Mississauga Bus Rapid Transit (BRT) Project *CEAA* Screening Report

MAIN REPORT (Book 1)

January 2009

TABLE OF CONTENTS – BOOK 1

LIST OF FIGURES

LIST OF TABLES

DESIGN PLATES & APPENDICES – BOOK 2 (UNDER SEPARATE COVER)

GLOSSARY

AAQC	**Ambient Air Quality Criterion**
ANSIs	**Areas of Natural or Scientific Interest - Life or Earth Science**
asl	**above sea level**
bgs	**below ground surface**
BRT	**Bus Rapid Transit**
BRT West	**The segment of the Mississauga BRT between Winston Churchill Boulevard and Erin Mills Parkway to the north of Highway 403.**
BRT East	**The segment of the Mississauga BRT between Hurontario Street and Renforth Drive running alongside Eastgate Parkway and Eglinton Avenue**
CEAA	***Canadian Environmental Assessment Act***
CoCs	**Contaminants of Concern**
COSSARO	**Committee on the Status of Species at Risk in Ontario**
COSEWIC	**Committee on the Status of Endangered Species in Canada**
CVC	**Credit Valley Conservation Authority**
CWS	**Canada Wide Standard**
dB	**Decibel**
dBA	**Decibel (A Scale)**
DFO	**Department of Fisheries and Oceans Canada**
EA	**Environmental Assessment**
EC	**Environment Canada**
ELC	**Ecological Land Classification**
EO	**Element Occurrence**
ESA	**Environmental Site Assessment**
FA	**Federal Authority**
FRT	**Federal Environmental Assessment Review Team**
GO Transit	**Greater Toronto Transit Authority**
GTA	**Greater Toronto Area (i.e. Toronto, Halton, Peel, York, Durham Regions)**
HIP	**Habitat Implementation Plan**
HC	**Health Canada**
INFC	**Infrastructure Canada**
MNR	**Ministry of Natural Resources (Ontario)**
MTO	**Ministry of Transportation (Ontario)**
NEB	**National Energy Board**

NHIC	**Natural Heritage Information Centre**
NRVIS	**Natural Resources and Values Information System**
NWPA	***Navigable Waters Protection Act***
OPSS	**Ontario Provincial Standard Specification**
PIC	**Public Information Centre**
$PM_{2.5}$	**respirable (fine) particulate matter**
PM_{10}	**inhalable (coarse) particulate matter**
PSW	**Provincially Significant or Locally Significant Wetland**
RA	**Responsible Authority**
ROW	**right-of-way**
SAR	**Species at Risk**
SARA	***Species at Risk Act***
SMA	**Special Management Area**
TC	**Transport Canada**
TOV	**Total Organic Vapor**
TRCA	**Toronto and Region Conservation Authority**
US EPA	**United States Environmental Protection Agency**
VOCs	**Volatile Organic Compounds**
WWIS	**Water Well Information System**

EXECUTIVE SUMMARY

This report has been prepared in accordance with the requirements of the *Canadian Environmental Assessment Act* (*CEAA*) to review and document the potential environmental effects of the Mississauga Bus Rapid Transit (BRT) Project. The report was structured based on the information request included the Federal Scoping Document (November 2007) prepared by the Federal Environmental Assessment Review Team (FRT) (copy provided in **Appendix A**). The following provides an overview of the various sections of the report.

Introduction and Scope of the Project (Chapters 1 and 3)

Mississauga's Rapid Transit program is centred on a bus-only roadway (busway) running across the heart of the City. The Mississauga Bus Rapid Transit facility (also known as the Mississauga Transitway) is also the Mississauga segment of the Greater Toronto Transit Authority's (GO Transit's) Inter-Regional Bus Rapid Transit. This Bus Rapid Transit (BRT) facility was planned and approved under the Ontario *Environmental Assessment Act* in the early 1990s, and a Provincial EA Addendum for an updated plan was approved in 2005. The project is now getting underway, courtesy of funding from the federal, provincial, and municipal governments. The Preliminary Design of the facility is currently being undertaken and construction is scheduled to be completed by 2013.

This project, Phase 1, includes a two-lane bus-only roadway (busway) that will run parallel to parts of Highway 403, Eastgate Parkway, and Eglinton Avenue. The busway will have 3.75m lanes, 2.75m shoulders and will fit within an approximate right-of-way of 30m. The current project addresses Phase 1 of the busway which will include eleven stations. At these stations, Mississauga Transit and GO Transit buses will serve passengers transferring from local bus routes, people walking or cycling to and from nearby homes and workplaces, and commuters getting dropped off by car. Ultimately two additional stations will be provided (not part of this project).

This project includes two main sections which are sometimes referred to as BRT West and BRT East. BRT West runs between Winston Churchill Boulevard and Erin Mills Parkway to the north of Highway 403. BRT East runs between Hurontario Street and Renforth Drive running alongside Eastgate Parkway and Eglinton Avenue. The bus bypass which connects BRT West and BRT East is already operational, making use of the bus bypass shoulder along Highway 403 and running along Centre View Drive, and is <u>not</u> part of the scope of this project (Phase 1).

There will be bus routes that stop at each station and others that operate express to selected major stations. The busway will also accommodate buses that pick up passengers in the community and travel to a station to drive directly on to the busway and into the City Centre.

The busway will be grade separated from all crossing roads, allowing buses to operate at up to 80 km/h on their own roadway, with no other traffic, no signals, and no stop signs. Bus passengers will enjoy a smooth, fast, reliable trip through a landscaped corridor. High quality stations will welcome users with elevators, protected walkways, an open, secure environment, clear and up-to-date travel information, and attractive architecture. Wherever possible, the stations will be connected to adjacent office buildings and communities. Parking areas will be well-lit and pathways leading to stations will be convenient and inviting.

Federal Environmental Assessment Process (Chapter 2)

The FRT is comprised of Federal Agencies that have an approval authority for a component of the project (Responsible Authorities) and those that provide expert advice to assist in the Responsible Authorities review. Additional details on the FRT are included in **Chapter 2** of this report.

The Responsible Authorities have a legal responsibility to review this project in accordance with the requirements of the *CEAA* to determine whether the project is likely to cause any significant adverse environmental effects. This *CEAA* Screening Report is intended to assist the Responsible Authorities in making their determination.

The environmental effects assessment process was designed to meet the information requirements outlined in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT in November 2007. The potential environmental effects outlined in this *CEAA* Screening Report are based on the Preliminary Design of the project.

Description of the Existing Environmental (Chapter 4)

The Mississauga BRT facility stretches across central Mississauga, through a variety of land uses. Most of the BRT facility is located in the Parkway Belt West, a broad swath of public lands stretching across the western half of the Greater Toronto Area. With the exception of two creek valleys, the landscape has been modified by earthworks for utilities and infrastructure. A detailed description of the existing biophysical and socio-economic environment is provided in **Chapter 4** of this report.

Potential Environmental Effects, Mitigation and Significance (Chapter 5)

Chapter 5 of this report outlines potential effects, mitigation measures and the commitments to future work and consultation to be completed as design proceeds to ensure that the mitigation commitments outlined in this document are realized during the design, construction and operation/maintenance stages. It is also recognized that additional details will be provided at the time specific permits and approvals are sought.

The environmental effects assessment process was designed to meet the information requirements outlined in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT received in November 2007. The potential environmental effects outlined in this *CEAA* Screening Report are based on the Preliminary Design of the project.

The environmental effects assessment examined potential environmental effects during the construction phase as well as during operations and maintenance (**Section 5.1**). In addition, potential environmental effects associated with accidents and malfunctions (**Section 5.2**), effects of the environment on the project (**Section 5.3**), decommissioning (**Section 5.4**) and cumulative effects (**Section 5.5**) were examined. **Section 5.6** provides a summary of the significance of the potential environmental effects of the Mississauga BRT project both prior to and following the application of mitigation.

As noted previously, the mitigation measures documented in this report have been developed with due consideration for the full range of potential adverse effects of the project. The identified mitigation measures will be carried forward through the Detail Design, construction, operation and maintenance phases of the project, as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project to ensure that this project does not result in any significant adverse environmental effects. As the project progresses, Transport Canada and Infrastructure Canada will be provided with information regarding any substantial changes to the identified mitigation measures and will be provided with an opportunity to review and comment on those revisions.

As discussed in **Chapter 5**, most of the potential adverse environmental effects of this project will occur during the construction phase. **Chapter 5** outlines the detailed commitments for mitigation that will be employed to further reduce potential adverse environmental effects. A summary of mitigation and commitments to future work is included in **Section 5.7**.

Consultation (Chapter 6)

The Mississauga BRT project has been the subject of an extensive consultation process, stretching back to the late 1980s with the development of the Mississauga Transportation Study which established the preferred corridor. An in-depth public and agency consultation process was included in the 1990 – 1993 Provincial Environmental Assessment process (documented in the Provincial EA Report). It included surveys, cable television presentations, opinion polls, newspaper advertising, individual meetings, open public meetings, and agency liaison.

The Provincial EA Addendum process in 2003 – 2004 also had a full public and agency consultation process, covering the whole project but with a focus on aspects of the project that had changed since the 1993 plan.

At the current Preliminary Design stage, the City of Mississauga and GO Transit followed up on those earlier studies with a new public information program. This is to be carried out during the design, construction, and operation stages of the project. The program employs a number of means of informing the public of study developments and opportunities for interested members of the public to provide their input on the project, **Chapter 6** provides details regarding consultation with the general public (**Section 6.1**), external departments and agencies (**Section 6.2**), First Nations (**Section 6.3**) and property owners and developers (**Section 6.4**).

PROJECT IDENTIFICATION

Project Title: Mississauga Bus Rapid Transit Project
Project Location: City of Mississauga
NWPP File no.: 8200-08-6145
CEAR File no.: 07-01-31000

CONTACTS

Responsible Authorities:

Name: Kathryn Cooper-MacDonald
Environmental Assessment Officer
Surface Infrastructure Programs
Highways and Borders
Transport Canada
Telephone: (613) 990-1043
Fax: (613) 957-9639
E-mail: kathryn.cooper@tc.gc.ca

Name: Keith Grady
Senior Advisor, Environmental Review and Approvals
Issues Management Directorate
Program Operations Branch
Infrastructure Canada
Telephone: (613) 954-1372
Fax.: (613) 946-9888
E-mail: Keith.Grady@infc.gc.ca

Federal Authorities:

Name: Dave Gibson
Fish Habitat Biologist
Fisheries and Oceans Canada
Central and Arctic Region
Ontario-Great Lakes Area
Burlington District
Telephone: (905) 639-8269
Fax: (905) 639-3549
E-mail: Dave.Gibson@dfo-mpo.gc.ca

Name: Kitty Ma
Regional Environmental Assessment Coordinator
Ontario Region
Health Canada
Telephone: (416) 954-2206
Fax: (416) 952-0102
E-mail: kitty_ma@hc-sc.gc.ca

Name: Denise Fell
Environmental Assessment Officer
Environmental Assessment and Federal Programs
Environment Canada
Telephone: (905) 336-4951
Fax: (905) 336-8901
E-mail: Denise.Fell@ec.gc.ca

Proponents:

City of Mississauga
Telephone: (905) 615-3200

GO Transit
Telephone: (416) 869-3600

Proponents (Contacts):

Name: Geoff Wright
Project Director, Mississauga BRT Office
City of Mississauga
Telephone: (905) 615-3200 ext. 4940
Fax: (905) 615-4444
E-mail: Geoff.Wright@mississauga.ca

Name: Judy Knight
Vice-President, Corporate Infrastructure
GO Transit
Telephone: (416) 869-3600 ext. 5195
Fax: (416) 869-1755
E-mail: Judy.Knight@gotransit.com

1.0 PROJECT DESCRIPTION

1.1 PROJECT OVERVIEW

Mississauga's Rapid Transit program is centred on a busway running across the heart of the City. The Mississauga Bus Rapid Transit facility (also known as the Mississauga Transitway) is also the Mississauga segment of GO Transit's Inter-Regional Bus Rapid Transit. This Bus Rapid Transit (BRT) facility was planned and approved under the Ontario *Environmental Assessment Act* (approved on July 6, 1993), and a Provincial EA Addendum for an updated plan was approved on March 4, 2005. The project is now getting underway, courtesy of funding from the federal, provincial, and municipal governments. The Preliminary Design of the facility is currently being undertaken and construction is scheduled to be completed by 2013.

This project, Phase 1, includes a two-lane bus-only roadway (busway) that will run parallel to parts of Highway 403, Eastgate Parkway, and Eglinton Avenue. The busway will have 3.75m lanes, 2.75m shoulders and will fit within an approximate right-of-way of 30m. The current project addresses Phase 1 of the busway which will include eleven stations. At these stations, Mississauga Transit and GO Transit buses will serve passengers transferring from local bus routes, people walking or cycling to and from nearby homes and workplaces, and commuters getting dropped off by car. Ultimately two additional stations will be provided (not part of this project).

This project includes two main sections which are sometimes referred to as BRT West and BRT East. BRT West runs between Winston Churchill Boulevard and Erin Mills Parkway to the north of Highway 403. BRT East runs between Hurontario Street and Renforth Drive running alongside Eastgate Parkway and Eglinton Avenue. The bus bypass which connects BRT West and BRT East is already operational, making use of the bus bypass shoulder along Highway 403 and running along Centre View Drive, and is <u>not</u> part of the scope of this project (Phase 1).

The Preliminary Design of Phase 1 is shown in design plates included in Book 2 of this report. It should be noted that this *CEAA* Screening Report is only assessing Phase 1 as that is what is currently being constructed and funded by the Federal Government.

There will be bus routes that stop at each station and others that operate express to selected major stations. The busway will also accommodate buses that pick up passengers in the community and travel to a station to drive directly on to the busway and into the City Centre and destinations beyond (e.g. Kipling Subway Station).

The busway will be grade separated from all crossing roads, allowing buses to operate at up to 80 km/h on their own roadway, with no other traffic, no signals, and no stop signs. Bus passengers will enjoy a smooth, fast, reliable trip through a landscaped corridor. High quality stations will welcome users with elevators, protected walkways, an open, secure environment,

clear and up-to-date travel information, and attractive architecture. Wherever possible, the stations will be connected to adjacent office buildings and communities. Parking areas will be well-lit and pathways leading to stations will be convenient and inviting.

The Mississauga busway will be physically and functionally similar to the grade-separated segments of the Ottawa Transitway, which has been successfully serving that city's transit customers for over twenty years.

Additional details regarding the design are provided in **Section 3.1**.

Phase 1 funding allows the City of Mississauga and GO Transit to work together to construct the busway between Winston Churchill Boulevard and Erin Mills Parkway on the north side of Highway 403 (BRT West), and between Hurontario Street (Mississauga City Centre) and Renforth Drive (south of the Airport) alongside Eastgate Parkway and Eglinton Avenue (BRT East). Between those segments, buses will continue to use the already operational facility along Highway 403 (bus bypass shoulders). Future phases will extend and enhance the facility, especially through the City Centre area.

1.2 PROJECT JUSTIFICATION

The project has been part of Mississauga's Official Plan for nearly two decades, has gone through the Ontario Environmental Assessment process (and been approved), and had funding committed to it by the municipal, provincial, and federal levels of government. It is part of the Greater Toronto Area (GTA) transportation plan, and forms a key segment of GO Transit's Interregional Bus Rapid Transit plan stretching across the GTA from Oakville to Pickering.

Upon its completion, Mississauga BRT patrons will have frequent, direct, and rapid access to inter-regional destinations such as Pearson Airport, Kipling Subway Station, York University, uptown Oakville, and the Mississauga City Centre. Connections to other inter-regional destinations will also be provided as will be an important aspect of the overall service plan. The busway will benefit local passengers by allowing them to connect with a variety of local routes and services and those connections will operate faster and more reliably than today's buses caught on congested streets.

The BRT will assist the City of Mississauga in meeting the goals and objectives set out in their Official Plan (City of Mississauga 2005) and in particular the goals and objectives associated with developing a more sustainable transportation network. The busway has been planned to have a minimal effects on the environment and to protect nearby residents from noise, visual, or other forms of intrusion. It is a crucial part of Mississauga's plan to attract more transit riders and to reduce dependence on auto use to get around the City. This translates into reduced fuel use, less land paved for parking, greater mobility for residents and workers, and a boost to the local economy.

The BRT will make riders' travel better through:

- Increased reliability;
- Reduced travel time;
- Greater convenience; and
- Greater accessibility.

The BRT will enhance Mississauga and the surrounding communities through:

- Increased capacity;
- Reduced automobile traffic;
- Reduced emissions;
- Increased density; and
- Increased safety.

2.0 FEDERAL ENVIRONMENTAL ASSESSMENT PROCESS

2.1 FEDERAL TRIGGERS

In accordance with the *Canadian Environmental Assessment Act* (*CEAA*), each responsible authority is required to ensure that an environmental assessment is conducted before a federal authority performs one or more of the following *CEAA* triggers with respect to a project if it:

- is the proponent of a project;
- grants money or any other form of financial assistance to the project;
- leases, sells or disposes of land to enable a project to be carried out; or
- exercises a regulatory duty in relation to a project, such as issuing a permit or license that is included in the Law list prescribed by the regulations to the Act.

In accordance with *CEAA*, a screening is required for the Mississauga BRT project. Transport Canada is acting as the Federal Environmental Assessment Coordinator for the screening. The federal triggers and anticipated federal involvement are outlined in **Table 2.1-1**. This was identified through Transport Canada circulating a project description to various Federal Agencies in accordance with the *Federal Coordination Regulations*.

Table 2.1-1 Summary of Potential Federal Triggers and Federal Involvement

Federal Responsible Authorities
Transport Canada - funding, approval under the *Navigable Waters Protection Act* for the Etobicoke Creek crossing.
Infrastructure Canada - funding
Federal Authorities
Department of Fisheries and Oceans
Environment Canada
Health Canada

Note: although the study area includes pipelines regulated by the National Energy Board (NEB) none of the works will result in the need for a permit from the National Energy Board. Please refer to **Section 4.2.8** and **Section 5.1.2.4** for additional information regarding pipelines.

Other jurisdictions and agencies have been notified of this project as part of the provincial environmental assessment process and the current Preliminary Design study. Please refer to **Chapter 6** for additional information regarding consultation.

2.2 ENVIRONMENTAL ASSESSMENT METHODOLOGY AND SCOPE OF ASSESSMENT

The environmental effects assessment process was designed to meet the information requirements outlined in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT in November 2007. The potential environmental effects outlined in this *CEAA* Screening Report are based on the Preliminary Design of the project. The environmental components included in the scope of assessment have been identified through the potential interaction between the various environmental components and project components as detailed in **Table 2.2-1**.

The mitigation measures documented in this report have been developed with due consideration for the full range of potential adverse effects of the project. The identified mitigation measures will be carried forward through the Detail Design, construction, operation and maintenance phases of the project, as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project to ensure that this project does not result in any significant adverse environmental effects. As the project progresses, Transport Canada and Infrastructure Canada will be provided with information regarding any substantial changes to the identified mitigation measures and will be provided with an opportunity to review and comment on those revisions.

Chapter 5 of this report outlines potential effects, mitigation measures and the commitments to future work and consultation to be completed as design proceeds to ensure that the mitigation commitments outlined in this document are realized during the design, construction and operation/maintenance stages. It is also recognized that additional details will be provided at the time specific permits and approvals are sought.

The potential effects to valued ecosystem and social components identified in **Chapter 5** focuses on the following key steps:

- determine whether or not there are potential environmental effects and, if so, whether they are adverse;
- identify mitigation measures to mitigate potential adverse environmental effects;
- determine whether the residual adverse effects are significant; and
- determine whether significant adverse environmental effects are likely based on probability of occurrence and scientific certainty.

