation of the discharge site, or flow off of the approved release area is minimized. – Construction at or near the ground water level in areas where chemical contaminants have been noted, or have the potential to occur, should include treatment of dewatering discharge to ensure that chemicals are not released into the environment. Mitigation measures recommended within the geotechnical reports should be incorporated into final design plans.

			6.2	*Provincial Best Management Practices for Redside Dace: (Construction and Design)* – For new crossings in confined valleys, stream crossing should be bridge that spans the valley with piers placed outside the meander belt. – For new crossings in unconfined valleys, stream crossings should be open bottom culverts designed to span the meander belt of the stream. – For the extension of existing structures, the footprint of the structure should be minimized by using retaining walls where feasible to minimize disruption of riparian habitat. – Closed bottom culverts to be installed so that the invert is embedded a minimum of 20% of the culvert diameter below the stream bed to facilitate fish passage by ensuring culvert is not perched. – Slopes of culverts should mimic the natural stream bed. – Subject to provincial policies and existing guidelines for protection of Redside Dace habitat (as noted above), an overall benefit permit will be required as part of the detailed design phase of the project. The overall benefit is expected to be above and beyond normal requirements and will be subjected to further discussion with MECP at the detailed design phase.
7.0	**Noise**	– Potential to increase noise in association with increased traffic volumes/congestion – Potential to increase noise on the east side of Mississauga Road between Bovaird Drive and Sandalwood Parkway to be the nearest sensitive receptor to the Lagerfeld Drive – Potential to increase noise in Noise Sensitive Areas (NSAs)	7.1	– Limit the major construction activities during the daytime hours only (i.e. 07:00 to 19:00 hours) and avoid evening and nighttime construction (19:00 to 07:00 hours).
			7.2	– Combine all noisy activities to occur in the same time period. The combined sound level will not be significantly greater than the sound level if done separately.
			7.3	– Install and maintain noise mitigation mechanisms such as muffler systems on construction equipment.
			7.4	– Consider alternative construction methods (less intense).
			7.5	– Use quieter construction equipment.
			7.6	– Re-route the truck traffic away from the noise sensitive areas.
			7.6	– Implement no idling policy and turn off construction equipment when not in use.
			7.7	– Construct temporary sound barriers between the noisy construction activities and the noise sensitive areas, if Feasible.
			7.8	– Noise mitigation measures can be implemented in accordance with City's Noise Policy.
8.0	**Built Heritage and Cultural Heritage**		8.1	– Any proposed alterations within the study area should be planned in a manner that avoids any identified, above ground, cultural heritage resource.
			8.2	– Where any identified, above ground, cultural heritage resource is to be affected by loss or displacement further research should be undertaken to identify both the specific heritage significance of the affected cultural heritage resource and appropriate mitigation measures required to avoid or minimize impact.
			8.3	– Where features are to be disrupted by introducing physical, visual, audible or atmospheric elements that are not in keeping with the resources and/or their setting, suitable measures such as landscaping, buffering or other forms of mitigation should be adopted. In this regard provincial guidelines should be consulted for advice. Where possible, existing trees and plantings should be retained.
9.0	**Archaeology**		9.1	– The undisturbed areas of the property within the study area that has been previously unassessed must be subject to Stage 2 survey.
			9.2	– Areas of actively or recently cultivated agricultural land must be subject to pedestrian survey.
			9.3	– All other areas where ploughing is not possible or viable must be subject to test pit survey.

			9.4	– 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.
			9.5	– The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act.
			9.6	– The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.
			9.7	– In addition to the contacts above, should previously undocumented archaeological resources or human remains be discovered, the City of Brampton Heritage staff shall also be contacted.
10.0	**Utilities**	– Potential impact to services or utilities within the corridor	10.1	– New right-of-way accommodates future improvements to services/utilities within the corridor (only west of Mississauga Road).
11.0	**Construction Staging**	– Potential impact to existing traffic operations during road/lane closure – Potential impact to air quality through exhaust, dust and noise impact to natural environment	11.1	– A Traffic management plan to be required.
12.0	**Groundwater**	– Impacts to Nearby Structures	12.1	– Conduct a geotechnical review of potential ground to ensure that risk to the nearby structures is minimized during active dewatering.
		– Potential for groundwater discharge to the West and East Huttonville Creek (potential for Redside Dace habitat)	12.2	During the detailed design stage: – Detailed monitoring and mitigation plan will be required that includes adequate sediment and erosion control and possibly the use of drive-point piezometers and staff gauges to evaluate hydraulic gradients; – groundwater cut-off structure could be used to reduce the dewatering needs for excavations that extend below the water table.
13.0	**Property**	– Potential impacts on private property to accommodate pedestrian facilities (e.g. sidewalks) and commuter parking lots outside of the City's right-of-way – Potential impact to property related to improvements in the road network in the vicinity of the study area. – Require realigning the roadway to the south in the proximity of the cul-de-sac east of Mississauga Road, cutting into development property. – Potential impact on a single-unit residential dwelling on the east side of Mississauga Road between Bovaird Drive and Sandalwood Parkway, with municipal address10179 Mississauga Road – Access to the stand-alone properties east of Mississauga Road (10179 Mississauga Road and the property north of theirs) may be too close to the new intersection. New accesses will have to be provided. – Property easements and potential impacts in localized areas due to additional right-of-way width required to accommodate auxiliary turn lanes.	13.1	– Develop a property impact plan.
14.0	**Traffic Safety**	– Conflicts between motor vehicles and bicycles at Mississauga Road intersection.	14.1	– Provision of additional delineation, installation of left-turn queue boxes or the provision of protected bicycle signal phase.
15.0	**Hydrogeology**	– Construction Monitoring	15.1	– The active construction dewatering stage will require monitoring designed to assess the potential for impacts to water levels in aquifers, water quality, and surface water. In addition to the aforementioned