Chapter 4 and **Chapter 5** have been organized based on the factor areas identified in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT. The one exception is Surface Water Quality and Quantity. Since this factor area is so closely linked to water features it is documented in the Fish and Fish Habitat, Vegetation and Wetlands, and Stormwater Management sections (**Sections 4.1.1**, **4.1.2** [existing conditions], **5.1.1.1**, **5.1.1.2** and **5.1.1.8**). A separate section has been included to address navigability (**Sections 4.2.6** [existing conditions] and **5.1.2.3**).

Table 2.2-1 Potential Project-Environment Interaction Matrix

Project Phases / Components	Environmental Components														
	Direct Environmental Effects									**Indirect Environmental Effects**					
	Land	**Water**		**Air**	**Natural Systems**					**Socio-Economic**			**Cultural**		
	Physiography, Geology and Contamination	**Surface Water Quality and Quantity**	**Groundwater**	**Air Quality**	**Fish and Fish Habitat**	**Vegetation and Wetlands**	**Wildlife and Migratory Birds**	**Species of Conservation Concern and Species at Risk**	**Noise**	**Health and Wellbeing**	**Navigability**	**Pipelines**	**Archaeology**	**Heritage**
Construction:														
Excavation and grading	X	P	P	X	P	X	X	P	X	P		X	P	
Road works	X	X	P	X	P	X	X	P	X	P		X	P	
Bridge, wall, and culvert works	X	P	P	X	P	P	X	P	X	P	P	X	P	
Stations and parking lots	X	P	P	X	P	X	X	P	X	P		X	P	
Drainage and stormwater management facilities	X	X	P	X	P	X	X	P	X	P		X	P	
Utility relocations	X	P	P	X	P	P	P	P	X	P		X	P	
Equipment Maintenance	P	P	P	X	P	P	P	P	X	P				
Operation and Maintenance:														
Snow removal, salting/sanding, minor repairs and general maintenance	P	P	P	P	P	P	P	P	P	P	P	P		
Decommissioning:														
Decommissioning is not anticipated.														
Accidents and Malfunctions:														
Spills	P	P	P	P	P	P	P	P		P				
Effects of the Environment on the Project:														
Snowstorm, tornado, earthquake, severe ice, watercourse flooding, heat waves, smog alerts, fog, fire	P	P	P	P	P	P	P	P	P	P	P	P	P	

Legend: X – Presence of project-environment interaction P – Potential project-environment interaction Blank – Absence of project-environment interaction

Each section in **Chapter 5** includes documentation of potential effects, mitigation and the significance of the potential effect. The following issues were considered when determining the significance of the potential effect:

- **Direction** – measure of relative effect, i.e. positive or negative;
- **Geographic extent / location** – spatial area affected by a project – local, regional, national, global
- **Frequency** – measure of repetitions – one time, recurring
- **Duration** – measure of the length of time a potential effect could last, i.e. short-term, long-term;
- **Magnitude** – potential severity of the effect – based on relationship to a regulation or guidelines or accepted industry standards;
- **Occurrence** – measure of likelihood of the effect;
- **Reversibility/Mitigation** – the potential for recovery and ability to avoid effect or reduce time to recover;
- **Ecological** – measure of the ecological impact of the effect with consideration of the relative ecological importance of the environmental component;
- **Confidence** – level of confidence in prediction of effect;
- **Residual Effects** – measure of overall effect with consideration of reversibility/mitigation;
- **Cumulative Effects** – measure of the net environmental effects associated with the project in combination of the environmental effects of other past, present or future projects or activities; and
- **Significance** – overall impact significance of the potential environmental effects. A potential effect would be considered significant if, after considering the above criteria, there was a fairly high certainty that the project would result in a potential adverse effect that could not be reversed or mitigated and the magnitude of the residual effect was deemed to be high.

3.0 SCOPE OF THE PROJECT

3.1 PROJECT COMPONENTS DESCRIPTION

Under *CEAA*, "Scope of the Project" refers to those components of the proposal that should be considered part of the project for the purposes of the assessment.

The Responsible Authorities determine which undertakings, in relation to a physical work, fall within the scope of a project and this is partially determined by the federal triggers. For this project the Responsible Authorities have indicated that the "Scope of the Project" includes all aspects of the project related to the construction, operation, maintenance and decommissioning phases of the Mississauga BRT. Issues associated with accidents and malfunctions will also be considered.

Table 3.1-1 summarizes the various activities by project phase.

Table 3.1-1 Summary of Activities by Project Phase

Project Activity	Related Activities
Construction	
Approximately 11 km of dedicated busway: - 9.1 km for BRT East (Hurontario to Renforth) - 1.8 km for BRT West (Winston Churchill to Erin Mills)	Site excavation and grading, vegetation clearing, drainage, street construction, overhead electrical installation, paving, signal installation, utility relocation, sediment and erosion control measures, stormwater management facilities, security features, installation of lights and communication systems, transportation and storage of construction materials and equipment, vegetation/habitat restoration, construction of multi-use pathways and sidewalks, construction of retaining walls, traffic management, landscaping
11 new stations: - Winston Churchill - Erin Mills - Central Parkway - Cawthra - Tomken - Dixie - Tahoe - Etobicoke Creek - Spectrum - Orbitor - Renforth	Site excavation and grading, vegetation clearing, drainage, street construction, installation of platforms and shelters, building erection, construction of stairs, elevators, and pedestrian bridges, utility relocation, sediment and erosion control measures, stormwater management facilities, security features, installation of lights and communication systems, transportation and storage of construction materials and equipment, vegetation/habitat restoration, construction of multi-use pathways and sidewalks, landscaping

Project Activity	Related Activities
5 new parking facilities associated with the following stations: - Winston Churchill - Erin Mills - Cawthra - Tomken - Dixie	Site excavation and grading, vegetation clearing, drainage, street construction, utility relocation, sediment and erosion control measures, stormwater management facilities, security features, installation of lights and communication systems, transportation and storage of construction materials and equipment, vegetation/habitat restoration, landscaping
21 new road structures - Winston Churchill N-W Ramp - Winston Churchill Blvd - Winston Churchill S-W Ramp - Winston Churchill E-N/S Ramp - Glen Erin Drive - Sherwoodtowne Blvd - Central Parkway - Highway 403 W-N/S/E Ramp / E/N/S-W Ramp - Cawthra Road - Tomken Road - Dixie Road - Eastgate Parkway - Fieldgate Road - Tahoe Drive - Eglinton Avenue - Bell Mobility Entrance (opposite from the intersection of Tahoe Drive and Eglinton Avenue) - Spectrum Way - Satellite Drive - Orbitor Drive - Explorer Drive - Commerce Blvd.	Site excavation and grading, vegetation clearing, drainage, street reconstruction, bridges, culverts, retaining walls, traffic management,

Project Activity	Related Activities
Three existing structures requiring modification (e.g. rehabilitation, retrofitting, extension, widening) - Cooksville Creek (culvert modification) - Little Etobicoke Creek (culvert extension) - Etobicoke Creek (bridge widening)	Site excavation and grading, vegetation clearing, drainage, street reconstruction, rehabilitation or retrofitting works, extension or widening works, traffic management
Operation and Maintenance	
Service and Alignment	General operation of the busway, stations and parking facilities, repair or replacement of underpass, bridge structures, culverts, pavement, security issues, recovery from system accidents or malfunctions, landscaping, fencing, signs, illumination
Parking facilities	Repair or repaving of parking lots, winter snow clearance, limited salt application to parking lots and crossroad locations, landscaping, fencing, signs, illumination, graffiti removal, garbage collection
Stations	Winter snow clearance, maintenance / rehabilitation of building and infrastructure, landscaping, fencing, signs, salting, illumination, graffiti removal, and garbage collection
Vehicles	Daily maintenance of vehicles, cleaning, graffiti removal
Structures	Building and infrastructure inspection, maintenance / rehabilitation
Utilities	Storm drainage system inspection, monitoring, repairs, drainage structure maintenance / clean out
Decommissioning	
Decommissioning is not applicable to the project given that the facility is part of the City of Mississauga's long-term transportation vision and is considered permanent within the planning horizon (lifespan of the facilities). However, decommissioning of any project elements, if required, will be undertaken in accordance with applicable environmental regulations in place at that point in time.	

3.1.1 Stations

The 11 new stations included in this phase are designed to meet functional requirements and be cost-effective while fitting into their surroundings in a way that is attractive and convenient to users. There are several station types:

- Park and ride oriented stations with interregional bus service
  - Winston Churchill
  - Erin Mills
- Local stations with parking
  - Cawthra
  - Tomken
  - Dixie
- On-line stations (no parking provision)
  - Central Parkway
  - Tahoe
  - Etobicoke Creek
  - Spectrum
  - Orbitor
  - Renforth

Despite their physical and functional differences, the stations are all located close or adjacent to crossing roads, in order to allow users to approach by car, bus, bicycle, or foot. All stations share a common architectural style and materials. **Figures 3.1.1-1** to **3.1.1-3** illustrates some of the architectural concepts that have been developed for a typical on-line Mississauga BRT station.

Figure 3.1.1-1 Mississauga BRT Station Architectural Concepts – Station Overview

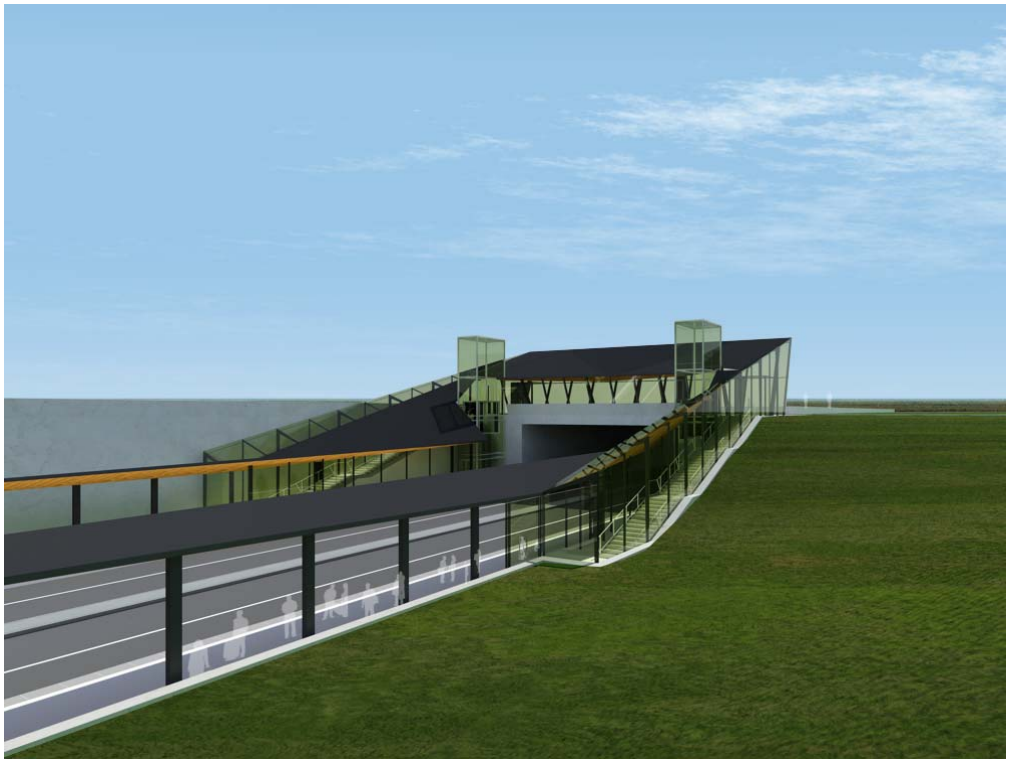


Figure 3.1.1-2 Mississauga BRT Station Architectural Concepts – View at Platform Level

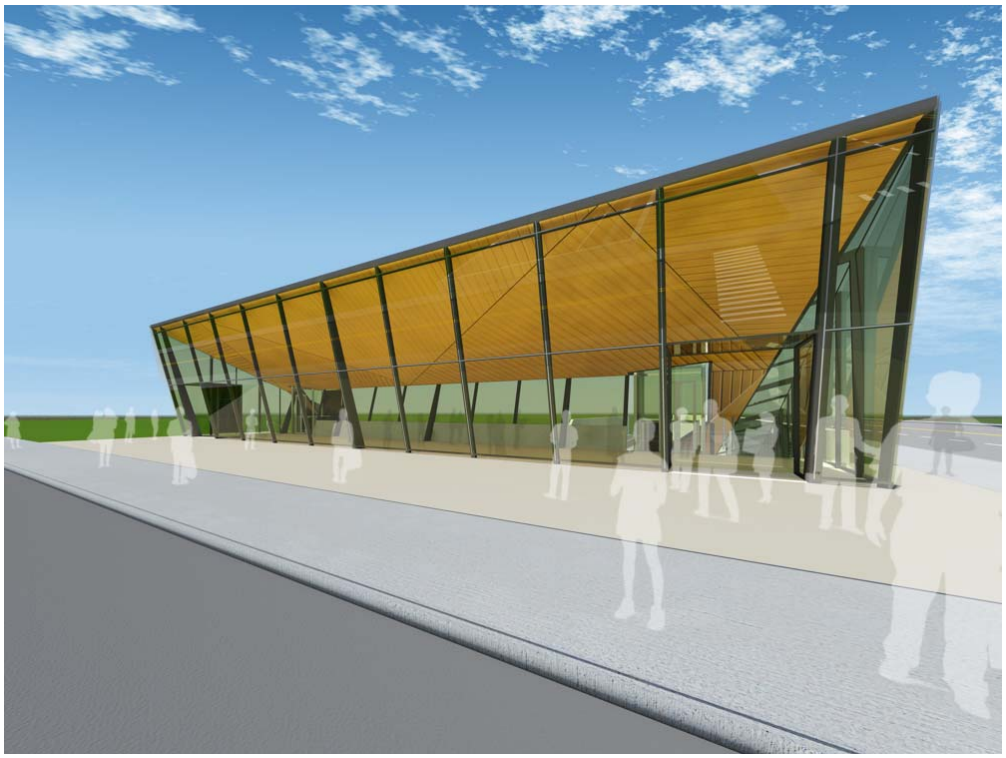


Figure 3.1.1-3 Mississauga BRT Station Architectural Concepts – Typical Street Level Passenger Information and Ticketing Building

The Renforth station is intended to function as a "gateway" facility at the east end of the busway, where a variety of services (Mississauga Transit, GO Transit, Toronto Transit Commission, and potentially private carriers) would have the opportunity to meet, exchange passengers, and move on to the nearby airport, to Highway 427 North (to the future Highway 407 Transitway and other destinations), to Highway 427 South (to the Kipling terminus of Toronto's Bloor-Danforth subway line), to Highway 401 (interregional service to various mid-Toronto transit hubs), to the Northwest Toronto Hydro Corridor (with the potential for a rapid transit line to the Spadina Subway and York University), and to Toronto's planned Eglinton West Rapid Transit line.

However, many of these corridors are at the concept planning stage only, and no certainty has yet been laid out regarding the role the Renforth station may play in the interregional network (there are several other possible sites in the vicinity for a major transit hub). Furthermore, all of the facilities are the responsibilities of other agencies and are following study timeframes that do not match that of the BRT project.

Therefore, the Renforth station is, at this time, being treated by the City of Mississauga as a simple on line station with a design similar to the others along Eglinton Avenue to the west. Should any expansion or reconfiguration of the station plan be required to make the station support other projects noted above, the changes would be the responsibility of the other project proponent(s) and be addressed under the appropriate environmental assessment process.

Each BRT East station includes an eastbound and westbound passenger platform featuring a canopy, information panels, security measures, and real-time information displays. The platforms are generally 55 m long and 6 m wide; the Dixie station features 80 m long platforms. The two BRT West stations have those same features on a single island platform that is used by both BRT and local buses. All platforms are fully accessible to the disabled (by elevator or at-grade access) and are served by an open staircase from street level. A street-level plaza offers an enclosed waiting / information / ticketing area with a view of the busway; the enclosure is approximately 5 m wide and 32.6 m long. A broad open area (approximately 10 m deep and 35 m wide across the busway) allows passenger circulation. Covered bicycle racks are provided at each station. Sidewalks and multi-use pathways are used to connect each station with its surrounding community.

The busway stations will be constructed using conventional and standard civil construction equipment (e.g. truck-mounted cranes, scissor-lifts, excavators, concrete trucks, and other mobile construction equipment). Materials to be employed include typical construction materials, including concrete (plaza structure only), steel framing and roofing, and glazing. Equipment incorporated into the stations includes: elevators; mechanical and electrical rooms; maintenance rooms, safety and security equipment (e.g. CCTV and communications systems), and passenger information systems (e.g. real-time passenger information signage/next-bus information signage). Selected stations include bus operator facilities (lunch room, male and female washrooms, janitor room).

For more details regarding the footprint of each station, please refer to **Figures 1.1-1** to **1.1-6**.

The Winston Churchill, Erin Mills, and Cawthra stations are situated at grade; the Central Parkway and Tomken stations are on embankments adjacent to bridges over existing roads; and the remaining stations are below grade and immediately adjacent to a crossing road structure.

3.1.2 Parking Facilities

Parking lots are proposed for the Winston Churchill, Erin Mills, Cawthra, Tomken, and Dixie stations. The parking lots will be constructed using a conventional asphalt pavement structure with concrete curbs and sidewalk-type pedestrian pathways. Each lot is relatively small, in the 150 – 300 space range (compared to GO Transit's train station parking lots, which run to 2,000 spaces or more) and located immediately adjacent to the station. Motorist access to the parking lots is separated as much as possible from bus circulation areas; connections with the adjacent arterial road are via a signalized intersection. Provision is made for the appropriate number of dedicated parking spaces for disabled patrons, passenger drop off / pick up zones, taxi curbs, and safe and pleasant walkways. Landscaping, drainage, and snow removal provisions are all incorporated into each parking area. The parking lots will be illuminated (per Ministry of Transportation and GO Transit standards) and will be covered by Closed Circuit Television cameras linked to the rest of the BRT security system. The lots and access roads are designed

to avoid buried utilities and pipelines, and to remain functional even when utility maintenance work is underway. Signs will be posted on the approach road network to advise potential users of the lot location.

Where space is available, protection for parking lot expansion into additional Parkway Belt open space (generally within the hydro corridor) is made. The number of vehicles using each lot cannot be reliably forecast, so usage will be closely monitored and lot capacity adjusted if and as necessary (noting that there are other measures available to the proponent, such as service changes or usage restrictions that can also be used to manage demand to meet lot capacity).

The approximate dimensions of the proposed parking facilities are:

- Winston Churchill Station: 150m x 60m = 9,000 m^2
- Erin Mills Station: 185m x 75m = 13,900 m^2
- Cawthra Station: 235m x 36m = 8,500 m^2
- Tomken Station: 55m x 30m + 65m x 36m = 4,000 m^2
- Dixie Station: 130m x 50m = 6,500 m^2

3.1.3 Structures

The Mississauga BRT project includes 21 new road structures, as follows:

- Winston Churchill N-W Ramp: single lane ramp over busway
- Winston Churchill Boulevard: six lane arterial over busway
- Winston Churchill S-W Ramp: busway over single lane ramp
- Winston Churchill E-N/S Ramp: busway over two lane ramp
- Glen Erin Drive: four lane road over busway
- Sherwoodtowne Boulevard: two lane road over busway
- Central Parkway: busway over four lane road
- Highway 403 W-N/S/E Ramp and E/N/S-W Ramp: two two-lane ramps on combined structure over busway
- Cawthra Road: four lane arterial over busway
- Tomken Road: busway over four lane arterial
- Dixie Road: six lane arterial over busway
- Eastgate Parkway: busway over four lane arterial
- Fieldgate Road: two lane arterial over busway
- Tahoe Drive: two lane arterial over busway
- Eglinton Avenue: busway under six lane arterial
- Bell Mobility Entrance (opposite from the intersection of Tahoe Drive and Eglinton Avenue): two lane arterial over busway
- Spectrum Way: four lane arterial over busway
- Satellite Drive: two lane arterial over busway
- Orbitor Drive: four lane arterial over busway

- Explorer Drive: four lane arterial over busway
- Commerce Boulevard: four lane arterial over busway

Three existing structures will be modified to accommodate the busway:

- The Cooksville Creek double box cell culvert will have its obvert lowered by approximately 0.5 m at the point where the busway crosses it immediately north of Rathburn Road;
- the Little Etobicoke Creek triple box cell culvert will be lengthened by approximately 12 m; and
- the Eglinton Avenue bridge over Etobicoke Creek will be reconfigured and widened by less than 1m (varies 0.49 m - 0.66 m) . Widening of the bridge over Etobicoke Creek is subject to approval from the City of Toronto as they own the structure. Consultation is ongoing and City of Toronto staff has indicated support for the widening. Formal approval is still pending.

All new structures will be of conventional type (rigid frame or steel or concrete girder) designed in accordance with current provincial structural codes and standards. Sidewalks, bicycle lanes, multi-use paths, and/or turn lanes will be provided as necessary. Clearances will be to Ministry of Transportation of Ontario standard, and will accommodate a double-decker bus. Where appropriate, structures will be designed to accommodate Light Rail loading and clearances, to protect for that future possibility.

4.0 DESCRIPTION OF EXISTING ENVIRONMENT

This chapter has been organized based on the factor areas identified in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT. The one exception is Surface Water Quality and Quantity. Since this factor area is so closely linked to water features it is documented in both the Fish and Fish Habitat, and Vegetation and Wetlands sections (**Sections 4.1.1** and **4.1.2**). A separate section has been included to address navigability (**Section 4.2.6**).

4.1 DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

The BRT West and the BRT East between Hurontario Street and Fieldgate Drive are within the Parkway Belt West Plan (PBWP) area. This is an area designated as a multi-purpose utility corridor, urban separator and linked open space system including hydroelectric towers and lines, pipelines and utilities. With the exception of two creek valleys (Little Etobicoke Creek and Etobicoke Creek), the landscape has been modified by earthworks for these utilities and infrastructure. Ecosystem components continue to be affected by infrastructure operation and maintenance including earthworks, vegetation maintenance (e.g., herbicide application, clearing and pruning), drainage works, stormwater runoff and 'contaminant drift' from the roadway (e.g., hydrocarbons, metals and salt spray).

The following sections describe the character and associated sensitivities of the existing ecosystem components within the BRT West and BRT East project limits. Where needed to provide context, some areas outside of the project limits are also described. Supporting information (such as species lists and field photographs) is provided in **Appendix B**. Natural environment features are depicted in **Figures 4.1-1** to **4.1-9**.

2008/11/21

MississaugaBRT_MapBook5000_West_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5-3: Sugar Maple - Hickory Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1: Cattail Mineral Shallow Marsh

W4 MAM2-2
W3 MAM2-2
W1 CUW
W2 MAM2-2
W8 MAM2-2
W7 MAM2-2
W9 MAM2-2
HIGHWAY 403
W5 CUW
W6 FOD5-3
WINSTON CHURCHILL BOULEVARD

REVISIONS				
		ecoplans Limited	DRAWN:	MISSISSAUGA BRT - WEST SECTION
			CHECKED:	MISSISSAUGA BRT PROJECT Plate 1
			CORRECT:	FIGURE 4.1-1
			SCALE: 1:5,000	

2008/11/21

MississaugaBRT_MapBook5000_West_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5-3: Sugar Maple - Hickory Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1: Cattail Mineral Shallow Marsh

W9 MAM2-2
W10 MAS2-1
W11 CUW
Landscape Plantings
W12 CUW
W13 CUW
W14 CUW
HIGHWAY 403
GLEN ERIN DRIVE
ERIN MILLS PARKWAY

REVISIONS			DRAWN:	MISSISSAUGA BRT - WEST SECTION	FIGURE
			CHECKED:		
			CORRECT:	MISSISSAUGA BRT PROJECT Plate 2	4.1-2
			SCALE: 1:5,000		

2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh

Cooksville Creek

HURONTARIO STREET

E1 CUW

E2 CUW

E3 CUW

E4 CUW

E5 FOD5-5

CENTRE VIEW DRIVE

RATHBURN ROAD WEST

RATHBURN ROAD EAST

DUKE OF YORK BOULEVARD

CITY CENTRE DRIVE

REVISIONS		DRAWN:	MISSISSAUGA BRT - EAST SECTION	FIGURE
	ecoplans Limited	CHECKED:	MISSISSAUGA BRT PROJECT	4.1-3
		CORRECT:	Plate 1	
		SCALE: 1:5,000		

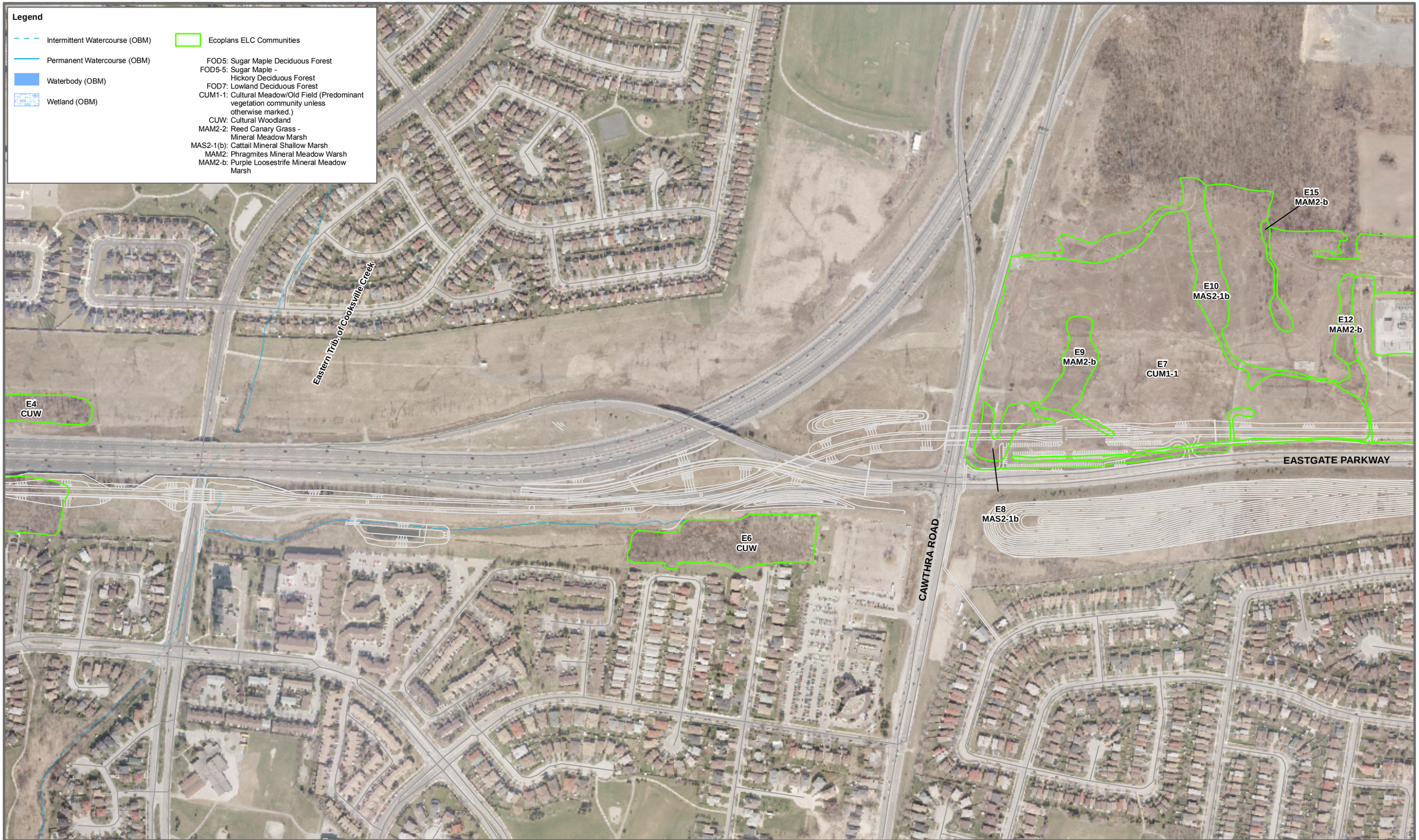
2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh



REVISIONS				
		ecoplans Limited	DRAWN:	MISSISSAUGA BRT - EAST SECTION
			CHECKED:	MISSISSAUGA BRT PROJECT
			CORRECT:	Plate 2
			SCALE: 1:5,000	FIGURE 4.1-4

2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh

E15 MAM2-b
E11 CUM1-1
E10 MAS2-1b
E12 MAM2-b
E14 MAS2-1b
E7 CUM1-1
E13 CUM1-1
Little Etobicoke Creek
E16 MAS2-1
E18 MAS2-1
E19 MAS2-1b
E20 MAS2-1b
E21 MAM2-2
E17 MAM2-2
E24 MAS2-1b
E25 MAS2-1b
DIXIE ROAD
EASTGATE PARKWAY
EASTGATE PARKWAY
TOMKEN ROAD
E31 MAM2-2

REVISIONS			

ecoplans Limited

DRAWN:
CHECKED:
CORRECT:
SCALE: 1:5,000

MISSISSAUGA BRT - EAST SECTION

MISSISSAUGA BRT PROJECT
Plate 3

FIGURE
4.1-5

2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh

DIXIE

EASTGATE PARKWAY

E35 CUW

E41 FOD7

E42 CUM1-1

E40 FOD5

E43 FOD5

21 12-2

E24 MAS2-1b

E25 MAS2-1b

E26 MAM2-2

E27 MAM2-2

E30 MAM2-b

E29 MAM2-b

E22 CUM1-1

EASTGATE PARKWAY

E28 MAM2-b

E23 CUM1-1

E31 MAM2-2

E32 MAM2-b

E33 MAM2-b

E34 MAM2-2

REVISIONS		DRAWN:	MISSISSAUGA BRT - EAST SECTION	FIGURE
	ecoplans Limited	CHECKED:	MISSISSAUGA BRT PROJECT	4.1-6
		CORRECT:	Plate 4	
		SCALE: 1:5,000		

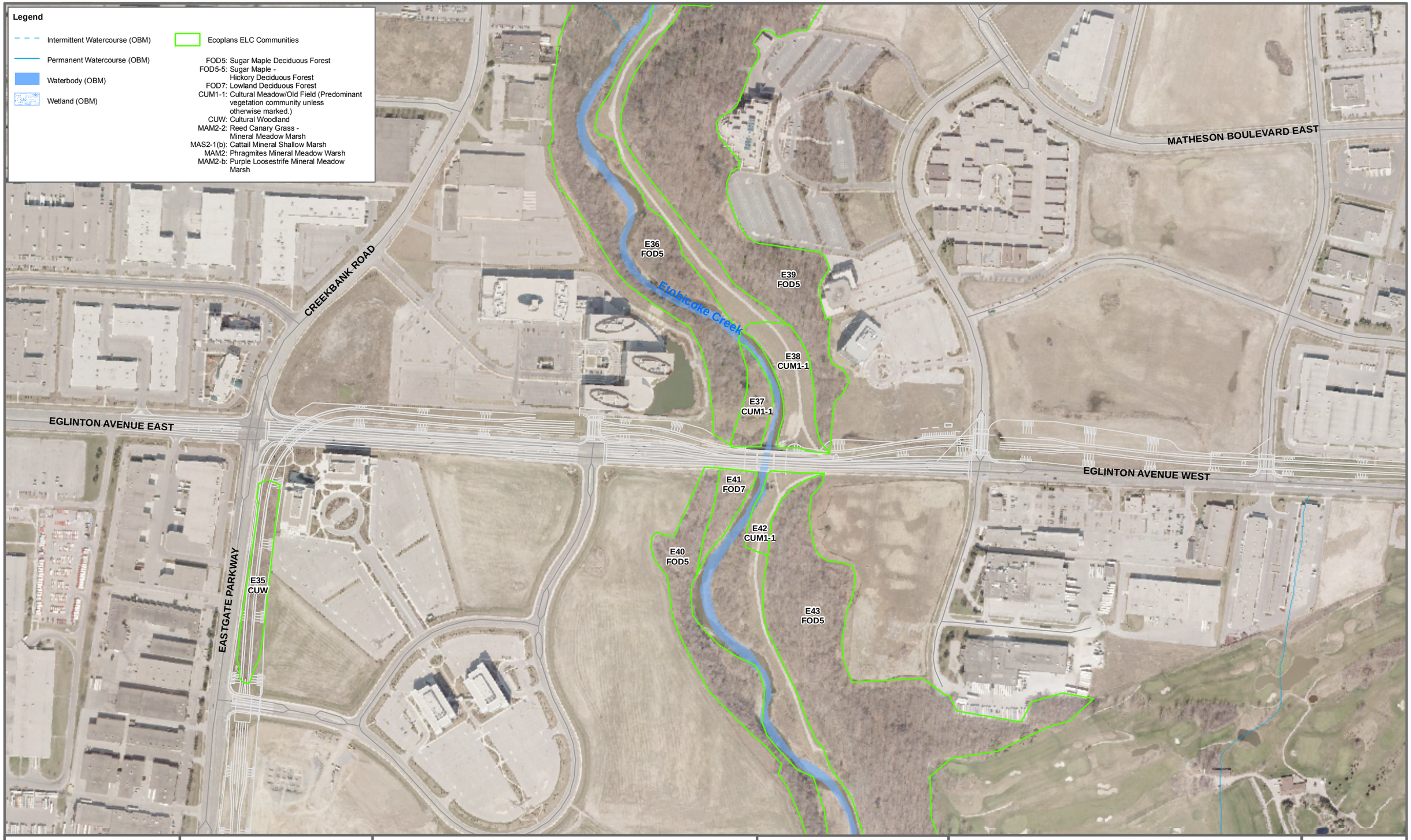
2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh



REVISIONS		DRAWN:	MISSISSAUGA BRT - EAST SECTION	FIGURE
	ecoplans Limited	CHECKED:	MISSISSAUGA BRT PROJECT	4.1-7
		CORRECT:	Plate 5	
		SCALE: 1:5,000		

2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh

REVISIONS				
		ecoplans Limited	DRAWN:	MISSISSAUGA BRT - EAST SECTION
			CHECKED:	MISSISSAUGA BRT PROJECT
			CORRECT:	Plate 6
			SCALE: 1:5,000	FIGURE 4.1-8

2008/11/21

MississaugaBRT_MapBook5000_East_Nov_VegRemoval.mxd

Legend

- Intermittent Watercourse (OBM)
- Permanent Watercourse (OBM)
- Waterbody (OBM)
- Wetland (OBM)
- Ecoplans ELC Communities

FOD5: Sugar Maple Deciduous Forest
FOD5-5: Sugar Maple - Hickory Deciduous Forest
FOD7: Lowland Deciduous Forest
CUM1-1: Cultural Meadow/Old Field (Predominant vegetation community unless otherwise marked.)
CUW: Cultural Woodland
MAM2-2: Reed Canary Grass - Mineral Meadow Marsh
MAS2-1(b): Cattail Mineral Shallow Marsh
MAM2: Phragmites Mineral Meadow Warsh
MAM2-b: Purple Loosestrife Mineral Meadow Marsh

RENFORTH DRIVE
CARLINGVIEW DRIVE
INTERNATIONAL BOULEVARD
MATHESON BOULEVARD EAST
HIGHWAY 401 EXPRESSWAY EAST
EGLINTON AVENUE WEST
HIGHWAY 427 SOUTH
HIGHWAY 427 NORTH
Renforth Creek

REVISIONS		DRAWN:	MISSISSAUGA BRT - EAST SECTION	FIGURE
	ecoplans Limited	CHECKED:	MISSISSAUGA BRT PROJECT Plate 7	4.1-9
		CORRECT:		
		SCALE: 1:5,000		

Designated Natural Areas and Policy Areas

Provincial and Regional

Based on information from Ministry of Municipal Affairs and Housing (2002 and 2005), the project limits are outside of Provincial Land Use and Environmental Plans areas (Oak Ridges Moraine, Niagara Escarpment and Greenbelt). Based on a review of MNR Natural Resources and Values Information System (NRVIS) information, an Natural Heritage Information Centre (NHIC) database query, and information received from the Credit Valley Conservation (CVC), and Toronto and Region Conservation (TRCA) and the City of Mississauga, there are no designated natural features within or adjacent to the project limits including ANSIs (Areas of Natural or Scientific Interest - Life or Earth Science), evaluated wetlands (Provincially Significant or Locally Significant Wetlands - PSW) or other federally or provincially designated areas.

City of Mississauga Natural Areas

A Natural Areas Survey for the City of Mississauga was undertaken during 1995 and 1996 (Geomatics 1996). The *Natural Areas Survey* identified and designated natural features as Natural Areas (NA) Special Management Areas (SMAs), Linkage Areas (Linkages) and Residential Woodlands. In order to keep the Natural Areas database current, each year, natural areas in different quadrants of the City are reviewed. With the completion of the 2001 work, all Wards in the City were updated once since the initial study in 1996. The start of the second round of updates commenced in 2002. Using the most recent maps and fact sheets (City of Mississauga 2006), several of the features within the project limits have local designations identified through these studies. These are described in **Section 4.1.2**.

Regulated Limits

Under the *Conservation Authorities Act* (1990), CVC and TRCA have developed regulations that apply to areas such as river or stream valleys, hazardous lands and wetlands:

- O. Reg. 166/06 Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Consolidation Period: from May 14, 2008 to July 22, 2008).
- O. Reg. 160/06 Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Consolidation Period; from May 4, 2006 to July 22, 2008).

Within the project limits, TRCA has mapped several regulated areas as shown on **Figures 4.1-4** to **4.1-8** as Generic Regulation Limits. No such mapping was available for CVC areas. The designations, as they apply to specific features, are noted in the relevant sections of the report.

4.1.1 Fish and Fish Habitat

There are no watercourse crossings in the BRT WEST section.

Within the BRT EAST Section, the BRT alignment crosses portions of Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek sub-watersheds. The BRT alignment crosses, from east to west and the Eastern Tributary of Cooksville Creek (both of which are enclosed at their crossings), Little Etobicoke Creek and Etobicoke Creek (**Figures 4.1-3** to **4.1-9**).

As shown in the previous Provincial Environmental Assessment documentation (City of Mississauga 1994 and 2004), the 'original' flow paths of Elmcrest and Renforth Creeks cross Eglinton Avenue and the project limits. However, as discussed below, the portions of these watercourses upstream/north of the road have been enclosed, and all of the overland flow from the upstream portions of their drainage areas has been diverted to the west through the storm sewer system to Etobicoke Creek.

The following sections describe fish (where relevant) and fish/aquatic habitat in Cooksville Creek and its tributary, Little Etobicoke Creek and Etobicoke Creek. Potential sensitivities are also highlighted. Fish species of conservation concern are discussed in **Section 4.1.4**. Additional details are included in **Appendix B**.

Approach

Aquatic field surveys were conducted on October 11 and 12, 2007. Additional general information was collected during site visits with TRCA on November 19, 2007 and June 18, 2008. Fluvial geomorphic information was collected on June 18, 2008. The field information collected was used to update background information provided by the agencies (TRCA, CVC and MNR) as listed in **Appendix B**. Specific fish community inventories (e.g., electrofishing) were not conducted by Ecoplans Limited (Ecoplans) staff given the availability of fish community sampling information and related input from TRCA, CVC and MNR.

Aquatic habitat conditions were assessed at each of the following: Cooksville Creek, Eastern Tributary of Cooksville Creek (upstream open section), Little Etobicoke Creek, Etobicoke Creek, Renforth Creek (downstream section) and Elmcrest Creek (downstream section). Habitat conditions were assessed upstream, through and downstream of the BRT alignment. Detailed assessment was conducted through the reaches just upstream and just downstream of the alignment, to encompass areas that might be directly affected, and a review of conditions further up and downstream.