				components, the use of responsible construction mitigation methods should also include implementing an Erosion and Sediment Control (ESC) plan for receiving surface water courses.
			15.2	*Discharge Volume Reporting* – During active dewatering, the contractor will be required to document discharge pumping rates as a required condition of the PTTW, with regular reporting of water taking volumes via the MECP Water Taking Reporting System. The total combined daily discharge must never exceed the limits as outlined in the PTTW. Additional storage measures (such as extra tank storage or temporary settling ponds) can be used to control large rain events and reduce the instantaneous discharge/pumping rates.
			15.3	*Groundwater Level Monitoring* – Weekly groundwater monitoring can be undertaken with the use of programmed data loggers installed in preselected monitoring wells and drive points located along the creek. During the construction period, if there are any groundwater supply complaints received, they can be reviewed on a case by case basis to determine the cause of the disruption and the need for mitigation, in accordance with groundwater supply protection best management practices. If remediation is required, the short-term solution must include provisions to supply potable water to any affected users. Long-term remediation will require provisions on a case-by-case basis.
			15.4	*Surface Water Monitoring* – During construction, and when area groundwater levels exceed the streambed elevation (i.e. springtime), the water level in the piezometers should be monitored on a daily basis for evidence of any lowering to the water table. Reducing excavation areas near the tributaries and within the expected zone of influence to 25 m length can also be implemented to further reduce pumping rates if any impacts are observed. After target water levels are reached, the frequency of monitoring can be extended to weekly.
			15.5	*Groundwater and Effluent Quality Monitoring* – Water clarity and sediment level should also be monitored to ensure that the quality is not degrading during construction. Filters should be examined on a regular basis, and any failures to equipment should be repaired immediately. Discharge permitting may also include specific water quality testing that must be adhered to. To ensure that excess erosion and sediment-laden water is not directed into the nearby watercourse, and in accordance with OPSS 518 (and 185), all dewatering discharge will be laminar and directed through energy dissipating / settling / filtration systems prior to return to the natural environment. Refueling should be performed in designated areas away from open excavations, and surface water features. In the event of a spill, remedial action must be undertaken immediately by the contractor, following all MECP and provincial spill guidelines
			15.6	*Surface Water Quality Monitoring* – Should dewatering discharge back to the natural environment be directed towards either watercourse, additional sampling is to be conducted on a weekly basis during the first month of discharge to evaluate changes from baseline conditions. Samples are to be taken upstream and downstream of the discharge point to assess potential impacts. Should significant changes in water quality occur, mitigation should be initiated, which could include changing discharge locations, reducing dewatering volumes, suspension of dewatering, or adding additional treatment measures.
16.0	**Road Safety**		16.1	– Mitigating measures should be considered to reduce the potential conflicts at the intersection. These may include the provision of additional delineation, installation of left-turn queue boxes or the provision of protected bicycle signal phase. The MTO Bikeways Design Manual1 provides guidance on recommended signs and pavement markings for bicycle facilities.

10 FUTURE COMMITMENTS

The following identifies specific items to be considered, reviewed and confirmed during detailed design phase of the Project. Some of the commitments will address specific concerns raised by property owners and review agencies during the EA process. Items to be considered include:

Item			Detailed Design Commitments
Natural Environment			
1.0	1.1	CVC	– Road crossings of watercourses have the potential to undermine the ecological integrity of stream ecosystems in several ways including acting as fish barriers and contributing to population declines due to habitat fragmentation. There is also the potential to disturb and damage existing habitat quality and quantity of populations through construction activities. To avoid impacts to the sensitive aquatic habitat of East and West Huttonville Creeks the potential bridge crossings must be designed such that natural channel processes, aquatic habitat and fish passage are not impacted. The potential bridge crossing must have no in-water footprint and must minimize encroachment into surrounding terrestrial habitat. The design must ensure that the crossings do not result in barriers or alterations to flows that will impact fish passage. Removal of aquatic habitat is to be avoided (e.g. placement of material within the watercourse, hardening of the watercourse and associate banks).
	1.2		– The regulated watercourses within the study area contain habitat for endangered species and are considered highly sensitive. To protect sensitive downstream receivers during their critical life stages an in-water and near water construction timing window will be applied to this project. As indicated in the Natural Heritage Assessment report (WSP January 2021) the in-water and near-water construction timing window for when works are allowed will be July 1 – September 15 of any given year. This timing window restriction is to appear on all relevant contract drawings and specifications to ensure compliance.
	1.3		– The Stormwater Management and Drainage Report (WSP April 2020) indicates that the proposed outlet A will drain to the existing Provincially Significant Wetland contained within the Significant Woodland in the western portion of the study area. Generally, outlets to wetland should be avoided unless it can be demonstrated that the hydrology and ecological function of the wetland will not be negatively impacted. The Provincially Significant Wetland and Significant Woodland will be reviewed further during detail design to assess ecological function, determine impacts and develop site-specific mitigation measures as required.
	1.4		– As per the recommendations in the Natural Heritage Assessment report (WSP January 2021) a tree and vegetation protection plan should be developed to protect trees and vegetation communities (including wetlands) that are to be retained. Vegetation protection measures should be specified on contract drawing and implemented to ensure there is no encroachment beyond the approved limit of disturbance. Tree protection fencing should be installed according to City of Brampton requirements. Non-treed vegetated areas to be protected should be protected with robust erosion and sediment control (ESC) fencing set at the limit of disturbance. A detailed tree protection plan and ESC plan should be prepared and provided to CVC for review during the design phase.
	1.5		– The Natural Heritage Assessment Reports (WSP January 2021) indicates there will be unavoidable impacts to vegetation due to the proposed works. Vegetation removals are to be limited to the extent feasible and any unavoidable impacts must be mitigated and compensated through robust restoration. A restoration plan should be developed that demonstrates how disturbed areas will be restored to existing conditions or better and provide an ecological gain to the natural heritage system. To determine restoration requirements the area of impact and number and size of trees removed should be quantified and used to calculate restoration requirements. The CVC Ecosystem Offsetting Guideline should be reviewed for compensation recommendations. **a**. Only common native species suitable to the area should be used in restoration. The CVC Plant Selection Guideline contains a list of species, seed mixes and cover crops that should be used in restoration. **b**. Soil conditions in restored areas must be suitable to support long term vegetation establishment. The CVC Healthy Soils Guideline should be reviewed for soil management recommendation. Soil conditions including required amendments should be specified on the contract drawings.
	1.6		– To avoid impacts to federally protected migratory birds and provincially protected bats vegetation removals should be avoided between April 1 – September 31 of any given year. It is recommended that vegetation removals occur from October 1 – March 31 to avoid contravention of the federal Migratory Birds Convention Act and the provincial Fish and Wildlife Conservation Act. Note that timing restrictions for vegetation removals are considered best practice in avoiding impacts but do not constitute clearance under any relevant legislation. Timing windows should appear on relevant contract drawings and specifications.
	1.7		– Given that works are proposed in or near water, it is the responsibility of the proponent to ensure that works, undertakings or activities do not cause the death of fish or cause the harmful alteration, disruption or destruction of fish habitat under the Fisheries Act. Please review the complete list of measures to avoid harm at http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html and implement those that are applicable to the proposed work. If it is not possible to avoid or mitigate impacts, proponents can submit a request for review form to their region's Fish and Fish Habitat Protection Program office (contact info: fisheriesprotection@dfo-mpo.gc.ca or 1 855 852-8320). Please refer to the Fisheries and Oceans Canada (DFO) website for additional information.
	1.8		– Natural heritage features west of Mississauga Road, including the Provincially Significant Wetland, Significant Woodland, and associated watercourse/drain will be assessed during detailed design to determine their ecological functions and the potential for adverse impacts, so that a site-specific mitigation plan can be developed. Efforts should be made during the design phase to maintain a 30 m setback from the Significant Woodland and Provincially Significant Wetland.

	1.9	CVC MNRF MECP DFO	– A Department of Fisheries and Oceans (DFO) self-assessment will be completed during detailed design to determine if serious harm to fish or fish habitat is expected as a result of activities from the project with respect to crossings of Huttonville Creek tributaries.
	1.10		– If channel realignments are required to accommodate the west crossing of Huttonville Creek at Mississauga Road, it should match the upstream and downstream channel with the new structure should be completed by a fluvial geomorphologist using natural channel design principles with the creation of habitat features/structures and the restoration of the banks and riparian vegetation. This work should be done in consultation with aquatic and terrestrial biologists to ensure that an overall habitat improvement will be realized. Efforts will be made to minimize effects to surrounding vegetated areas and vegetation removals will be compensated for via plantings of the same or similar species.
	1.11		– A CVC permit for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses will be required for all works within regulated areas. This will include works where a coordinated design and review process to address both CVC and DFO requirements will be necessary.
	1.12		– Due to the presence of several Species at Risk within the project area, and the potential for adverse impacts to species or their habitat, the proponent will continue discussions with the Ministry of the Environment, Conservation and Parks (sarontario@ontario.ca) regarding permitting requirements under the Endangered Species Act. It is anticipated that an Overall Benefit Permit will be required for impacts to regulated habitat for Redside Dace associated with the crossings of East Huttonville Creek and West Huttonville Creek. During detailed design, consultation with DFO and MNRF/MECP regarding the work proposed at these crossings should be conducted to determine offsetting plan requirements.
	1.13		– To comply with the requirements of the Migratory Birds Convention Act (MBCA), it is recommended that disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the breeding bird window of April 1 to August 31. In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey will be conducted by a qualified avian biologist. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.
	1.14		– A tree inventory and tree preservation plan should be developed during detailed design. The need for a tree compensation strategy will be confirmed during detailed design.
	1.15		– If tree removals are proposed, all trees must be assessed as to their use by species at risk bats in consultation with MNRF/MECP.
	1.16		– Opportunities to reduce the design footprint and minimize impacts to natural features will be reviewed during detailed design.
	1.17		– Environmental Management Plans per CVCA's guidelines, or their equivalent if submitted within other technical reports, are to be provided for any active groundwater controls or dewatering activities for construction.
	1.18		– Confirmation of permitting requirements for Redside Dace to establish if there have been any changes at the agency with respect to the species. This will ensure that all the necessary permit requirements are met. If required, the necessary permit(s) and associated offset plans will be secured during detailed design.
	1.19		– The design of the East Huttonville Creek and West Huttonville Creek crossings should consider passage by aquatic and terrestrial wildlife. CVC's Fish and Wildlife Crossing Guidelines (2017) are to be reviewed for further guidance during detailed design. Specifically, crossings should be designed to facilitate passage by large mammals, such as deer and coyote.
	1.20		– A mitigation and/or compensation strategy to address anticipated temporary and permanent impacts to unevaluated wetlands should be developed through consultation with regulatory agencies during the detailed design phase. It is expected that areas temporarily disturbed during construction will be restored and/or enhanced, whereas, areas that may be permanently impacted, either directly or indirectly by the bridge construction, may be addressed by enhancing wetlands elsewhere in the study area or offset through feature replacement. Opportunities for habitat enhancement, restoration, and/or offsetting may be explored and implemented as part of the Overall Benefit Permit.
Archaeology			
2.0	2.1	MTCS	– Undertake and incorporate findings and recommendations from Stage 2 Archaeological Assessments. Findings from subsequent archaeological assessments are to be filed with the Ministry of Tourism, Culture and Sport (MTCS) to obtain clearance for archaeology.
Property Impacts			
3.0	3.1	Property Owners City of Brampton	– Review opportunities to further optimize the design and minimize impacts to adjacent properties.
	3.2		– Review design opportunities to further minimize property acquisition requirements.
	3.3		– Property and easement requirements identified in this ESR and shown on the preliminary design drawings will be finalized during detailed design, taking into consideration design optimizations.
	3.4		– Permission to Enter Agreements are to be obtained from landowners where access to their property is required for construction staging or access
	3.5		– Property owners who will be impact should be consulted during the development of construction staging plans to maintain access to properties and minimize impacts as feasible.
Roadway Design			
4.0	4.1	City of Brampton	– The City will address design requirements through the preparation of contract drawings and specifications. Final alignment and right-of-way for the road segment west of Mississauga Road are subject to future development planning and will be finalized through detailed design of subdivision without the need to amend the Environmental Study Report.

	4.2		– At the time of detailed design, any changes to City design standards and/or industry best practices compared to those available at the time of the EA are to be considered.
	4.3		– Signage and pavement markings are to be confirmed during detailed design.
Streetscaping and Landscaping			
5.0	5.1	City of Brampton	– Streetscaping opportunities as identified in the preliminary designs are to be confirmed.
	5.2		– A streetscaping plan, including individual tree planting locations, is to be developed during detailed design.
Stormwater Management and Drainage			
6.0	6.1	CVC MECP	– A hydrogeological investigation must be completed that establishes the seasonally high groundwater level in accordance to CVC and TRCA's LID SWM Planning and Design Guide which states that "Designers should ensure that the bottom of the swale is separated from the seasonally high-water table or top of bedrock elevation by at least one (1) metre to prevent groundwater contamination."
	6.2		– The MOECC SWM Planning and Design Manual (2003) shall be referred to for detailed guidance on the design of a bioswale (dry swale) and bioretention facility.
	6.3		– The location(s) of pre-treatment measures utilized (CB Shields, inlet sumps, level spreaders) shall be identified in the ROW Typical Cross-Sections to ensure they are utilized in the appropriate location.
	6.4		– The Region of Peel is currently in the process of completing the detailed design for the Mississauga Rd. widening (from Bovaird Dr. to Mayfield Rd.). This widening proposes three outlets on the east side of Mississauga Rd., in the vicinity of the intersection with Lagerfeld Rd. It is CVC's preference to decrease the number of storm outlets to the regulated watercourses. Appropriate outlet locations shall be coordinated in conjunction with the related works.
	6.5		– All infrastructure (specifically storm outlets) must be located outside of the local erosion hazard associated with the regulated watercourses. This will be determined in conjunction with the geomorphic assessment at the detailed design stage. The detailed design of these outlets must incorporate appropriate erosion control measures and treatment as outlined in the EA.
	6.6		– The proponent is responsible for the submission and ultimate implementation of a comprehensive ESC plan for each stage of construction. If the construction duration is relatively long and/or the watercourse is sensitive, multi stage construction ESC plans will be required to ensure adequate control for the entire period of work. – If necessary, a flow diversion or by-pass plan must also be submitted. – In the instances where groundwater is high, and dewatering is required, during construction activities a dewatering plan will be required by a qualified person. – Please refer to the Standard Notes for Drawings Submitted for CVC Review and apply the notes to the Erosion and Sediment Control drawings as necessary.
	6.7		– Dewatering requirements are to be confirmed during detailed design. If the potential daily withdrawal of each of the construction dewatering estimates may be greater than 50,000 liters per day but less than 400,000 liters per day, Environmental Activity and Sector Registry (EASR) may be required to permit the construction dewatering as stipulated by MECP. An EASR for construction dewatering would apply to the entire project and therefore construction would need to be staged such that the dewatering demands of the entire project do not exceed the 400,000 liters per day limit at any time. If simultaneous dewatering is required that would result in the project takings exceeding the 400,000 liters per day rate, then a Permit to Take Water (PTTW) would be required from the MECP to permit this level of water taking.
	6.8		– Should a PTTW be required, a discharge management plan is to be prepared together with erosion and sediment control measures for around water features (Huttonville Creek). The proposed plans should take into consideration the sensitive environmental features and fish habitat.
	6.9		– Additional water quality control measures including Low Impact Development (LID) strategies are to be reviewed during detailed design.
	6.10		– CVCA review and approval is required for all work in areas which are regulated by CVCA.
	6.11		– The need for an Environmental Monitoring Plan, or its equivalent if submitted within other technical reports, will be reviewed in consultation with CVCA
	6.12		– Environmental Compliance Approval (ECA) will be required from MECP for stormwater management facilities and storm sewers.
	6.13		– During detailed design and prior to construction, the following should be conducted: ○ Refine estimates of dewatering rates to confirm if an EASR or PTTW is required for construction; ○ Characterize groundwater quality in areas to be dewatered; ○ Identify need for treatment of groundwater prior to discharge, and recommend appropriate treatment methods, if required; ○ Where treatment of pumped groundwater is required, an ECA from the MECP may be required.