Existing Conditions

Cooksville Creek

The BRT alignment crosses Cooksville Creek north of Rathburn Road East immediately east of Hurontario Street where it is currently enclosed (**Figure 4.1-3**). The open reaches of Cooksville Creek upstream of the 'crossing', west of Hurontario Street and up and downstream of Highway 403, are not affected by the alignment.

Upstream of Highway 403, the open section of creek channel appears to have been previously modified / straightened. It is confined in a narrow corridor between the single and multi-family residential blocks north of the highway, draining through the open Parkway Belt/hydroelectric corridor and is then enclosed for approximately 150 m under the highway and west ends of the ramps. It then flows as an open but modified channel section between the ramp and Hurontario Street, and is then enclosed for another approximately 230 m downstream of Hurontario Street and Rathburn Road East. The busway alignment crosses this double box cell culvert immediately east of Hurontario Street. In that location a twin cell box culvert carries Cooksville Creek under Hurontario Street and Rathburn Road. That culvert is 2.7 m high and approximately 230 m long. The channel flows along the base of a retaining wall along Rathburn Road East. Grade control structures at and downstream of the Hurontario Street crossing act as permanent barriers to upstream fish movement.

The CVC considers the open portions of this watercourse within the project limits to have the potential to support a warmwater fishery (City of Mississauga 1994); however, no fish were collected at the sampling station near Rathburn Road (upstream of the grade control structures) in July of 1995. Although flow is permanent, there may be insufficient refuge habitat available in the short open reach to support fish, and the man made grade control structures downstream of the project limits and the long enclosed reaches preclude re-colonization from downstream reaches. Therefore, these reaches do not appear to support direct fish use within the BRT project limits. However, these reaches contribute to downstream habitat through conveyance of flow and some limited inputs of allochthonous materials (e.g., nutrients and detritus).

Eastern Tributary of Cooksville Creek

The BRT alignment crosses this watercourse on the south side of the existing Highway 403 culvert structure, over a section of the channel that is currently enclosed. The only remaining section of open channel (approximately 75 m length) along this tributary in the vicinity of the project limits is located just upstream of the highway. The open channel section is channelized.

The CVC considers this watercourse, within the project limits, to have the potential to support a warmwater fishery (City of Mississauga 1994). However, no fish were observed in the open channel section during Ecoplans' field investigations. Although flow appears to be permanent,

likely supported by storm sewer outfalls, there appears to be insufficient refuge habitat available to support fish seasonally and the long sections of enclosed channel (e.g., greater than 1 km) preclude re-colonization. Therefore, this reach does not appear to directly support fish use, although it continues to convey flow and limited allochthonous input downstream.

Little Etobicoke Creek

The BRT alignment crosses Little Etobicoke Creek on the north side of Eastgate Parkway. The existing crossing at Eastgate Parkway is a 3 cell culvert with all cells set at the same elevation. Little Etobicoke Creek is considered by the TRCA to support a degraded warmwater fish community with common and prevalent habitat, affected by urbanization and stormwater issues (debris, water quality, etc.) (City of Mississauga 1994). Through the project limits and vicinity, it appears that the Little Etobicoke Creek channel was straightened and modified historically. Much of the channel banks are armoured with riprap (which is now overgrown with vegetation) or gabions (downstream).

A concrete Jersey barrier was installed subsequently to divert low flow into the easternmost cell. There is also a low concrete weir structure extending across the channel between the upstream wingwalls that creates a barrier to movement under at least low flow conditions. As well, a gabion weir structure and several steep man-made features downstream of the alignment area act as seasonal barriers to the upstream movement of fish.

The morphology of the channel is predominantly flats, with some riffles. Substrates are dominated by cobble, which may have been placed during the historical channel works, and/or sloughs off the banks. The woody riparian corridor is narrow upstream, widening downstream.

Historical (1949) fish sampling records at the closest sampling station located approximately 1.25 km downstream of the project limits near Burnamthorpe Road East recorded the presence of three species of tolerant warmwater bait/forage fish (Common Shiner [*Luxilus cornutus*], Creek Chub [*Semotilus atromaculatus*], Brook Stickleback [*Culaea inconstans*]), as well as Redside Dace (*Clinostomus elongates)* (NHIC 2008). The Redside Dace record is considered 'historical', and this species is considered to be extirpated from this creek, as discussed further in **Section 4.1.4**.

Etobicoke Creek

Etobicoke Creek meanders through a well-defined deep valley with a broad floodplain and steep slopes that rise more than 20 m. Through the vicinity of the project limits, the BRT alignment crosses Etobicoke Creek on the north side of Eglinton Avenue, the channel flows close to the west side of the valley, with some contact directly with the valley wall approximately 200 m downstream of the crossing. The valley now supports only about 5.5% of its original natural

vegetative cover, with over 66% of the watershed now urbanized; approximately 1/3 of the watercourse is no longer considered in its natural state (TRCA 2006).

Through the project limits, the east bank has been historically disturbed for the development of the walkway system that extends along the valley floor. The banks and over-bank area through the structure are completely armoured with poured concrete. Some of this concrete is failing, particularly on the west bank where a corrugated steel pipe is now exposed. The Eglinton Avenue East bridge piers have been constructed into the concrete armouring that extends through and slightly up and downstream of the bridge. This concrete armouring encroaches into bankfull area; flows are confined by the concrete 'banks' through the crossing.

Downstream of the bridge, there is a large (10 m wide) concrete box storm sewer outfall, through the concrete armouring on the east bank. Large concrete blocks have been placed in the outfall to dissipate flow; however the outflow has scoured a deep pool feature. The gabion wingwalls that are tied into the banks on either side of the outfall show signs of failure (i.e., being undermined). The scour pool, which is more than 150 cm deep, provides good refuge cover off-line to the main thalweg flow.

The channel exhibits a broad shallow profile, and moderate gradient. The morphology is comprised of flats, with riffles; the only pool within the subject reaches is at the storm sewer outfall. Substrates include cobble/rubble, with sand and some gravel and boulders, and exposed bedrock through the existing bridge section. Instream cover is limited to scattered boulders and overhanging vegetation along the edges.

Woody riparian vegetation is limited to the valley slopes, with common old field herbs and grasses dominating the valley floor and riverbanks. The east side of the floodplain is manicured. Both banks exhibit erosion and some slumping upstream of the north bridge piers.

The TRCA (2006a) indicated that Etobicoke Creek supports a warmwater fish community, and formerly high quality habitat that has been degraded by stormwater discharge, loss of natural cover and other urban influences. Several common tolerant bait/forage and panfish species have been recorded in sampling data at various stations between 1949 and 2004 (**Appendix B**).

Elmcrest and Renforth Creeks

Elmcrest and Renforth Creeks are tributaries of Etobicoke Creek. However, as noted, they no longer exhibit connected flow through the project limits. The portions of these watercourses upstream/north of the road have been enclosed, and all of the overland flow from the upstream portions of their drainage areas has been diverted through the storm sewer system to the west to Etobicoke Creek.

There is no surface evidence at all of Elmcrest Creek north of Eglinton Road. Downstream of the road (and BRT alignment), a defined remnant channel section persists. Localized evidence of Renforth Creek in the form of a low vegetated draw swale persists upstream of Eglinton Road, however it no longer conveys flow. Downstream of the road, there is a small cattail pocket, with no evidence of a flow path through it, as well as a series of constructed ditches and swales through the hydroelectric corridor and behind a parking lot, which ultimately outfall to the storm sewer system to the west.

Given the enclosure and since the diversion of the upstream portions of the drainage areas that are crossed by the BRT alignment completely severs any downstream connectivity, Elmcrest and Renforth Creeks are not discussed further in this section. Mitigation measures associated with storm water flowing into Etobicoke Creek are discussed in **Section 5.1.1.7**.

4.1.2 Vegetation and Wetlands

The existing characteristics and sensitivities of the vegetation, associated habitat and wildlife along the project limits are described below. The vegetation units are mapped on the natural environmental features map presented in **Figures 4.1-1** to **4.1-9**. The mapping identifies 'designations' of those features, where relevant. It also highlights the major designated natural areas that are found outside the project limits.

Approach

The vegetation inventory focused on compiling and reviewing existing information within the project limits, augmented with field surveys focused in specific locations to refine the site specific data base and address any data gaps, and support the impact assessment process. The City's Natural Areas Survey (City of Mississauga 2006) provides an existing information base for most of the natural areas in the vicinity of the project.

Initial field surveys were conducted on October 11th, 2007 with additional surveys carried out on January 29th, and June 18th and 26th, 2008. The scope of the field work and terrestrial resources analyses included:

- Classifying or verifying previous classifications for vegetation communities, using the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998);
- Evaluating the sensitivity and significance of vegetation communities, using the "Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario" (Bakowsky 1996; NHIC 2008)
- Evaluating significance and sensitivity of flora and fauna recorded during field surveys, using Newmaster et al. (1998) and the NHIC website (2008) for provincial and national significance
- Preparing a vascular plant species list; and
- Taking representative site photographs, a selection of which is included in **Appendix B**.

Existing Conditions

As outlined previously, the BRT project limits traverse an urbanized landscape dominated by residential and commercial land uses. The project limits are located immediately adjacent to the existing road/highway network and much of the project is within the parkway belt infrastructure corridor. As a result, the terrestrial features are culturally influenced or anthropogenic in origin and character, and heavily influenced by the existing land uses.

The vegetation within the study corridor is dominated by cultural meadow (CUM 1-1), with scattered pockets of culturally-influenced meadow marsh/shallow marsh, successional growth/treed patches and occasional remnant forest patches. The cultural meadow communities are dominated by species such as Brome Grass (*Bromus inermis ssp. inermis*), Canada Goldenrod (*Solidago canadensis*), New England Aster (*Aster novae-angliae*), Canada Thistle (*Cirsium arvense*), Teasel (*Dipsacus fullonum ssp.sylvestris*), Queen Anne's Lace (*Daucus carota*) and Red Raspberry (*Rubus idaeus ssp. melanolasius*). This early-successional community is of low quality and low sensitivity, comprised of common species that are tolerant of disturbed conditions.

The cultural influence on flora and vegetation communities is reflected in the high proportion and wide distribution of non-native, disturbance-tolerant and invasive plant species.

Within the cultural meadow dominated landscape are numerous small pockets of wetland vegetation; the larger of these features are discussed below. These wetlands have formed in local topographic depressions (usually created through previous earth works in the utility corridor) that are poorly drained. Drainage ditches also contain pockets / strips of wetland vegetation. Given that the surficial geology of the project limits consists of silt and clay associated with Halton Till deposits, it is unlikely that significant hydraulic connectivity with the underlying groundwater system exists. As such, these wetland pockets are likely sustained by precipitation and surface water runoff.

The wet pockets are dominated by a variety of common, disturbance tolerant wetland vegetation species that colonize wet areas quickly, such as Common Cattail and Reed Canary Grass. Giant Reed, an aggressive invasive species is abundant, and Purple Loosestrife also occurs commonly.

Specific characteristics of vegetation and habitat features along the BRT West and BRT East project limits are described below.

BRT West

The vegetation along the BRT West project limits is dominated by cultural meadow. Scattered landscape plantings and successional growth include patches of Manitoba Maple (*Acer negundo*), Sugar Maple (*A. saccharum*), Trembling Aspen (*Populus tremuloides*), White Spruce (*Picea glauca*), Austrian Pine (*Pinus nigra*), Eastern White Cedar (*Thuja occidentalis*), Norway Spruce (*Picea abies*) and occasional Red Cedar (*Juniperus sp.*). These species are tolerant of disturbance and the vegetation communities are of low quality and diversity. Specific vegetation communities that occur north of Highway 403, in the vicinity of the BRT, are described below. There are 14 vegetation units within BRT West representing a total area of 2.98 ha. These features are shown on **Figures 4.1-1** and **4.1-2**. The full list of species observed for each vegetation community type can be found in **Appendix B**. Species of Conservation Concern are discussed in **Section 4.1.4**.

- There are two small Cultural Woodland patches located north of Highway 403, west and east of the Winston Churchill Boulevard interchange. Unit W1 (0.2 ha) is located west of Winston Churchill Boulevard and Unit W5 (0.03 ha) is located east of Winston Churchill Boulevard. These patches contain maple, Red and White Oak, White Pine, White Ash and Trembling Aspen in the canopy with groundcover dominated by old field and invasive species.
- A third Cultural Woodland patch (Unit W11) is located just west of Glen Erin Drive. This 0.09 ha patch is comprised of tolerant early successional woody species (Trembling Aspen, White Ash, Sugar Maple, Austrian Pine, and Red Osier Dogwood). Ground cover is dominated by old field species such as Canadian Goldenrod, Tufted Vetch, Red Clover and grass species. This vegetation community is cultural in character and of low quality and sensitivity.
- Seven small isolated pockets of mineral meadow marsh and mineral shallow marsh vegetation occur along the north side of Hwy 403, east and west of Winston Churchill Boulevard (Units W2, W3, W4, W7, W8, W9 and W10). These wetland pockets range in size from 0.02 to 0.05 ha with the exception of W4 which is 0.2 ha. All are considered to be of low quality and sensitivity, almost exclusively dominated by either Reed Canary Grass or Narrow-leaved Cattail with some Phragmites, and Purple Loosestrife. All of these species are aggressive and tend to out-compete other wetland plants to form homogeneous mats, and the latter species is also non-native. As described above, these wetland pockets are cultural in origin, having formed in shallow depressions along the infrastructure corridor where water collects seasonally / following storm events on the till-based soils.
- Additional landscape plantings and successional growth of White Spruce, Austrian Pine, Norway Spruce, Manitoba Maple and Eastern White Cedar are present within the various interchange loops. These species are common and tolerant of disturbance and several are non-native, likely planted for their tolerance to the surrounding conditions. The vegetation patches are of low ecological quality and sensitivity.

BRT East

Similar to the BRT West project limits, the vegetation along the BRT East project limits is dominated by cultural meadow, an early-successional community of low quality and low sensitivity, comprised of common species that are tolerant of cultural influence and disturbance. A relatively high component of the species is 'invasive' and non-native. Specific vegetation communities that occur in the vicinity of the BRT are described below. There are 43 vegetation units within BRT East representing a total area of 83.18 ha. These features are shown on **Figures 4.1-3** to **4.1-9**. The full list of species observed for each vegetation community type can be found in **Appendix B**. Species of Conservation Concern are discussed in **Section 4.1.4**.

City of Mississauga Natural Area Remnant Wooded Area - RW1

RW1 is a 3 ha linear dry-fresh sugar maple-white ash deciduous forest (FOD 5-5) located on a low berm adjacent to and south of Highway 403 between Hurontario Street and Central Parkway East (Unit E5) (**Figure 4.1-3**). This wooded area is dominated by Sugar Maple (*Acer saccharum ssp. saccharum*), Bitternut Hickory (*Juglans cinerea*), Shagbark Hickory (*Carya ovata var ovata*) and White Ash (*Fraxinus americana*), in association with, American Elm (*Ulmus americana*), Basswood (*Tilia americana*), and the occasional Red Oak (*Quercus rubra*). It is in fair condition but disturbed due to residential encroachment, dumping, compost, garbage, trails, and invasive plant species (Garlic Mustard and Buckthorn).

RW1 provides some local wildlife habitat and woody cover for common wildlife species, including common migratory bird nesting and foraging. However these functions are limited by the isolation of this small feature in the surrounding urban landscape and its proximity of Highway 403 (noise, bird song cannot be heard, etc.), and the understory disturbance due to active dumping by local residents and recreational uses (e.g. mountain bikes).

As discussed in **Section 4.1.4**, three regionally and municipally uncommon/rare species were recorded in RW1; Sharp-lobed Hepatica (uncommon within the City), Squirrel-corn (rare within the City, uncommon within the Region) and Bellwort (uncommon within the City). These species were not re-located during Ecoplans 2008 field surveys and therefore, construction and operation / maintenance effects to these species are not anticipated; however, additional surveys will occur during Detail Design once the grading footprint is finalized. The survey results will be provided to Transport Canada and Infrastructure Canada who will determine whether or there is a warrant for review by any Federal Authorities. It is noteworthy that none of these species are listed under the *Species at Risk Act*.

City of Mississauga Natural Area NE4 and Associated Special Management Area

NE4 is a sub-mature to mature deciduous wooded area located approximately 300 m north of Eastgate Parkway and outside the project limits. This contains a variety of vegetation communities and provides habitat to a variety of forest flora and fauna species.

NE4SMA is located immediately to the south of Natural Area NE4, along the north side of Eastgate immediately east of Cawthra Road. NE4SMA is predominantly cultural meadow (CUM 1-1) (e.g., Brome Grass, Canada Goldenrod, New England Aster, Canada Thistle, Teasel, Queen Anne's Lace and Red Raspberry), with numerous (approximately nine) small patches of wetland vegetation occupying the low-lying areas in the undulating / hummocky surface topography and adding to the overall diversity of the habitat mosaic. Digger Crayfish, a species of interest to TRCA (Pers. Comm. S. Lingertat November 30, 2007a) has been identified throughout this unit. This species is discussed further in **Section 4.1.3**.

Of the several wet pockets located throughout NE4SMA, one of the largest and least disturbed is Unit E10, a Cattail Mineral Shallow Marsh (MAS 2-1), dominated by Narrow-leaved Cattail and located in the northern half of the natural area. This area is within TRCA's Generic Regulation Limits. Other smaller meadow/shallow marsh pockets include the following:

- Unit E8 - a Cattail Mineral Shallow Marsh (MAS2-1b) dominated by Narrow-leaved Cattail (*Typha angustifolia*) located in a roadside ditch;
- A roadside portion of Unit 10 - a Cattail Shallow Meadow Marsh dominated by Narrow-leaved Cattail (MAS2-1b) that follows the roadside ditchline before extending further up into NE4SMA;
- Units E12 and E15 - Mineral Meadow Marsh communities dominated by Purple Loosestrife (*Lythrum salicaria*); (MAM2-b) located in the central eastern section of NE4SMA; and
- Unit E9 - a Mineral Meadow Marsh dominated by Purple Loosestrife (MAM2-b) located in the south western section of NE4SMA and within the TRCA Generic Regulation Limits.

Overall vegetation quality and sensitivity are low. Communities and species are common. The area is heavily disturbed as a result of active dumping, occasional pipeline maintenance activities and on-going recreational use, including ATVs and dirt bikes, which have created an extensive trail system. The NE4SMA area is not designated as a Natural Area, but is recognized as a buffer zone, with potential for restoration, in relation to Natural Area NE4. The area exhibits good opportunities for enhancement based on its size and association with NE4. The NE4SMA is also identified by TRCA as a Habitat Implementation Plan (HIP) area (Pers. Comm. S. Smith, December 11, 2007d). The HIP is a targeted strategy that is the mechanism by which the concepts of the TRCA Terrestrial Natural Heritage Program, Fisheries Management Plan, and Watershed Management Strategy can be implemented.

Two Wetlands South side of Eastgate Parkway

There are two wetland pockets located on the east and west sides of Tomken Road, south the Eastgate Parkway. The first is a very small (0.04 ha) Reed Canary Grass Mineral Meadow Marsh (MAM2-2) unit west of Tomken Road. The second is a slightly larger (0.13 ha) Mineral Meadow Marsh dominated by Purple Loosestrife east of Tomken Road. Both of the features are small seasonally wet depressions along the south side of an existing earthen berm.

Dominated by common, disturbance tolerant and invasive wetland species, these wet pockets are of low sensitivity due to past construction disturbances (berm and residential creation), recreational practices (fire pits, and bike trails), dumping, and proximity to major thoroughfares such as Eastgate Parkway and Tomken Road.

Little Etobicoke Creek Valley

The Little Etobicoke Creek valley has multiple designations within the City of Mississauga. The valley slopes of Little Etobicoke Creek are designated Valley Effect Zone (protected to preserve natural environment of watercourse) and the valley is designated in the City of Mississauga's OP as Natural Heritage System. The north portion of the valley (~100 m north of BRT alignment) is identified as Natural Area NE3 and the south portion of the valley (south of Eastgate Parkway) is identified as RW6 in the Mississauga Natural Areas Study.

Within the project limits, riparian vegetation consists of Heart-leaved Willow (*Salix eriocephala*) and other willow species, Staghorn Sumac (*Rhus typhina*), Red Osier Dogwood (*Cornus stolonifera*), wild grape, golden rod species, sedges, rushes.

Two lower lying pockets, one just west of the Little Etobicoke Creek valley (Unit E16), and one just to the east of the creek (Unit E18), support small wetland communities (unlabeled on Natural Area Survey):

- Unit E16, on the west, contains a mix of Mineral Meadow Marsh (MAM2) dominated by Phragmites. This area of hydroelectric corridor is actively mown (located south of an arena), and the Phragmites meadow marsh is mown up to the edges). A Narrow-leaved Cattail Shallow Meadow Marsh (MAS2-1b) within the roadside ditch also forms part of this unit. The marsh extends along the drainage ditch between Tomken Road and Dixie Road.
- Unit E18, on the east, contains a small (0.4 ha) Cattail Mineral Shallow Marsh (MAS2-1) dominated almost entirely by Narrow-leaved Cattail. Digger Crayfish, a species of interest to TRCA (Pers. Comm. S. Lingertat November 30, 2007a) has been identified along the north edge of this unit. This species is discussed further in **Section 4.1.4**. A similar, very small wetland pocket is located further east (Unit 19).

Closer to Dixie Road, Units E20 and E21 contain 0.34 ha and 0.7 ha pockets of Cattail Mineral Meadow Marsh and Reed Canary Grass Mineral Meadow Marsh respectively. Portions of these have been previously (recently) removed/bisected by a new access road within the hydroelectric corridor. A culvert has also been installed. All of these works are within the TRCA Generic Regulation Limits.

The vegetation and habitat system is dominated by tolerant and common species and communities, as such, the sensitivity of this system is low. However the location in and adjacent to the Little Etobicoke Valley, with natural areas further to north and south, provide opportunities for enhancement.

Wetland Pockets on the North Side of Eastgate Parkway

Units E24 and E25, located east of Dixie Road, north Eastgate Parkway, contain small (each 0.2 ha) pockets of Narrow-leaved Cattail dominated Cattail Mineral Shallow Marsh (MAS2-1b).

A series of very small wetland pockets are situated under the hydroelectric corridor and between two pipelines on the east side of Dixie Road (Units E26, E27, E28, E29 and E30). The pockets range in size from 0.01 to 0.04 ha with the exception of Unit E30 which is just under 0.2 ha. All are dominated by Narrow-leaved Cattail. Surrounding vegetation consists of cultural meadow communities dominated by old field species.

Units E33 (0.08 ha) and E34 (0.04 ha) occur adjacent to the bend at Eastgate Parkway. Both of the features are small wet or seasonally wet depressions on the south side of an existing earthen berm. Typical of the landscape features generally, these wetlands are of low sensitivity and are culturally influenced due to their location and past disturbances with the development of the hydroelectric lines and towers, pipelines and access road.

Eastgate / Eglinton Vegetated Strip (CUW1-A3)

Unit E35 is a 0.9 ha narrow vegetated strip adjacent to the west side of Eastgate Parkway, south of the intersection with Eglinton, Avenue. This City-owned area has been under the care of the adjacent property owner (TD Bank) and includes a ‘naturalization’ project area with a combination of landscape tree and shrub plantings and successional old field growth that has been allowed to develop (not mown). The ‘naturalization’ project area has been dedicated to the City for the Mississauga for the Mississauga BRT. This area is surrounded by manicured lawn. Tree species include a variety of common, tolerant species such as Manitoba Maple, Sugar Maple, Trembling Aspen, White Spruce, Austrian Pine, White Cedar and Norway Spruce (CUW1-A3).

This vegetated strip is of low sensitivity dominated by a variety of common, tolerant species. Any function as wildlife habitat is limited by its small size, linear nature and isolation.

Etobicoke Creek Valley

The Etobicoke valley is the largest and most prominent natural feature along the project limits. The valley consists of a mosaic of vegetation communities with deciduous forest communities dominating the slopes and more culturally influenced woodland and meadow communities scattered along the tableland and floodplain. A pathway system runs through the floodplain along the east river edge. Forest communities typically contain Sugar Maple, White Ash, Beech, White Birch with occasional White Pine. Lowland willow deciduous forest dominated by crack willow occurs along the banks of Etobicoke Creek. For a full list of plant species see **Appendix B**.

The Etobicoke River Valley provides an important natural corridor within the urban landscape. As noted above:

- The valley slopes and tributaries are designated Valley Effect Zone (protected to preserve natural environment of watercourse);
- Etobicoke Creek and its tributaries are designated by the City of Toronto as Natural Heritage Systems (City of Mississauga 2006; City of Toronto 2007); and
- The valley is designated as "Natural Area – ET04" (City of Mississauga 2006) as shown on **Figure 4.1-7**).

The area adjacent to ET04 south of Eglinton Avenue and east of Etobicoke Creek, which at present is dominated by cultural meadow, has also been identified as a Candidate Terrestrial Restoration Site of High Potential (TRCA 2006b).

East of Etobicoke Creek

A small (~0.3 ha) pocket of Narrow-leaved Cattail Mineral Shallow Marsh (MAS 2-1) located along the south side of Eglinton Avenue West, just west of Renforth Drive. The marsh is dominated almost entirely by Narrow-leaved Cattail.

City of Mississauga Linkage Area

Linkage Areas are defined as areas which serve to link two or more of the components of the Natural Area Systems within the City, or to natural areas outside of the City boundaries. Within the project limits, this Linkage Area extends along the north side of Highway 403 and Eastgate Parkway, within the hydroelectric / utility corridor, from near Mississauga Road, continuing to the east of the point where Eastgate Parkway curves north, to 'connect' the Etobicoke and Little Etobicoke Creek valleys (**Figures 4.1-4** to **4.1-6**). Within the project limits, it includes portions of the following areas (also discussed above):

- City of Mississauga Natural Area (NE4) and associated Special Management Area (NE4SMA) and associated wetlands;

- Cultural meadow with scattered woody successional growth and associated wet pockets north of Eastgate Parkway; and
- Valley of Little Etobicoke Creek.

The Linkage Area remains dominated by cultural meadow vegetation, ubiquitous along the project limits, with the typical meadow marsh pockets and occasional successional woody growth (**Figures 4.1-3** to **4.1-6**). The exception is two watercourse valleys.

The numerous small seasonally wet, monoculture meadow and shallow marshes (ranging in size from 0.01 ha to 0.2 ha) are dominated common, disturbance tolerant wetland vegetation species. The ELC communities are classified as Narrow-leaved Cattail Shallow Marsh (MAS 2-1), Reed Canary Grass Meadow Marsh (MAM 2-2) or Mineral Meadow Marsh (MAM 2). The full list of species observed can be found in **Appendix B**. As noted, most appear to have formed in the minor topographic depressions created by the construction and maintenance of infrastructure and ditching that allow water to collect on the imperfectly to poorly drained clay soils. Several of the wet pockets are 'regulated' by TRCA (see below), including some of the roadside ditches along Eastgate Parkway (classified as Narrow-leaved Cattail Shallow Marsh [MAS 2-1]). These vegetation communities are of low sensitivity, comprised of common species that are tolerant of disturbed conditions and many are dominated by *Phragmites*.

Sensitivities and Management Implications

In general, the vegetation and wetlands occupying the majority of the study corridor is cultural in character, reflecting the influence of the utility and transportation corridors within the urban landscape. Vegetation species are predominantly common and tolerant. The level of disturbance is generally high, as reflected by the high proportion and wide distribution of non-native and invasive species. Furthermore, these wetland pockets are not designated as provincially or locally significant. The vegetation communities and species located along and immediately adjacent to the majority of the BRT alignment are therefore not considered sensitive.

4.1.3 Wildlife and Migratory Birds

Background and Approach

The wildlife and habitat assessment focused on compiling and reviewing existing information within the project limits, augmented with general observations. Specific wildlife surveys were not conducted; however all observations of wildlife and sign (e.g., calls, scat, burrows, nests) were recorded during the terrestrial and aquatic field work. As well, wildlife habitat was assessed generally based on the vegetation community characteristics. Potential wildlife movement areas were also assessed generally based on background information, air photo interpretation and field surveys. A number of wildlife inventories have also been conducted within the general project limits, specifically, those associated with the Natural Areas Survey

and Update (City of Mississauga, 2006) and TRCA's Draft Terrestrial Natural Heritage System Report (2004). This information is also integrated in the following discussions.

In addition to the data collected and summarized from background reports, the MNR was contacted to obtain Element Occurrence (EO) records of Species at Risk (SAR) and species of provincial conservation concern documented within the project limits. Ecoplans also considered potential habitat for species of conservation concern during their field surveys. A summary of the wildlife and wildlife habitat within the project limits is presented below.

Overview

As described in the vegetation section, the study corridor is located within a fully urbanized landscape, extending as a long narrow band parallel to existing infrastructure. This band is widest on the north. Terrestrial habitat is dominated by cultural meadow, with scattered woody patches and occasional small, isolated woodlands (e.g., RW1). The most prominent feature is the Etobicoke Creek valley, and secondarily, the habitat mosaic west of Cawthra Road (NE4 with NE4SMA) and the Little Etobicoke valley. Connectivity is fragmented by the existing road infrastructure and development, as discussed further below.

The wildlife species recorded by Ecoplans and the City of Mississauga (2006) within the study corridor include common, tolerant generalist species such as White-tailed Deer (*Odocoileus virginianus)*, Raccoon (*Procyon lotor)*, Striped Skunk (*Mephitis mephitis)*, Eastern Cottontail (*Sylvilagus floridanus*), vole species (*Microtus sp.*) and a variety of small passerines and hawks, tolerant of urban conditions. Additional species, such as Grey Squirrel (*Sciurus carolinensis*) and Groundhog (*Marmota monax*), are anticipated to use the habitat along the corridor. The observed species assemblage is consistent with the cultural habitat mosaic, proximity to commercial / industrial / residential development, cultural influence and high level of disturbance and fragmentation. The Etobicoke Creek valley and NE4 with NE4SMA mosaic are generally intact enough and of sufficient size to provide local habitat for a diversity of species.

Digger Crayfish (*Fallicambarus fodiens*) is found within NE4SMA and the wet pockets present on the east and west sides of Little Etobicoke Creek. This species prefers moist habitat and will dig down to reach the water table during drier seasons. This digging produces small "chimneys" of mud above ground, approximately 12-15 cm high which provide ample protection from terrestrial predators such as snakes (Barr 1994); garnering this species the additional common name of "Chimney Crayfish". There are nine species of crayfish (burrowing and non-burrowing) residing in Ontario (NHIC 2008). Digger Crayfish, the species found within the project limits, is a common burrowing species found in southern Ontario; the other three burrowing species are usually found farther north or within the Niagara Peninsula. Digger Crayfish is not considered 'rare' in Ontario, as they are commonly found throughout the province in a variety of culturally modified and natural habitats (NHIC 2008). However, TRCA ranks it as L-2, or of regional

concern and probably rare within its jurisdiction. Species of conservation concern are discussed in the **Section 4.1.4**.

A variety of migratory bird species are likely to utilize natural corridors such as Little Etobicoke and Etobicoke Creeks during the spring and fall migration periods, as well as the NE4 with NE4SMA mosaic and to a lesser extent RW1 and the open habitat areas as 'stopover' habitat. A variety of more tolerant species (e.g., Northern Cardinal [*Cardinalis cardinalis*], Black-capped Chickadee [*Poecile atricapillus*], Song Sparrow [*Melospiza* melodia], Yellow Warbler [*Dendroica petechia*] and American Goldfinch [*Carduelis tristis*]) will also use the main valley and NE4 with NE4SMA mosaic for nesting; the smaller features may be used by very tolerant species such as American Robin (*Turdus migratorius*), however their isolation and proximity to the highway adversely affects the quality of the habitat for nesting.

There are several migratory bird species that may utilize the bridge and large culvert structures along the project limits for nesting, including Cliff Swallow (*Petrochelidon pyrrhonota*), Barn Swallow (*Hirundo rustica*) and Eastern Phoebe (*Sayornis phoebe*). Four Cliff Swallow nests were noted on the Etobicoke Creek bridge during the field surveys; no nests were noted in the Little Etobicoke Creek culverts.

Wildlife Movement Opportunities

Wildlife movement opportunities were assessed using background information, field information, air photo interpretation and professional judgement. Wildlife habitat and wildlife movement opportunities are very limited within the urban, culturally modified landscape generally, given the very few remaining vegetation features of notable size, limited cover and adjacent urban development. Movement opportunities are further limited by the fragmentation by the numerous roads. The watercourse valleys, and primarily Etobicoke Creek valley, provide the only more or less continuous conduits with large enough structures to accommodate movement under the roads. The well-defined Etobicoke Creek valley and its more or less continuous woody vegetation provide a linkage down to Lake Ontario. There is confirmation that White-tailed Deer (City of Mississauga 2006) move through the area, indicating that other wildlife species also likely do so.

Within the east-west 'Linkage Area' designated by the City, potential land-based wildlife movement is hindered by the general lack of cover, and at present, fragmented regularly by the major road crossings (e.g., Hurontario Street, Highway 403, Cawthra Road, Tomken Road, Dixie Road and Eastgate Parkway) and their interchanges with Highway 403.

Wildlife Sensitivities and Management Implications

In general, the open character of the cultural meadow habitats is not sensitive to disturbance, given its anthropogenic origin. The urban landscape existing infrastructure disturbance and

roadway fragmentation limit the potential of the remnant habitat features generally. Nonetheless, these features provide local habitat opportunities in the otherwise developed landscape, accentuating the relative importance of the Etobicoke Creek valley, and secondarily the Little Etobicoke Creek valley, as both habitat and 'corridors'. The functions of the 'Linkage Area' are limited by the disturbance and major road and highway fragmentation; however, it is the only east-west linkage opportunity within the area and particularly between Little Etobicoke Creek and Etobicoke Creek valleys. Therefore, the City encourages any potential means of improving movement and habitat opportunities along this area.

4.1.4 Species of Conservation Concern and Species at Risk

The NHIC database (which uses the provincial S-rank system to designate 'rare' species [S1, S2, S3]), MNR Aurora District, CVC and TRCA, Department of Fisheries and Oceans Canada (DFO) Species at Risk (SAR) mapping, Environment Canada's SAR search tool (available at: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=793) and various monitoring and background reports were consulted for information on species of conservation concern within the project limits. The species list compiled from the above mentioned sources with their current status is provided in **Appendix B**.

Fish

The *Distribution of Fish Species at Risk* map (DFO 2007b) indicates that the reaches of Little Etobicoke Creek (within the project limits), as well as the remnant reaches of Renforth and Elmcrest Creeks (downstream of the project limits) have a "high potential" for Redside Dace and Atlantic Salmon. However, it was confirmed with DFO that the "potential" mapped for these creeks pertains only to Redside Dace (Andrea Doherty Pers. Comm. July 31, 2008).

Redside Dace is designated as Threatened by the Committee on the Status of Species at Risk in Ontario (COSSARO) and its federal status has recently been elevated to Endangered by the Committee on the Status of Endangered Species in Canada (COSEWIC).

Redside Dace was last recorded in Little Etobicoke Creek, at Burnamthorpe Road (downstream of the project limits) in 1949 (NHIC). Redside Dace was last recorded in Little Etobicoke Creek, at Burnamthorpe Road (downstream of the project limits) in 1949 (NHIC). The Redside Dace Recovery Strategy indicates that Redside Dace has likely been extirpated from the Etobicoke Creek Watershed. TRCA (Pers. Comm. Scott Smith, Tuesday July 29, 2008) confirms this point.

Flora

The working vascular plant species list is found in **Appendix B**. This list combines the findings of Ecoplans field surveys and the City of Mississauga Natural Areas Survey (2006). It should be noted that Ecoplans inventory focussed on features in the immediate vicinity of the alignment

and would not be considered exhaustive. However, the combined list provides a reasonably representative list for the purposes of a project of this nature.

Species of conservation concern will be associated primarily with the higher quality habitats and vegetation communities found within the remnant natural areas and valley stream corridors in the vicinity of the BRT East project limits (e.g., RW1, NE4, NE4SMA, Little Etobicoke and Etobicoke Creek [City of Mississauga 2006]). There are no intact 'natural areas' associated with BRT West. The presence of species of conservation concern is therefore considered limited relative to the BRT West section; the following discussion focuses on BRT East.

Although not within the project limits, Butternut was the only flora SAR recorded within the *Natural* Areas *Survey Update* (City of Mississauga 2006) in the vicinity of the BRT alignment. This tree species is designated by COSEWIC as *Endangered* in Canada and it is listed on Schedule 1 of the *SARA*. It is also designated by MNR as *Endangered*, but is not regulated in Ontario (i.e., the *Ontario Endangered Species Act* does not apply). This species also has a provincial rarity rank of S3.

The Endangered status is due to general Butternut decline from the disease *Butternut Canker*. Butternut canker is widespread, hyper-virulent and fatal (although infected trees can live for 20-40 years if otherwise healthy and able to "wall off" infected areas). Based on U.S. experience, a very small percentage of trees are resistant. Secondary fungal infections can develop in infected trees (black fungus at base of trees). The canker vectors are rain, wind and insects. The canker can be difficult to detect – some trees will show obvious signs / stress while others seem to be vigorous. One Butternut not infected by the canker was observed in ET04 in the Butternut Survey conducted in 2006.

Based on a query of the Environment Canada SAR search tool, American Ginseng (*Panax quinquefolius)* is also indicated as potentially being present in a broader area that encompasses the project limits. American Ginseng typically grows in mature, undisturbed deciduous forests, typically near the bottom of south-facing slopes where soils are well-drained and warm. Forest canopy is usually dominated by Sugar Maple, White Ash, Bitternut Hickory, and Basswood. These habitat conditions do not occur within the project limits; the most likely candidate habitat would be intact areas along the Etobicoke Creek valley. However, it is not known whether this species persists even there, as it has not been identified in recent surveys conducted (TRCA 2004).

The NHIC website (2008) shows an historical (1961) occurrence records of another vascular plant species, the Harbinger-of-spring (*Erigenia bulbosa*), that is ranked S3. This record is located in the vicinity of Etobicoke Creek but not within the project limits. This species is considered extirpated in the TRCA/Peel region (TRCA 2004; Varga *et al*. 1999).

A colony of Twinleaf is located on the eastern bank of Etobicoke Creek, well to the north of the project limits. The Twinleaf is considered rare in the TRCA region (L1) but is not considered a provincial or federal SAR. This colony is considered a Life Science Site by NHIC (2008).

Of the 95 species recorded in the general vicinity of the BRT EAST project limits by Ecoplans or during the City of Mississauga's *Natural Areas Survey Update* (2006), 42 are regionally recognized as "species of special concern" by Peel Region and/or TRCA. (As noted, the definitions of the various ranking systems are provided in **Appendix B**, along with the species lists). The following summary comments are relevant:

- Of these 42 species, TRCA (2003) ranks one as L1 (Twinleaf), three as L2 (Toadflax, White Oak, Clinton Wood Fern), 17 as L3, and 19 as L4 (see **Appendix B**). One is considered extirpated within the TRCA's jurisdiction (Harbinger-of-spring).
- Of the L2 to L4-ranked species, only White Oak was recorded along the project limits and its occurrence was associated with landscape plantings.
- Of the 42 species, Peel Region (Varga *et al*. 1999) has designated 15 as regionally rare: 13 as 'rare', one as 'uncommon', and one as 'extirpated' (some of these have overlapping L-ranks); and the City of Mississauga has identified 24 plant species as uncommon and 8 as rare (some of which overlap with the Regional list):
- The locations of the regionally and municipally rare species *within* the project limits are noted as follows:
    - RW1 – Sharp-lobed Hepatica (uncommon within the City), Squirrel-corn (rare within the City, uncommon within the Region) and Bellwort (uncommon within the City).
    - White Spruce – present throughout the project limits (BRT East and West), however they are most likely planted or seeded in from residential and landscape plantings.
- The locations of the Regionally rare species *in the immediate vicinity* of the project limits are noted as follows:
    - ET04 (Etobicoke Creek Valley) south of Eglinton Avenue (and south of BRT alignment)- Clinton Wood Fern, Twinleaf, Great Ragweed, River-bank Wild-rye, Rock Elm, Water Dock, White Bear Sedge, Carolina Spring Beauty, Squirrel Corn; and
    - NE4 (well outside of the project limits and is separated from the project limits by NE4SMA) - Bristly Sedge, Canada Moonseed, Toadflax, Cleavers.