	6.14		– There is an increase in flood elevations for the preferred alternative, particularly for the reach of East Huttonville Creek. Table 3-3 (Crossing 1B East) in the Stormwater Management and Drainage Report indicates that the maximum increase in Regional flood elevation is 230 mm right upstream of the crossing and this increase vanishes at further upstream cross sections. Appendix B of the same report presented floodplain delineation under existing and Alternative 1B and it shows that the floodline extent will increase in the order of 1.5 m horizontally, contained within the creek corridor. The increases noted are contained within property limits of the City of Brampton. This increase in the floodline limits does not impact any private or Regional properties. In addition, there are no off-site impacts to regional property.
	6.15		– The proposed design, particularly for the preferred Alignment 1B, has specified the bridge abutments are located within the erosion hazard / meander belt. A more detailed geomorphic assessment must take place during detailed design in order to clearly define the impacts this may have on the hazard and to ultimately confirm the 100-year erosion hazard at these locations. More detailed geomorphic assessment must take place during detailed design in order to clearly define the impacts this may have on the hazard and to ultimately confirm the 100-year erosion hazard at these locations.
	6.16		– In regard to CVC's expectations within the EA in anticipation of the detailed design, exact location of the proposed bridge abutments will be determined by a Fluvial Geomorphologist during the detail design to ensure that they are located outside the 100-year erosion hazard limits to satisfy the CVC Design Criteria. If this cannot be achieved, then scour protection or banks hardening measures will be designed at the toe of the abutments.
	6.17		– There are a number of ongoing projects in the general project area which may affect future flows/modeling and will need to be further coordinated to ensure the prospective design is not altered due to any of the adjacent projects. Further coordination of the hydraulic modeling will be undertaken during the detail design stage to ensure the prospective design is not altered due to any of the adjacent projects.
Geotechnical Investigation			
7.0	7.1	City of Brampton MECP	– All areas of the proposed road reconstruction and proposed creek crossing abutments should be stripped of topsoil and sub-excavated to the proposed subgrade level. Prepared structural subgrade areas should be proof-rolled using a self-propelled vibratory compactor with a minimum static weight of 8 tonnes. Any new fill from onsite cuts or offsite borrow sources, should be approved by the Geotechnical Engineer and /or designated QP. Material should be placed in 200 mm maximum loose lifts, compacted to the following Standard Proctor Maximum Dry Density (SPMDD) requirements (per ASTM D698) based on presumptive loading conditions: Material placed below structurally loaded areas: 100 % — 100 % SPMDD Material placed below roadways: — 98 % SPMDD Materials placed within general fill areas: — 95 % SPMDD Moisture adjustments may be required to compact materials to the required design standards, as directed by the Geotechnical Engineer.
	7.2		– Based on OHSA criteria, the site soils (till) above the groundwater table may be considered a Type 2 soil, while site soils below the groundwater tables should be considered a Type 4 soil. Excavation sidewalls in a Type 2 soil should be sloped at a maximum of 1H:1V to within 1.2 m of the base of the excavation, while excavation sidewalls in a Type 4 soil should be sloped at a maximum of 3H:1V to the base of the excavation. If localized instability is noted during excavation, or if wet conditions are encountered, side slopes should be flattened as required to maintain safe working conditions. If excavation side slopes cannot be achieved due to site confinement, shoring should be designed and installed. Relatively minor seepage into open cut excavations above the groundwater table may be controlled using filtered sumps and pumps. All dewatering shall be completed according to OPSS 518 and shall be completed using submersible pumps and sumps, well points or diversions as required. If dewatering activities are to exceed 50,000 L/day the project would either need to be registered under the Environmental Sector and Registry (ESAR) program by the MOECC (for up to 400,000 L/day) or require a permit to take water (PTTW) (greater than 400,000 L/day). Both an EASR or a PTTW application should be done well in advance of construction, by a Qualified Person (QP), and consider the pumping rates, drawdown, water quality for discharge, ground effects, and monitoring requirements.
	7.3		– Buried infrastructure pipes below the proposed route may be installed with Class B bedding, in accordance with the OPSD 802.010. Bedding materials can be well graded, granular fill, such as Granular A (OPSS 1010), 19 mm crushed Clear Stone Bedding (OPSS 1010) or HPBS (OPSS 1010) with a minimum compacted thickness of 150 mm. Pipe bedding and cover materials should be compacted to at least 98 percent of SPMDD for Granular Materials.
	7.4		– Based on Ontario Provincial Standard Drawing (OPSD) 3090.101 (Foundation Frost Penetration Depths for Southern Ontario), professional experience, soil types, and proposed structures, foundation elements and roadways should be designed in consideration of at least 1.3 m frost penetration. Earth cover or an equivalent thickness of insulation installed according to manufacturer's specifications may be used for frost protection.
	7.5		– Based on the soil conditions encountered in the boreholes, available information, and in accordance with Table 4.1.8.4.A of the 2012 Ontario Building Code, we recommend that Site Class 'D' be assumed for design.
	7.6		– Recommended pavement structures have been determined based on expected road classification and the City of Brampton Design Standards, specifically Standard 208 dated May 13, 2014.