The remainder of these species are located well outside of the project limits. Although it is possible that some may occur within the project limits, none was noted during the field surveys and most would be associated with the forest habitats or less disturbed habitats.

Wildlife

No SAR wildlife species were recorded during Ecoplans' field surveys, and potential is considered low along the project limits with the general exception of the Etobicoke Creek valley. The following summary points provide an overview of wildlife species and habitat significance associated with the general project limits:

- The only SAR recorded in the general vicinity is Eastern Milksnake (*Lampropeltis triangulum*), which was recorded historically (1966) along Etobicoke Creek approximately 2 km south of the project limits, as discussed further below. The Milksnake is designated provincially rare "S3", and "Special Concern" both by COSEWIC and COSSARO (NHIC 2008).
- No SAR designated by the COSEWIC or COSSARO, or provincially rare (S-rank: S1, S2, S3) species identified by NHIC were observed by Ecoplans or during the City's or TRCA's natural area inventories, or are recorded in the NHIC database in or within the immediate vicinity of the project limits.
- Based on the background information review and Ecoplans' field inventories, the vast majority of the wildlife recorded in the project limits and environs is classified as S5 (very common in Ontario), with a few S4 (common) and SE (non-native) species also noted.
- Two bird species (Cooper's Hawk [*Accipiter cooperii*] and Savannah Sparrow [*Passerculus sandwichensis*]) considered 'area sensitive' (MNR, 2000) have been recorded within the greater project limits. These species use the larger forested natural areas including the Etobicoke Creek valley corridor and expanses of field habitat.
- Twenty-three species are considered regionally or locally rare by TRCA or CVC (five as L3, 13 as L4, 15 of which have been recorded within the project limits. These species are associated with the higher quality and larger area habitat present within NE4SMA, and ET04. These species are considered to be common, widespread species that are often adaptable to disturbed, urban areas. The overall species list is provided in **Appendix B**.
- No specific amphibian surveys were conducted. However, wet pocket habitats associated with the hydroelectric corridor support potential breeding habitat for common amphibian species.

The Environment Canada SAR Search Tool was used to review the habitat ranges of species belonging to Schedule 1 of the *Species at Risk Act* that overlap the project limits. The search tool is used as a broad brush approach to identify potential habitat in the broader area. Environment Canada acknowledges that the "*distribution maps presented on the web site are based on limited available information and that they do not represent an exhaustive and comprehensive inventory of a species current distribution. The distribution maps displayed on this web site are intended to be used at the national / regional scale; use at the local scale is inappropriate*." Therefore, the Environment Canada Search Tool is used to generally augment Species at Risk information and ensure that potential habitat and habitat ranges are considered as well as species observations.

The species identified using the search tool are listed in **Table 4.1.4-1**. A summary of their general habitat requirements and the related *potential* of the habitats within the project limits to support these species is provided below. Of these 13 species identified through the use of the Environment Canada's Species at Risk search tool, Monarch is the species most likely to use habitat present within the project limits. Adjacent to the project limits, there is some potential for

Eastern Milksnake and Northern Map Turtle to use habitat in the Etobicoke Creek valley. While there may be potential for Eastern Ribbon Snake and Eastern Milksnake to use similar habitats to what is found along the project limits (small wetland pockets surrounded by meadow), the likelihood of their presence along the project limits is very low given the setting (major transportation facilities, local roads, urban development and other anthropogenic disturbances). Suitable habitat for the other species does not occur along the project limits.

Table 4.1.4-1 Environment Canada Species at Risk Search Tool Results of Species That Have Habitat Ranges Encompassing Portions of the Project Limits

Scientific Name	Common Name	GRANK[1]	SRANK[2]	COSEWIC[3]	MNR[4]
Ixobrychus exilis	Least Bittern	G5	S3B,SZN	THR*	THR
Falco peregrinus anatum	Peregrine Falcon	G4T3	S2S3B,SZN	SC	THR
Tyto alba	Barn Owl	G5	S1	END*	END
Dendroica cerulea	Cerulean Warbler	G4	S3B,SZN	SC*	SC
Icteria virens virens	Yellow-breasted Chat	G5	S2S3B,SZN	SC*	SC
Wilsonia citrine	Hooded Warbler	G5	S3B,SZN	THR*	THR
Danaus plexippus	Monarch	G4	S4	SC*	SC
Emydoidea blandingii	Blanding's Turtle	G4	S3	THR*	THR
Graptemys geographica	Northern Map Turtle	G5	S3	SC*	SC
Lampropeltis triangulum	Eastern Milksnake	G5	S3	SC*	SC
Thamnophis sauritus	Eastern Ribbonsnake	G5	S3	SC*	SC
Ambystoma jeffersonianum	Jefferson Salamander	G4	S2	THR*	THR
Urocyon cinereoargenteus	Grey Fox	G5	SZB?	NAR	NAR

Least Bittern

This species prefers to nest in freshwater marshes with dense aquatic vegetation, clumps of woody vegetation and open water. Most often they are found in marshes that exceed 5 hectares in size.

Suitable nesting habitat for this species is not found in the project limits

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=51

Peregrine Falcon anatum subspecies

Nesting habitat for the Peregrine Falcon usually occurs on tall cliff areas that face a large open area for foraging. Open areas can consist of water, disturbed areas or young forests. The study site does not provide adequate habitat for this species. There is no cliff habitat or tall infrastructure within the vicinity of the project limits. No known habitat or potential habitat will be impacted. (*Forest Raptors and their Nests on Central Ontario.* Southcentral Sciences Section Field Guide FG-03 1998).

Barn Owl

Barn Owls preferred habitat includes low-elevation, open country, where their small rodent prey are more abundant. They are often associated with agricultural lands, especially pasture. Nests are located in buildings (barns etc), hollow trees and cavities in cliffs. Nests are most often found on man-made structures, especially those which are abandoned or unused. The preferred habitat for this species is not found in the project limits.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=611#habitat

Cerulean Warbler

The Cerulean Warbler is usually found in mature deciduous forests with an open understorey. In Ontario, this warbler also nests in older, second-growth deciduous forests. Little is known about the Cerulean Warbler's migratory habitat, but some individuals have been seen in lower elevation wet forests and in old-growth and second-growth forests. The forest cover, even along the Etobicoke Creek valley, is not mature or intact enough to provide suitable habitat for this species in species is observed in the Carolinian forests of far southern Ontario.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=46

Yellow-breasted Chat

The Yellow-breasted Chat's preferred habitat includes dense thickets around wooded edges, riparian areas, and overgrown shrubby clearings. The Ontario population is very dependent on successional habitats of thick shrubbery. These habitats are the result of vegetative growth in forest openings created by storms, fire, or abandoned fields. The availability of habitat in Ontario has been generally stable over the last decade. Although there is some thicket habitat available adjacent to NE4 and Etobicoke Creek, these patches do not provide the dense thicket cover and forest edge or clearing association typically used by this species. This species is most often found in far southern Ontario.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=61

Hooded Warbler

Hooded Warblers nest in mature hardwood forests with tall trees and a well-closed canopy. The species is considered area-sensitive, meaning that it requires large areas of forest. The bird occupies small clearings with low dense shrubby vegetation, generally from 1-5 years after it has been created (either naturally or by forestry practices). Prior to the 1800s, there was extensive habitat in Canada that would have been suitable for Hooded Warblers. Very little forest cover remains in the Carolinian area of Canada and much of the forest that does remain is highly fragmented. Presently, forest interior covers only about 2% of the land area in the Carolinian Forest region. The generally open and fragmented nature of the forest habitat even along the adjacent sections of the Etobicoke River valley does not provide adequate habitat for this species.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=37

Monarch Butterfly

Monarchs inhabit any areas where milkweed and wildflowers such as Goldenrod, asters, and Purple Loosestrife are found, including roadsides, abandoned farmland or open, meadow areas. The Monarch's Special Concern status is based on ongoing threats to wintering habitat outside of Canada rather than the rarity of is summer habitat and key host plant, Common Milkweed, which are still generally common throughout the province.

Potential Monarch is present throughout much of the cultural meadow habitat along the project limits; as previously noted, this meadow habitat is generally common and abundant within the project limits environs, and throughout much of the southern rural-agricultural Ontario.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=294

Blanding's Turtle

Blanding's Turtle inhabit areas of shallow water, usually in large marshes or shallow lakes. They are often found wandering on land, but not usually very far from water except when nesting. There are no open water marshes, ponds or lakes within the immediate vicinity of the project limits that would provide suitable habitat for this species.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=846

Northern Map Turtle

The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation with suitable basking site that are exposed to the sun for much of the day. Although there is some potential for this species to occur within Etobicoke Creek, this species was not observed by Ecoplans within the project limits, nor has it been recorded by NHIC within the project limits.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=712

Eastern Milksnake

The Eastern Milksnake can be found in a wide variety of habitats, including prairies, meadows, pastures, hayfields and rock outcroppings, as well as deciduous forests, pine plantations, bog forests, pine forests and mixed pine-hardwoods. In most cases, this snake is found along open edge habitats associated with these forest habitats. This snake is often found in rural habitats such as around barns, sheds and houses (particularly old buildings and structures) and farm 'debris'.

Due to the diversity of habitat preferences, this species could be found within the project limits or vicinity. As noted, this species was recorded historically (1966) along the Etobicoke Creek valley approximately 2 km downstream of Eglinton Avenue, and given the extent of the general habitat modification and disturbance associated with the surrounding urban landscape, it is unknown if this species persists in the valley. It is unlikely that this species would use the managed and modified floodplain area in the immediate vicinity of the project limits (COSEWIC 2002).

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=714

Eastern Ribbonsnake

This semi-aquatic snake is typically found near water including streams, ponds and wetlands. When associated with a wetland, the wetland is often close to forested areas. Within the study area wetland communities are restricted to small typically open and culturally derived pockets along small intermittent tributaries, east and west of Little Etobicoke Creek. NE4SMA includes wetland habitat with forest habitat found immediately to the north, however the larger wetland pockets adjacent to the forest are located well north of the alignment. Given the diversity of

habitats used by this species, it is possible that it could be found within the wetlands within and adjacent to the study area. However, as noted, most of these wetlands are small, cultural derived marsh pockets dominated by aggressive emergents and grasses. Therefore, the potential for this species to occur within the study area is limited generally. This species was not observed by Ecoplans within the study area, nor has it been recorded by NHIC within the study area.

Readers interested in additional information regarding this species should visit:
http://www.rom.on.ca/ontario/risk.php?doc_type=fact&id=295&lang=en

Jefferson Salamander

The Jefferson Salamander is found in a variety of woodland habitats including deciduous, coniferous or mixed forests as well as swamps. Breeding ponds are usually vernal pools found within these woodland areas, but this species will breed in acceptable marshes, swamps or even roadside ditches. Jefferson Salamander requires intact deciduous forest with undisturbed forest floor, and breeding ponds that are permanent and unpolluted. Within the project limits there is no intact expanse of suitable deciduous forest habitat and no vernal pools or other pond areas that might provide suitable breeding habitat.

Readers interested in additional information regarding this species should visit:
http://www.rom.on.ca/ontario/risk.php?doc_type=fact&id=154&lang=en

Grey Fox

Grey Foxes prefer deciduous forest and marsh habitats. Dens can be constructed in many types of substrate, but tend to be found in areas of dense bush with close proximity to a water source. Despite these habitat preferences the Grey Fox can often be found denning on the outskirts of cities. Within the project limits and vicinity, the only potential habitat for this species might be in the more intact forest areas along the Etobicoke Creek valley, or within the northern portion of the NE4/ NE4SMA mosaic. No dens were noted along the project limits during any of the field surveys.

Readers interested in additional information regarding this species should visit:
http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=157

As previously mentioned, Monarch is the species most likely to use habitat present within the project limits. Adjacent to the project limits, there is some potential for Eastern Milksnake and Northern Map Turtle to use habitat in the Etobicoke Creek valley. While there may be potential for Eastern Ribbon Snake and Eastern Milksnake to use similar habitats to what is found along the project limits (small wetland pockets surrounded by meadow), the likelihood of their presence along the project limits is very low given the setting (major transportation facilities,

local roads, urban development and other anthropogenic disturbances). Suitable habitat for the other species (as listed above) does not occur along the project limits.

4.1.5 Air Quality

As described in **Section 4.2.7**, the Mississauga BRT corridor lies adjacent to many major roads, including Highway 403, and in close proximity to many busy arterial and local collector roads. As a result, the many nearby roadways, and especially Highway 403, present notable contributions to reduced local air quality.

Overall, the ambient air quality in the area is typical to the urban air quality found within the Greater Toronto Area. Please refer to **Section 5.1.1.4** for details regarding an air quality assessment completed by RWDI AIR Inc. including information regarding existing air quality conditions. In particular, please refer to **Table 5.1.1-3** which outlines the ambient air pollutant concentrations for the Years 2002-2006.

4.1.6 Physiography, Geology and Contamination

The following provides an overview of the physiography and geology within the study area and comments on what those local conditions mean to the potential for contaminant migration.

Physiography

According to Chapman and Putnam's *"The Physiography of Southern Ontario"* (1984), and the Ministry of Natural Resources Map 2226 *"Physiography of South Central Portion of Southern Ontario"* (1972), the study area is falls within the physiographic region known as the Peel Plain. The Peel Plain is a level-to-undulating tract of clay soils and covers an area of approximately 777 km^2. It is bounded to the north and south by the South Slope physiographic region. Many rivers and streams drain this region, and swamps and bogs are not common. Much of the Peel Plain has been modified by a veneer of clay and silt.

In general, contaminant migration will be greatest in areas of permeable soils such as sand and gravel.

Quaternary Geology

Typical deposits found within the study area include clay till, with some bedrock and organic deposits evident around the Credit River. Halton Till (Ontario-Erie Lobe) has been identified within the study area and consists of silt to clayey silt tills. Around the intersection of Winston Churchill Boulevard, Paleozoic shale bedrock is exposed at the surface. At the intersection of Cawthra Road and Eglinton Avenue West and further east are glaciolacustrine deposits of silt and clay with some sand. According to MOE (2001) the thickness of the overburden within the study area is generally less than 10 m.

In general, silt and clay deposits will slow the migration of potential site contamination within or surrounding the study area. Areas of sand deposits, primarily located east of Cawthra Road, could have a larger influence on contaminant migration due to greater overall permeability.

Bedrock Geology

According to the Ontario Geological Survey (OGS) Map 2544 *"Bedrock Geology of Southern Ontario"* (1991), the study area is underlain by the Queenston Formation of Ordovician Age. This formation is dominated by shales, but also has thin interbeds of limestone and siltstone. The bedrock elevation is approximately 120 metres above sea level (asl) in the study area.

Due to the thickness of the overburden material within the study area, it is unlikely that substantial contaminant migration would occur in the bedrock.

Contamination

A Contaminant Overview Study was undertaken to identify areas/properties with actual and/or potential site contamination, which may affect future design and construction. The study was not intended to provide a full environmental liability assessment of actual or potential contamination, and it did not constitute a Phase I Environmental Site Assessment (ESA) as prescribed by the Canadian Standards Association (CSA) Standard Z768-01. In response to the findings of the Contaminant Overview Study, a contaminant investigation including subsurface investigation (i.e. boreholes) will be carried out the areas of high and moderate potential for contamination with the exception of Area 10 (Etobicoke Creek). The purpose of the subsurface investigations, a contaminant investigation, is to ascertain the presence or absence of soil and/or groundwater contamination in order to develop appropriate measures to manage excess materials during construction. Discussions are ongoing with property owners regarding permissions to enter property to complete the work. The exact schedule for completion of the contaminant investigation work is unknown as it is subject to field conditions and property access; however, the site investigations will be completed as soon as possible during Detail Design. A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada for their review.

A comprehensive records review was completed for the study area to collect available information on past activities that could have contributed to actual or potential contamination. In addition, a visual inspection of the study area was completed to properties/areas that pose the potential for contamination, either based on their nature of operations/land use (e.g. service stations, industrial areas) or by visual evidence of contamination (e.g. piles of waste debris, surface staining). The inspection was limited to a non-intrusive roadside inspection.

No areas of actual contamination were identified during the inspection based solely on observations; however, the following land uses and/or features were identified which may represent sources of potential contamination:

- The BRT alignment is largely located within or adjacent to a hydro corridor. The routine use of pesticides within the hydro corridor is suspected. This may represent a potential source of contamination;
- A hydro substation is located north of Eastgate Parkway, west of Tomken Road. There is the potential for site contamination on this property based on historical activities;
- Oil pipelines are located adjacent to, or within, the hydro corridor. The condition of the oil pipelines and the potential for spill/leaks represent a potential source of contamination;
- The commercial/industrial business activities located along the north side of Eastgate Parkway, from east of Tomken Road to just west of Dixie Road and along the west side of Eastgate Parkway from south of Fieldgate Drive to Eglinton Avenue West, represent a potential source of contamination migration;
- A fuel service station is located south of Eglinton Avenue West and west of Centennial Park Boulevard (Petro Canada). This represents a potential source of contamination migration; and
- A dry cleaning facility (registered waste generator) is located at 2800 Skymark Avenue. This represents a potential source of contamination migration.

Potential site contamination may exist within or surrounding the study area as a result of current and historical industrial/commercial land uses. The following is a list of typical chemical compounds associated with industrial/commercial activities and operations observed during the study area inspection, and noted during the background information review.

- *Dry Cleaning Facilities* – Volatile Organic Compounds (VOCs).
- *Fuel Service Stations* – petroleum hydrocarbons, lead and acid, and compressed gases.
- *Industrial Facilities* – solvents, petroleum hydrocarbons, heavy metals, and acids/bases.
- *Registered Waste Generators* – petroleum hydrocarbons, solvents, compressed gases, and hazardous solid, liquid and aerosol products.
- *Waste Disposal Sites* – petroleum hydrocarbons, heavy metals, solvents, and miscellaneous waste debris.

The fact that an activity or operation appears on the above list does not mean that hazardous substances are used or stored on all sites occupied by that activity or operation, nor that the land use will have hazardous substances present. The list merely indicates that such activities are more likely to use or store hazardous substances; and there is a greater probability of site contamination occurring than other uses or activities. Conversely, an activity or industry that does not appear on the list does not preclude it from having a potential for site contamination.

Oil pipelines exist within the study area, primarily along the north side of Highway 403 from west of Winston Churchill Boulevard easterly to Fieldgate Drive. If the pipelines are not adequately

maintained leaks and/or spills may occur to the surrounding environment which could affect soil and groundwater.

Hydro transmission towers are present within the study area. Historical spraying of vegetation with pesticides may have occurred within the corridor resulting in chemical accumulation in the shallow soil. In addition, corrosion of the galvanized steel towers which support the electrical transmission lines can cause zinc contamination of the soil (Jones 1982). Furthermore, the zinc used in hot dip galvanizing may be contaminated with cadmium, which could also contaminate the soil.

Road salts (predominantly sodium chloride) are used as de-icing and anti-icing chemicals for winter road maintenance. These salts can enter the surface water, soil and groundwater resulting in local or widespread effects. Since the study has a large proportion of high-use roadways, road salt contamination in proximity to roadways is a potential concern.