			<table><tr><td>**Asphaltic Concrete OPSS HL-1**</td><td>50 mm</td><td rowspan="2">92.5 % to 97.5 % MRD</td></tr><tr><td>**Asphaltic Concrete OPSS HL-8**</td><td>100 mm (2 lifts)</td></tr><tr><td>**Base Course OPSS 1010 Granular 'A'**</td><td>150 mm</td><td>98% SPMDD</td></tr><tr><td>**Subbase Course OPSS 1010 Granular 'B' Type 1**</td><td>450 mm</td><td>98% SPMDD</td></tr></table> The final subgrade should be sloped towards storm water control structure at a minimum cross fall of 2 %. Geotextile wrapped perforated subdrains consisting of a 150 mm diameter pipe are recommended at curb lines within the subgrade. The subdrains should be constructed in a minimum 300 mm wide and 300 mm deep trench, backfilled with an OPSS 1010 19 mm crushed clear stone. Subdrains should be connected to catch basins or other positive, frost free outlets. The clear stone should be wrapped on all sides with a geotextile (Terrafix 270R or an approved equivalent), and adjacent sheets of geotextile should be overlapped a minimum 450 mm. The pavement structure should also be graded towards the drainage ditches, or an approved alternative storm water control structure. The western leg of the proposed Brampton East-West Connector is proposed to cross a Trans-Canada pipeline. The presence of the pipeline is not expected to affect the proposed pavement structure. However Trans-Canada may require modifications to provide a thicker pavement structure where the proposed road crosses the pipeline. WSP should be consulted to confirm that any modified pavement structure is suitable.
	7.7		– Creek Crossings: It is recommended that proposed creek crossing structures be supported on concrete footings, placed directly on compact to dense native till, or engineered fill placed directly on such soils. Alternatively, higher bearing capacities may be achieved if foundations are extended deeper into the till; groundwater controls and shoring system may be required for deeper foundation construction below the water table. Alternative deep foundation solutions may include (but not necessarily be limited to) driven piles, augered piles, or helical piers. For design purposes, the recommended geotechnical resistance at Ultimate Limit States (ULS) (factored) and geotechnical reaction at Serviceability Limit States (SLS) for shallow spread footing foundations bearing on compact to dense till (or engineered fill placed directly on such material), are 225 kPa and 150 kPa, respectively. The geotechnical reaction at SLS is based on a total allowable settlement of 25 mm and maximum differential settlement of 15 mm. Engineered fill upon which footings are placed must be at least 300 mm in thickness.
	7.8		– It is recommended that a free draining, non-frost susceptible granular material, such as Granular 'B' (OPSS Form 1010), be utilized as backfill to the structure abutments. The backfill should extend horizontally from the back of the abutment for a minimum distance of 1.5 m. Provision for drainage of the backfill should be implemented.
	7.9		– For the purpose of preliminary design, it is assumed that lateral earth pressures are developed from free-draining granular backfill. The following unfactored earth pressure coefficients are recommended for design of retaining walls and underground structures. o Unit weight of Granular Materials (compacted to 100% SPMDD) : 23 kN/m3 o Passive Earth Pressure Coefficient, Kp =3.3 o Active Earth Pressure Coefficient, Ka =0.3
	7.10		– Once the location-specific hydraulic factors are determined, scour protection measures, if required, should be implemented as outlined in the Canadian Bridge Design Code.
	7.11		– If construction dewatering is required, manual monitoring should be conducted on a monthly basis. A minimum of 6 to 12 months of baseline information shall be collected to assess seasonal fluctuations and the impact of precipitation / spring melt on shallow groundwater levels. Project specific monitoring wells shall be measured on a daily basis for at least one week prior to the start of the dewatering system.
	7.12		– Pre-construction monitoring should be carried out on a monthly basis to identify the groundwater contribution to the streams near the crossings, with the frequency increasing to daily for at least one week prior to the beginning of dewatering.
	7.13		– Water quality shall be tested against PWQO parameters to ensure compliance prior to discharge to the natural environment. Water quality exceedances shall be reported to the contractor in order to initiate a treatment plan prior to discharge. The baseline water quality will be tabulated and compared against the Ontario Drinking Water Quality Standards (ODWQS).
	7.14		– Background surface water quality shall be tested in both branches of Huttonville creek once prior to the start of construction. Water quality shall be tested against PWQO parameters to provide additional baseline information to inform the discharge plan.
	7.15		– During active dewatering, the contractor will be required to document discharge pumping rates as a required condition of the PTTW, with regular reporting of water taking volumes via the MECP Water Taking Reporting System.
	7.16		– Once dewatering proceeds, it is recommended that groundwater levels be monitored across the monitoring well network to detect construction related impacts to water supply in the creeks or adjacent properties. During the construction period, if there are any groundwater supply complaints received, they can be reviewed on a case by case basis to determine the cause of the

			disruption and the need for mitigation, in accordance with groundwater supply protection best management practices. If remediation is required, the short-term solution must include provisions to supply potable water to any affected users. Long-term remediation will require provisions on a case-by-case basis.
	7.17		– During construction, and when area groundwater levels exceed the streambed elevation (i.e. springtime), the water level in the piezometers should be monitored on a daily basis for evidence of any lowering to the water table. If impacts are observed from active dewatering, the pumping rates should be lowered until conditions return or treated water can be directed back to the watercourse to allow for flow supplementation. Reducing excavation areas near the tributaries and within the expected zone of influence to 25 m length can also be implemented to further reduce pumping rates if any impacts are observed.
	7.18		– Water clarity and sediment level should also be monitored to ensure that the quality is not degrading during construction. Filters should be examined on a regular basis, and any failures to equipment should be repaired immediately. To ensure that excess erosion and sediment-laden water is not directed into the nearby watercourse, and in accordance with OPSS 518 (and 185), all dewatering discharge will be laminar and directed through energy dissipating / settling / filtration systems prior to return to the natural environment.
	7.19		– Should dewatering discharge back to the natural environment be directed towards either watercourse, additional sampling is to be conducted on a weekly basis during the first month of discharge to evaluate changes from baseline conditions. Samples are to be taken upstream and downstream of the discharge point to assess potential impacts. Should significant changes in water quality occur, mitigation should be initiated, which could include changing discharge locations, reducing dewatering volumes, suspension of dewatering, or adding additional treatment measures.
Hydrogeological Investigation			
8.0	8.1	City of Brampton	– Equip monitoring wells with data loggers to measure groundwater levels for 6 to 12 months to assess seasonal fluctuations and the impact precipitation/spring melt has on the shallow groundwater.
	8.2		– Produce dewatering estimates during the detailed design stage to assess for discharge and permitting needs.
	8.3		– Prior to construction dewatering, conduct a door-to-door water well survey for all water supply wells located within the Study Area to provide a baseline assessment of pre-construction conditions.
	8.4		– Review the potential impacts to surface and groundwater based on the dewatering assessment to direct future monitoring and mitigation.
	8.5		– In places that the depth of excavation is above the water table, some groundwater seepage could be expected from perched groundwater and other sources of nuisance water. It is expected that traditional pumping from gravity fed filtered sumps would be adequate to control this source of groundwater. Surface water in the form of precipitation should be controlled by directing it away from open excavations. In cases where a deeper excavation below the water table is required, a dewatering assessment will be required to assess expected flow rates and whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a Permit to Take Water (PTTW).
	8.6		– Dewatering efforts should focus on lowering the water table to a minimum of 1.0 m below the base of excavation. Limiting the open trench length to distances of less than 50 m for these deeper excavation areas can reduce the dewatering effort and therefore the discharge rates. A dewatering assessment will be required to assess potential flow rates during the detailed design stage to determine whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a PTTW.
	8.7		– The accumulation of stormwater into open excavations can increase the volumes associated with construction dewatering. Additional capacity should be accounted for to control larger precipitation events that could otherwise disrupt construction. Best efforts should be made to divert stormwater runoff from entering open excavations. The dewatering contractor should consider additional capacity to handle the additional source of water during weather events.
Trans-Canada Pipeline			
9.0	9.1		The following requirements from the Canadian Energy Regulator Act (the Act) and Canadian Energy Regulator Pipeline Damage Prevention Regulations-Authorizations (the DPRs) should be considered well in advance of any construction of the proposed extension of the Lagerfeld Drive. Pursuant to Section 335 of the Act and the DPRs, written consent from TC Energy must be obtained with respect to any of the following activities: – Constructing or installing a facility across, on, along or under a pipeline, which includes anywhere within the pipeline right-of-way arising from the definition of “Pipeline” in the Act, which includes the associated real property. – Conducting any ground disturbance (most commonly excavation or digging) within the Prescribed Area which is measured 30 meters perpendicularly from the center of each pipe. – Operating a vehicle or piece of mobile equipment or machinery, outside the travelled portion of a highway or public road, across, on, or along a pipeline, which includes anywhere in the pipeline right-of-way given the definition of “Pipeline” in the Act, which includes the associated real property. – Use of the Prescribed Area or the pipeline right-of-way for storage purposes.
	9.2		The following provides guidance for crossings. While exceptions might be made once an assessment has been completed, adhering to the guidance will assist in effort to process applications expeditiously.