Shale is the predominant bedrock formation within and surrounding the study area. The MOE conducted a study to sample shale across Ontario in order to characterize the concentration of naturally occurring elements in the late 1990s (MOE 1998). The results of the study demonstrated that elemental chemical composition of the shale varies significantly across the shale formations in Ontario and that the shale itself and the soil associated with it frequently exceeded the MOE Guidelines. Most notable elemental chemical exceedances included beryllium, copper, cobalt and nickel. The study indicated that in order to determine appropriate disposal of the shale, chemical sampling of the shale would be required. Since construction of the BRT will generate a substantial quantity of excess shale, appropriate handling and management of the shale will need to be addressed.

A large proportion of the study area was dominated by agricultural operations until the late 1960's. Since then, substantial development has occurred around the study area. The pesticides used in these agricultural operations can accumulate in the environment and remain for long periods of time. These contaminants can be transported through surface water runoff, wind and dust generation, and groundwater. However, due to a decrease in the intensity of the agricultural operations and the change in land use overall, there is a low potential for soil and groundwater contamination associated with historical agricultural operations.

Figures 4.1.6-1 to **4.1.6-4** illustrate the areas of potential soil and groundwater contamination. These areas have been categorized by assessing the overall relative potential of contamination in the study area. The categories used are as follows:

High Potential for Soil and Groundwater Contamination

Red highlights indicate areas with a high potential for soil and groundwater contamination. The red highlights typically correspond with locations within and adjacent to the study area where

land uses consist of known contaminated properties; or current and historical industrial/commercial operations.

The following areas of high potential are summarized below and are illustrated on **Figures 4.1.6-2** to **4.1.6-4**.

- **Area 1** – The current location of a hydro substation at the intersection of Rathburn Road and west of Hurontario. Previous environmental studies have been completed on this site; however the reports were not made available to Ecoplans. This represents a potential source of contamination migration.
- **Area 2** - The commercial/industrial business activities conducted on the properties along the north side of Eastgate Parkway from 250 metres east of Tomken Road to just west of Dixie Road. This represents a potential source of contamination migration.
- **Area 3** - The commercial/industrial business activities conducted on the properties along Eastgate Parkway from south of Fieldgate Drive to Eglinton Avenue West. This represents a potential source of contamination migration.
- **Area 4** – Registered waste generators are registered for properties located at the intersection of Spectrum Way and Skymark Avenue to the north of Eglinton Avenue West.
- **Area 5** – The activities associated with the Petro Canada fuel service station located south of Eglinton Avenue West and west of Centennial Park Boulevard. This represents a potential source of contamination migration.
- **Area 6** - A dry cleaning facility (registered waste generator) located to the north of the study area and contamination migration is a concern.
- **Area 7 –** Commercial/manufacturing facilities (registered waste generators)

Moderate Potential for Soil and Groundwater Contamination

Yellow highlights indicate areas with a moderate potential for site contamination**.** These areas represent land uses that are mostly commercial in nature; or are suspected of using chemical compounds or performing activities that could impact soil and/or groundwater.

The following areas of moderate potential are summarized below and are illustrated on **Figures 4.1.6-2** to **4.1.6-4**.

- **Area 8** – Hydro substation located to the north of Eastgate Parkway and west of Tomken Road. The activities conducted on this property have the potential for site contamination.
- **Area 9** - Oil Pipe Line Pressure Station located north of Eastgate Parkway and west of Dixie Road.
- **Area 10** – Historical spill occurrences in Etobicoke Creek

Areas not highlighted on the figures that are considered to have a moderate potential for site contamination include:

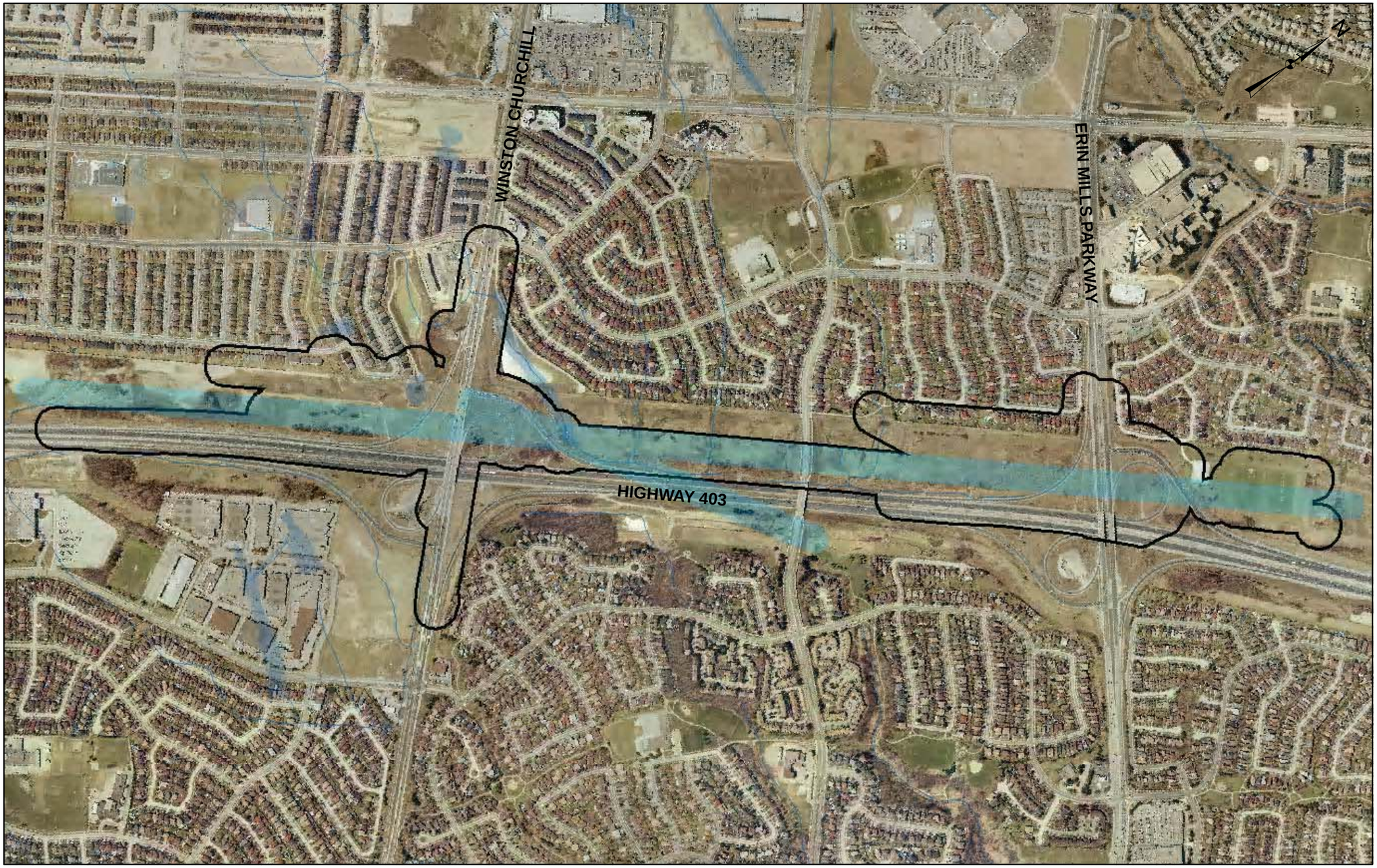
- The hydro corridor located within the study area – historical use of pesticides for vegetation control.
- The oil pipeline corridor located within the study area – potential for leaks/spills.

- Land adjacent to existing roadways – current and historical use of road salt.
- Shale bedrock – elevated concentrations of naturally occurring elements (metals).

Low Potential for Soil and Groundwater Contamination

All other areas not highlighted in **Figures 4.1.6-1** to **4.1.6-4** indicate land use features considered to have a low potential for site contamination. These areas are generally classified as open space, residential, or agricultural areas that are not suspected of using chemical compounds harmful to the environment or human health.

Please note that additional information regarding groundwater can be found in **Section 4.1.7**.



Source: Aerial Photograph provided by the City of Mississauga

MISSISSAUGA BRT PROJECT
No.: 177-R-06

CONTAMINATION OVERVIEW STUDY

AREAS OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION

WEST SECTION

Legend

- Watercourse
- Waterbody
- High Potential for Site Contamination
- Moderate Potential for Site Contamination
- Study Area (50 metre buffer)
- Approximate Location of Oil Pipeline Corridor

ecoplans Limited

SCALE: 1:9,500

0 100 200 400 600
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

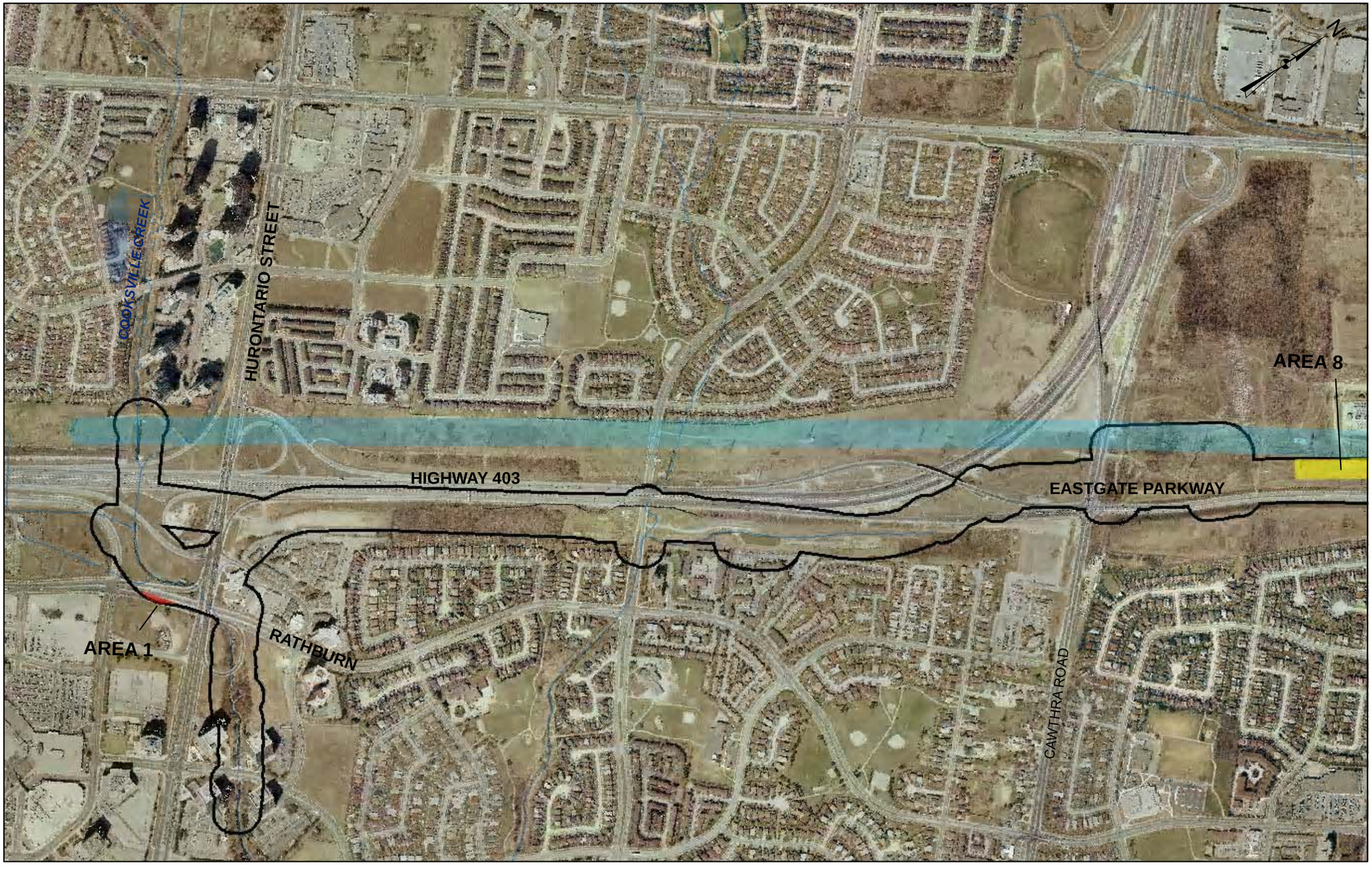
PROJECT: 07-3272

CHECKED BY: D. STEWART

FIGURE No.

4.1.6-1

Note: The oil pipeline and hydro corridor features are of moderate potential for site contamination, however, they have not been highlighted (yellow) as the majority of the study area is occupied on or adjacent to these features.



Source: Aerial Photograph provided by the City of Mississauga

MISSISSAUGA BRT PROJECT
No.: 177-R-06

CONTAMINATION OVERVIEW STUDY

AREAS OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION

EAST SECTION

Legend

- Watercourse
- Waterbody
- High Potential for Site Contamination
- Moderate Potential for Site Contamination
- Study Area (50 metre buffer)
- Approximate Location of Oil Pipeline Corridor

ecoplans Limited

SCALE: 1:9,500

0 100 200 400 600
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

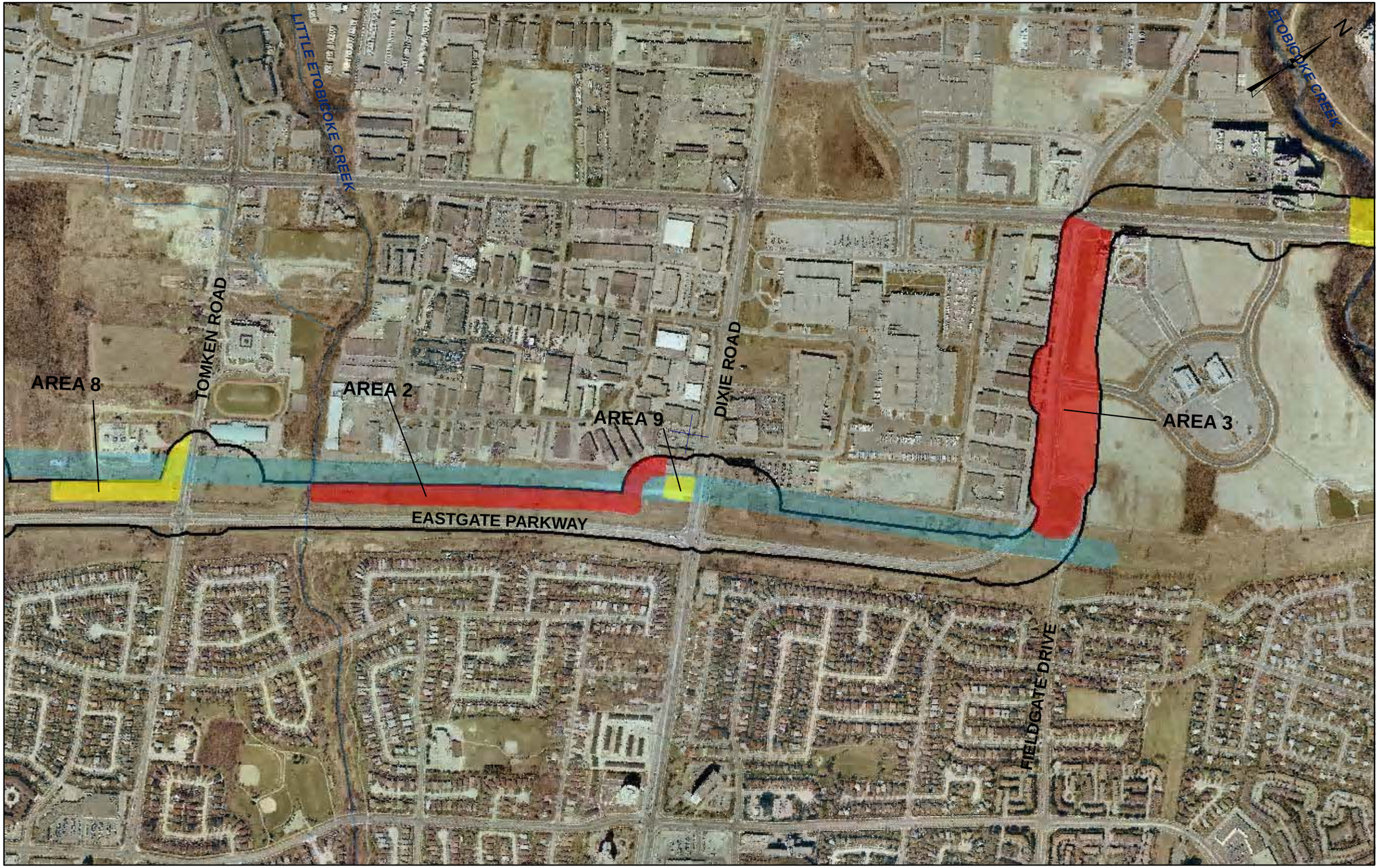
PROJECT: 07-3272

CHECKED BY: D. STEWART

FIGURE No.

4.1.6-2

Note: The oil pipeline and hydro corridor features are of moderate potential for site contamination, however, they have not been highlighted (yellow) as the majority of the study area is occupied on or adjacent to these features.



Source: Aerial Photograph provided by the City of Mississauga

MISSISSAUGA BRT PROJECT
No.: 177-R-06

CONTAMINATION OVERVIEW STUDY

AREAS OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION

EAST SECTION

Legend

- Watercourse
- Waterbody
- High Potential for Site Contamination
- Moderate Potential for Site Contamination
- Study Area (50 metre buffer)
- Approximate Location of Oil Pipeline Corridor

ecoplans Limited

SCALE: 1:9,500

0 100 200 400 600
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

PROJECT: 07-3272

CHECKED BY: D. STEWART

FIGURE No.

4.1.6-3

Note: The oil pipeline and hydro corridor features are of moderate potential for site contamination, however, they have not been highlighted (yellow) as the majority of the study area is occupied on or adjacent to these features.

Source: Aerial Photograph provided by the City of Mississauga

MISSISSAUGA BRT PROJECT
No.: 177-R-06

CONTAMINATION OVERVIEW STUDY

AREAS OF POTENTIAL SOIL AND GROUNDWATER CONTAMINATION

EAST SECTION

Legend

- Watercourse
- Waterbody
- High Potential for Site Contamination
- Moderate Potential for Site Contamination
- Study Area (50 metre buffer)
- Approximate Location of Oil Pipeline Corridor

ecoplans Limited

SCALE: 1:9,500

0 100 200 400 600
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

PROJECT: 07-3272

CHECKED BY: D. STEWART

FIGURE No.

4.1.6-4

Note: The oil pipeline and hydro corridor features are of moderate potential for site contamination, however, they have not been highlighted (yellow) as the majority of the study area is occupied on or adjacent to these features.

4.1.7 Groundwater

The following information provides an overview of groundwater resources within the study area and includes information regarding water wells that may be present within the study area. The information provided in this section is based on a records review including geological and hydrogeological maps/studies and Ministry of the Environment (MOE) water well records. Although wells are present within the study area it is not anticipated that any wells are actively being used as a potable water source, as municipal water servicing is available within the study area. Please refer to **Section 4.1.6** for details regarding regional geology.

Aquifers and Shallow Groundwater

Based on data derived from the MOE water well records, geotechnical information, and supporting documentation, the bedrock aquifer system appears to be the dominant supply of groundwater within the study area. Groundwater is commonly found in the Georgian Bay and Queenston bedrock formations, and is generally regarded as poor for domestic use, water quantity and quality. The overburden is not considered to be a significant source of groundwater within the study area.

Shallow groundwater zones do not appear to be common within the study area. Based on known groundwater depths recorded for water wells within the study area the average depth to groundwater ranges from approximately 11 to 21 m bgs. Three areas where shallow groundwater may be present are identified within the east section of the study area:

- Vicinity of Cooksville Creek near Hurontario Street
- Vicinity of Little Etobicoke Creek east of Tomken Road
- Vicinity of Etobicoke Creek near Spectrum Way

Groundwater Flow

Shallow groundwater flow is influenced largely by topography, the orientation of bedrock valleys (where present), the composition of impermeable deposits (Halton Till, Newmarket Till), and the thickness of permeable deposits that form recharge areas. In general, groundwater flow across the study area is southeasterly towards Lake Ontario, with flow deflections occurring in the vicinity of surface watercourses. Deep groundwater flow is influenced by the bedrock surface and the presence of buried bedrock valleys, but will normally mimic the shallow groundwater flow system.