			General requirements: – The crossing shall occur as close as possible to 90 degrees. – The crossing shall not occur at a bend in a TransCanada pipeline.
	9.3		*General conditions for Crossings of TransCanada Pipelines by Highways, Private Roads, and Railways:* – A highway of private road shall be constructed so that the travelled surface is no less than 1.5 meters above the top of the pipeline. – The bottom of the ditches adjacent to roads should not be less than 1.4 meters above the top of the pipeline. – Minimum cover for railway crossings (below base of rail) is 3.05 meters for uncased pipe.
	9.4		*General conditions for crossings of TransCanada's Pipelines by Utilities:* – TransCanada shall retain the upper position in the crossing area. – Minimum separation between buried facilities shall be 600mm for open cut excavations and 1000mm for horizontal directional drill installation methods. – The utility depth shall be maintained for the entire width of the right-of-way. – The utility shall have no bends within the pipeline right-of-way. – The utility shall have no joints, splices or other connections within the TransCanada pipeline right-of-way. – Pipeline crossings should not be placed within 7m of a TransCanada pipeline bend.
	9.5		– Following is a link to TransCanada's website for additional information on crossings: http://www.transcanada.com/en/commitment/safety/working-safely-around-pipelines
	9.6		– Pipeline remediation and protection work may be required at the crossing location, Pipeline remediation and protection work usually requires 2 years lead time to complete and is reimbursable to TransCanada. As such, TransCanada suggests that detailed designs are developed and submitted a minimum of 2 years in advance of any work talking place.
	9.7		– Regarding the crossing of the proposed extension of Lagerfeld Drive crossing the pipelines, TC Energy offers the following comments: – All structures such as curbs and gutters that are not part of the perpendicular road surface, street lighting, catch-basins, manholes and retaining walls, must be set back a minimum of 7 meters from the edge of the pipeline rights-of-way. – TC Energy will not accept grading within the right-of-way outside of crossings. Grading design should be planned such that the depth of cover over the pipeline will be maintained at current levels. – On the topic of stormwater management, TC Energy is assuming from the diagram shown at our October 29, 2020 meeting that the extension of Lagerfeld Dive will not require stormwater to cross the right-of-way. Major system flows of stormwater, including those carried by the proposed extension of Lagerfeld Drive, must be designed so as not to spill into the rights-of-way at the crossings. All drainage of the proposed extension should be directed away from the pipeline rights-of-way. – Depending on the outcome of a preliminary review of the crossing design, it is possible that an engineering assessment, involving excavation and inspection, of the pipeline prior to construction will be required in order to that TC Energy comply with CSA requirements, specifically Section 10.8.1 of CSA-Z662. If so, TC Energy will be required by the Canada Energy Regulator to prepare a detailed engineering analysis of all loads expected during construction and operation of the crossing and will provide designs for appropriate mitigation. The cost of this engineering assessment, analysis and design work, and the costs of any required mitigation, if incurred will be 100% the responsibility of the proponents. Recent examples of the cost of an engineering assessment have been in the range of $2 million to $4 million dollars. – A key factor in determining the need for an engineering assessment at the cost of the proponents will be the proximity of other crossings of Lagerfeld Drive, specifically: (1) Intersections of proposed local roads east and west of the right-of-way with Lagerfeld Drive; (2) A proposed crossing of a local road north of Lagerfeld Drive; (3) The crossing of Huttonville Creek; (4) A potential crossing of a storm sewer to a stormwater management facility proposed east of the right-of-way; (5) The crossing of the CN Rail north of Lagerfeld Drive; (6) A crossing of Bovaird Drive currently in preliminary engineering as planned by the Region of Peel; and, (7) A crossing of Mississauga Road incorporating significant grading currently in detailed engineering as planed by the Region of Peel. Each of these crossings considered in isolation would not typically require an engineering assessment; however, the number of crossings considered together within a relatively small area proposed along Lagerfeld Drive together with the design of the surrounding community will potentially alter TC Energy's ability to adequately access, maintain or manage the associated risk to the pipelines, thereby impacting whether crossings can be permitted.

Preliminary Streetlighting Design			
10.0	10.1		– the photometrics provided are not based on the street lighting pole locations shown on the preliminary design and a new photometric calculation will need to be completed during detailed design.
Utilities			
11.0	11.1		– Location of existing utilities and resulting impacts and required relocations are to be confirmed.
	11.2		– Formal definition of impacts on utilities including Trans Canada Pipelines will be determined during detailed design, in consultation with individual utility companies.
	11.3		– All utility information should be updated prior to construction to ensure that the data is accurate and to finalize relocation requirements as necessary.
	11.4		– During detailed design, consultation with utility companies as required where potential impacts to existing or future services are identified
Construction Staging			
12.0	12.1		– Develop a traffic management plan to determine how vehicular and pedestrian traffic will be accommodated during construction. – Construction of the east segment of Lagerfeld Drive should proceed ahead of the west segment, due to an ongoing adjacent developmental needs.

11 SUMMARY AND CONCLUSIONS

This Environmental Study Report (ESR) was prepared pursuant to the Municipal Class EA to facilitate the Lagerfeld Drive extension from the Mount Pleasant GO Station, west across Mississauga Road to address the identified transportation deficiencies. The ESR provides a full and complete account of Phases 1 through 4 of the planning process followed for the project.

This study involved undertaking an inventory of the natural, physical, socio-economic, cultural and technical setting within the Study Area. This information was used to produce maps identifying features and areas, which could be sensitive to roadway construction, and to facilitate the identification of alternative solutions and designs. The alternative solutions and designs were then compared and a preliminary preferred solution, and a preferred design concept was selected. The preferred design balances environmental and socio-economic impacts in a cost-effective manner.

Regulatory agencies, affected property owners and stakeholders have participated in the planning process by providing input through the study. Two Public Information Centres (PICs) were held to inform the public and regulatory agencies about the project and to solicit feedback on the environmental features inventoried within the study area, the planning process followed, proposed evaluation criteria, the alternative solutions/design concepts identified, and the preliminary preferred solution/design concept. A Technical Advisory Group (TAC) composed of the City, MNRF and CVC was convened to consult on the specific concerns and requirements for the proposed alignments, water crossings and structures. A landowner group composed of area developers was convened to coordinate development applications and receive comment on the proposed alignments. Based on the EA process and the consultations carried out throughout the study, R, a preferred design concept for the preferred solution was chosen. The preferred design for the project is the continuation of Lagerfeld Drive to lands west of Mississauga Road, with an alignment past Mississauga Road at 419m offset from Bovaird Drive centreline. Additional improvements include:

- A clear span bridge over the eastern branch of Huttonville Creek;
- A clear span bridge over the western branch of Huttonville Creek;
- Accommodation of active transportation activities (e.g., sidewalks, and multi-use paths) on Lagerfeld Drive.

The overall conclusion drawn from this ESR is that construction of the proposed improvements can be achieved with minimal disruption to and impact upon the natural, physical, socio-economic and cultural environment. The principal negative impacts will include Redside Dace habitat interference. Subject to provincial policies and existing guidelines for protection of Redside Dace habitat, an overall benefit permit will be required as part of the detailed design phase of the project. The overall benefit is expected to be above and beyond normal requirements and will be subjected to further discussion with MECP at the detailed design phase.