Vertical groundwater movement within the study area is downwards between the various aquifer systems. However, closer to Lake Ontario the vertical hydraulic gradient likely reverses, such that the gradient moves upward (i.e. conducive to groundwater discharge).

Groundwater Recharge and Discharge

Groundwater recharge is enhanced in areas of coarse-textured soils with either limited slope or hummocky topography, and in areas of natural vegetation. Accordingly, more groundwater recharge will occur north of the study area due to the increased presence of permeable material at or near the surface (i.e. sands and gravels). Recharge is reduced significantly within the study area due to the presence of impermeable deposits (e.g. Halton Till) and the degree of paved surfaces. Most precipitation available for groundwater recharge is conveyed to storm sewers or surface watercourses via drainage channels.

Based on the surficial geology of the study area along the Credit River system, some localized groundwater discharge may occur as baseflow to the Credit River and other local surface watercourses that are incised through the Halton Till (e.g. Etobicoke Creek). However, baseflow information presented by Davies and Holysh (2007) suggests that discharge may be minor in comparison to the total flow volume, particularly of the Credit River.

Groundwater Quality

The MOE Water Well Information System (WWIS) database contains some generalized information on water quality within the study area, and categorizes the groundwater (based on driller observations) as either fresh, salty, sulphurous, mineral rich or iron rich. Water wells screened in the Queenston and Georgian Bay Formations (i.e. overburden wells) consistently report poor water quality at the time of installation (e.g. salty or mineralized); however, this information should be interpreted with caution due to the subjective nature in which it was collected. The data indicate that the reported groundwater quality for bedrock wells is generally poorer than reported for overburden wells within the study area.

Wellhead Protection Areas

Wellhead protection refers to the process of identifying an area from which a well will potentially draw its water supply. Establishing controls of either land use management actions within these areas can minimize the potential for contaminants to reach the well. Several reports for the study area were reviewed. None of the reports reviewed indicate that wellhead protection areas are present within or immediately surrounding the study area.

Aquifer Vulnerability Zones

Aquifer vulnerability maps identify areas where contamination of aquifers is more or less likely to occur as a result of surface contamination. Several reports for the study area were reviewed. None of the reports reviewed indicate that aquifer vulnerability zones are present within or immediately surrounding the study area.

Wetlands

Groundwater is often the major source of water for wetland systems. Typically, this occurs in the form of groundwater discharge areas, such as low-lying depressions and valleys. Wetlands may also be a source of groundwater recharge. The few wetland systems located below the Niagara Escarpment are concentrated along surface watercourses. Small wetland pockets exist within the study area (see **Section 4.1.2**).

Given that the surficial geology of the study area consists of silt and clay associated with Halton Till deposits, it is unlikely that significant hydraulic connectivity with the underlying groundwater system exists. As such, these wetland pockets are likely sustained by surface water runoff and precipitations events, as opposed to groundwater discharge. It is also unlikely that the wetland systems identified serve an important groundwater recharge function when compared to other geomorphic features (i.e. the Oak Ridges Moraine).

MOE Water Well Records

The MOE WWIS is a compilation of water wells drilled in the Province of Ontario for the purpose of human, agricultural and industrial consumption. Pursuant to the *Ontario Water Resources Act* (OWRA), any well drilled for these purposes must be drilled by an MOE licensed well drilling contractor and documented in a water well record. The record is then filed with the MOE. Examples of data recorded on a water well record include: location of well, date drilled, depth to water, static water level and subsurface stratigraphy. Since well records have been completed by many different drillers during the past 50 or so years, data accuracy and consistency is sometimes questionable. As such, the information in the records cannot always been taken as precise and must be interpreted in context of the overall regional setting, given the geological conditions.

Seven water well records were available within and surrounding the study area. MOE's records also include an additional five wells for which no coordinates are available and it is only known that those wells are located within the Region of Peel. It is also worth noting, that none of those additional five wells are listed as being used as a water supply. Two of those wells are listed as abandoned, two are listed as observation wells and one is listed as a test hole.

Of the seven well records reviewed, five water wells were identified as being located within the BRT study area. The seven well locations are shown on **Figure 4.1.7-1** and **Figure 4.1.7-2** and are classified by depth to water. A summary of the well information for the wells identified within the study area is presented below.

- No wells are identified as encountering water less than 5.0 m below ground surface (bgs) – shallow wells.
- Four wells are identified as encountering water between 5.0 m to 15 m bgs – intermediate wells.

- One well is identified as encountering water greater than 15 m bgs – deep wells.
- There are five wells installed in the bedrock and two wells installed in the overburden.
- Five well records did not contain any information on depth to water or well type.
- Groundwater elevations range from 129 masl to 157 masl.
- Well depths range from 13.1 m to 22.8 m bgs.
- The depth to water ranges from 11.2 m to 21.3 m bgs.
- The average depth to bedrock ranges between 1.5 m and 16.7 m bgs.
- The surficial geology most closely associated with depth to water in the overburden is sand.
- The bedrock geology is composed of shale.

Overall, four of the five water wells located within the study area draw water from the bedrock aquifer system, indicating that the bedrock is likely the predominant supply of groundwater.

Although wells are present within the study area it is not anticipated that any wells are actively being used as a potable water source, as municipal water servicing is available within the study area. **Table 5.1.7-1** provides information from MOE's records regarding the seven wells within and surrounding the study area including date of completion, use, type of well and where the water is found.

Table 5.1.7-1 MOE Water Well Records Review

Well ID	Date of Completion	Well Use	Type of Well	Water Found In
2802186	July 15, 1958	Water Supply	Overburden	Sand
4902221	July 15, 1951	Abandoned	Bedrock	Shale
4902236	September 3, 1962	Water Supply	Bedrock	Shale
4902237	September 15, 1962	Water Supply	Bedrock	Shale
4903577	October 27, 1970	Water Supply	Bedrock	Shale
4907762 *	August 17, 1993	Test Hole	Bedrock	Sand
4909466 *	June 14, 2004	Observation Well	Overburden	Till

* Not within the immediate study area.

It should be noted that two water wells located within the study area appear to be covered by less than 5.0 m of overburden material. These wells may be more susceptible to contamination from surface sources:

- MOE Well 4902236 – overburden is 1.52 m thick
- MOE Well 4902237 – overburden is 2.13 m thick

Both wells are located on the south side of Hurontario Street and Highway 403 within the BRT footprint, in the vicinity of Sherwoodtown Boulevard.

It is important to note that although there are records of water wells within the study area the well locations and uses have not been confirmed at this time and it is very possible that the wells are no longer present. In addition, given the availability of municipal water servicing it seems unlikely that any of the water wells are being used as a source of potable water. During Detail Design, water wells will be verified in the field to determine their presence or absence and exact location, as the geographic coordinates supplied by the MOE may not be accurate or may contain a substantial degree of error (e.g. accurate to within 200 m). If wells are confirmed to be located within proposed construction zones they will be decommissioned in accordance with Ontario Regulation 903 under the *Ontario Water Resources Act* (OWRA). If the wells are still in use (by businesses or private owners) an alternate source of water will be provided to those owners. Consideration will also be given to potential indirect effects to any water wells and appropriate mitigation will be developed as warranted. During Detail Design Transport Canada and Infrastructure Canada will be provided with an update regarding the existence and use of water wells and any additional mitigation measures that are identified towards ensuring that water wells and water well use are not adversely affected by the project.

MISSISSAUGA BRT PROJECT
No.: 177-R-06

LOCATION OF WATER WELLS

WEST SECTION

Legend

- 0 m to 5 m depth to water
- 5 m to 15 m depth to water
- > 15 m depth to water
- Watercourse
- Waterbody
- Study Area (50 m buffer)

Source: Aerial Photograph provided by the City of Mississauga

ecoplans Limited

SCALE: 1:10,000

0 100 200 400 600 800
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

PROJECT: 07-3272

CHECKED BY: N. LEVESQUE

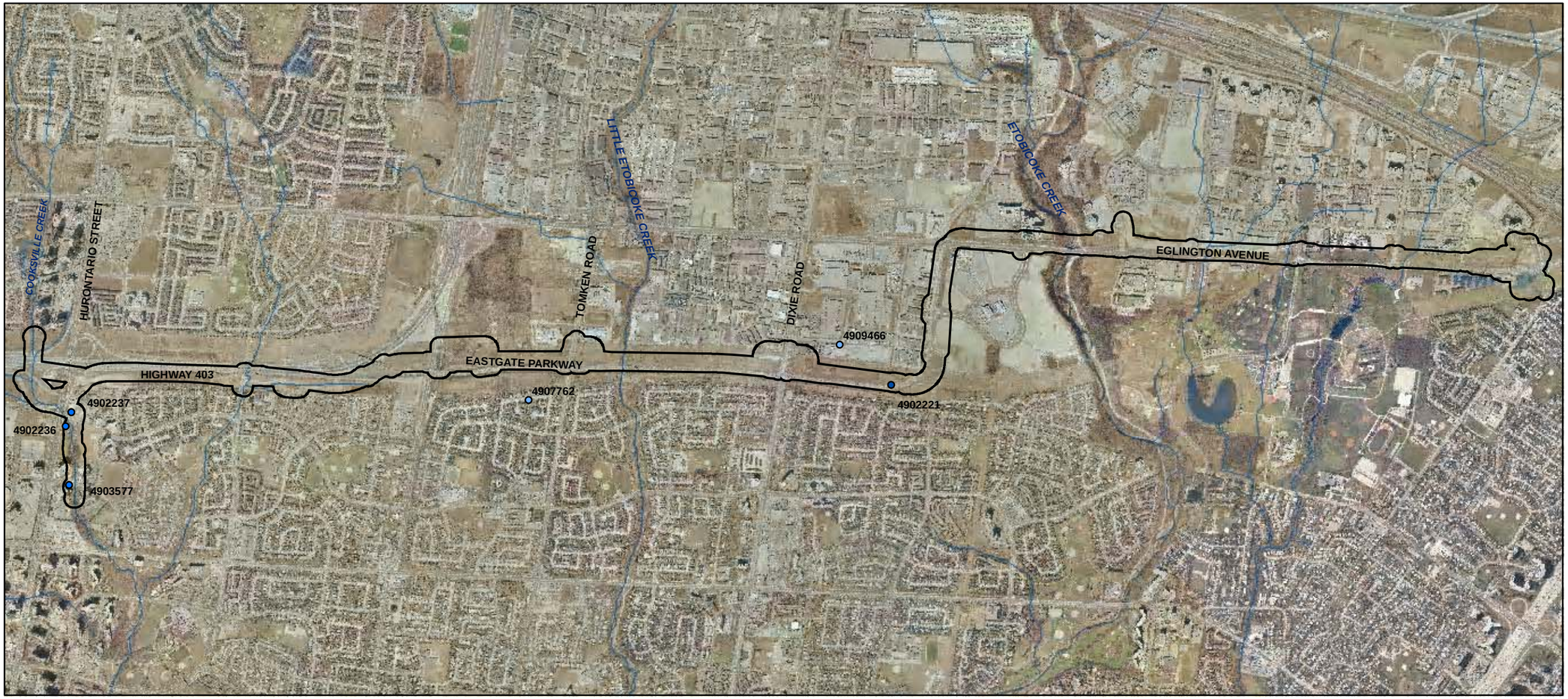
FIGURE No.

4.1.7-1

MISSISSAUGA BRT PROJECT
No.: 177-R-06

LOCATION OF WATER WELLS

EAST SECTION



Legend

- 0 m to 5 m depth to water
- 5 m to 15 m depth to water
- > 15 m depth to water
- Watercourse
- Waterbody
- Study Area (50 m buffer)

Source: Aerial Photograph provided by the City of Mississauga

ecoplans Limited

SCALE: 1:26,000

0 250 500 1,000 1,500 2,000

Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

PROJECT: 07-3272

CHECKED BY: N. LEVESQUE

FIGURE No.

4.1.7-2

4.1.8 Drainage and Surface Water

The existing drainage system within the project limits consists primarily of open ditches, culverts and storm sewers and includes Little Etobicoke Creek and Etobicoke Creek. Twelve outlet points are identified and the contributing drainage areas are divided according to these outlet points. A summary of the outlet points and their contributing drainage areas follows. It should be noted that for the purposes of the Preliminary Design study, it has been assumed that all existing storm sewers convey the 10 year storm event, which is the current City of Mississauga design standard. Figures showing the referenced outlets and drainage areas are included in **Appendix C**.

Outlet 1 - twin 1200 mm diameter pipes (Outlet 1A) and Twin 2590 mm diameter trunk sewer (Outlet 1B): Twin 1200 mm diameter pipes (Outlet 1A) cross Highway 403 just east of Winston Churchill Boulevard. The contributing drainage area to Outlet 1A is approximately 31.0 ha and consists entirely of Highway 403 and Hydro corridor areas. Runoff generated from the portion of this area located north of Highway 403 (21.2 ha - Catchments 1-1 to 1-3) is conveyed by side ditches and culverts under the highway ramps to the upstream end of the twin 1200 mm pipes. Minor event runoff from this area combines with runoff from Highway 403 (9.80 ha – Catchment MTO 103) and is conveyed through the twin 1200 mm pipes to a ditch on the south side of Highway 403. The ditch runs easterly to MTO Pond 2 and discharge from this facility is conveyed to Sawmill Creek through twin 2590 mm diameter storm trunk sewer (Outlet 1B). The twin 1200 mm pipes have adequate capacity to convey major event runoff from Catchments 1-1 to 1-3 and the existing MTO Pond 2 is sized to accommodate major event flows from these areas; however, the preliminary review of existing grades at the twin pipes inlet indicates that major event runoff from Catchments 1-1 to 1-3 continues eastward via ditch and culvert to Outlet 1B along with all runoff from Catchment 1-4. Major event runoff conditions for Catchments 1-1 to 1-3 will be confirmed at the Detail Design stage. As a part of this preliminary study, it has been confirmed that the twin pipes and MTO Pond 2 have capacity for major flows from these areas, but it is assumed that they are conveyed to Outlet 1B.

Outlet 2 - twin 2400 mm diameter pipes: Twin 2400 mm pipes run southerly and cross Highway 403 just east of Glen Erin Drive and ultimately discharge to Sawmill Creek. The approximate contributing drainage area to the twin pipes is 201 ha which includes a portion of the Highway 403 and Hydro corridors in addition to approximately 189 ha of residential lands north of the study area. Runoff generated within the Hydro corridor to the west and east of Glen Erin Drive is conveyed by natural watercourses, ditches and a culvert under Glen Erin Drive to a catchbasin and an inlet structure that discharge to the twin 2400 mm pipes just north Highway 403.

Outlet 3 - culvert at Erin Mills Parkway: This culvert conveys runoff from approximately 11.80 ha of Highway 403 and Hydro corridor lands. Runoff generated within the area west of Erin Mills Parkway is conveyed to Outlet 3 via side ditches and a culvert under the ramp located

west of Erin Mills Parkway. Outflow from Outlet 3 is ultimately conveyed to Mullett Creek, east of Erin Mills Parkway, by highway ramp culverts and side ditches.

Outlet 4 – Twin 1850 x 1000mm CSPA and Municipal Sewer: The twin culverts run southerly across Highway 403 just east of Hurontario Street and discharge to a 1350 mm diameter municipal storm sewer and ultimately to Cooksville Creek via the double box culvert at Rathburn Road. The overall contributing drainage area to Outlet 4 is approximately 9.35 ha, consisting primarily of Highway 403 corridor. Runoff from the area south of Highway 403 (1.30 ha) enters the 1350 mm diameter municipal sewer at a ditch inlet located in the south-east quadrant of the Highway 403 and Hurontario Street intersection.

Outlet 5 – Central Parkway Municipal Sewer and East Branch of Cooksville Creek: The Central Parkway municipal sewer runs southward and discharges to a 6100 mm x 2750 mm trunk sewer that conveys drainage from approximately 377 ha of upstream lands (Catchment 6-1) and ultimately to the East branch of Cooksville Creek, just south of Rathburn Road. The Central Parkway sewer collects drainage from approximately 27.41 ha of the Highway 403 and Hydro corridors, illustrated as Catchments 5-1 to 5-3. Drainage from the Hydro corridor is conveyed by a series of ditches and swales to an inlet to the Central Parkway sewer, north of Highway 403. Runoff from Highway 403 is collected by the highway median sewer and discharged to a swale on the south side of the highway, immediately west of Central Parkway. The swale directs runoff to a ditch inlet, connected to the Central Parkway sewer.

Outlet 6 – MTO Highway 403 Stormwater Management Facility 5 - (MTO Pond 5): This stormwater management facility lies on the south side of Highway 403 and collects minor and major event runoff from approximately 21.61 ha of the highway corridor and lands immediately south of it (Catchments 6-2 and 6-3). Runoff is conveyed to it by a series of ditches and the Highway 403 median sewer system. The median sewer discharges to a 750 mm diameter CSP (increases to an 800 mm diameter CSP) that conveys flows to the facility inlet. MTO Pond 5 was designed to provide Normal water quality control and water quantity control for runoff from the portion of Highway 403 that drains to it. It discharges to a twin 6100 mm x 2750 mm trunk sewer at Central Parkway (identified in Outlet 5, above) and ultimately to the East branch of Cooksville Creek, just south of Rathburn Road.

Outlet 7 – Intermittent Drainage Channel and Municipal Sewer: Approximately 58.7 ha of vacant lands, Hydro and Highway 403 corridor and residential development drain to the intermittent drainage channel located approximately 200 m west of Tomken Road. Runoff collected by the drainage channel is discharged into a large municipal sewer at Eastgate Parkway via two ditch inlets. Runoff from an additional 2.54 ha of the Eastgate Parkway corridor is also conveyed to Outlet 7; therefore, the total drainage area to Outlet 7 is 61.2 ha. The municipal sewer conveys flows to the west bank of Little Etobicoke Creek. Flows in excess of the capacity of the ditch inlets from the 58.7 ha to the north are conveyed eastward via roadside ditch and ultimately to Outlet 8, discussed below. At the time of this report, the

capacity of the ditch inlets and downstream municipal sewer were unknown. As a result, it was assumed that the ditch inlet and sewer system were designed to collect/convey the minor storm event (i.e. 10 year event). The capacity of this system must be confirmed at the final design stage.

Outlet 8 – Little Etobicoke Creek West: Drainage from approximately 8.9 ha is conveyed to the east bank of Little Etobicoke Creek via municipal storm sewers and open channels. Major event runoff from an additional 58.69 ha (Catchment 7-1) is also conveyed to this outlet via roadside ditches and channels. Runoff from the vacant lands and Hydro corridor west and east of Tomken road (Catchments 7-1, 8-3 and 8-4) is conveyed within a channel to a wet pocket prior to discharging to Little Etobicoke Creek. Runoff from Eastgate Parkway and Tomken Road is conveyed to Little Etobicoke Creek via storm sewers.

Outlet 9 – Little Etobicoke Creek East: Major and minor event runoff from approximately 20.69 ha west of Dixie Road (Catchments 9-1 to 9-3), including Hydro corridor, light industrial/commercial development and Eastgate Parkway, is conveyed to the east bank of Little Etobicoke Creek via roadside ditch and overland flow. Runoff from approximately 14.82 ha of this area (Catchments 9-1 and 9-2) is conveyed through a wet pocket within the Hydro corridor prior to discharging to the creek. Major event runoff from an additional 1.76 ha constituting Dixie Road is also conveyed to the west bank of Little Etobicoke Creek. These flows do not enter the wet pocket and are conveyed via sheet flow along the Dixie Road and Eastgate Parkway to the roadside ditches and ultimately to the Creek.

Outlet 10 – Eastgate Trunk Sewer: This sewer was constructed in conjunction with the Eastgate Parkway extension which extended Eastgate Parkway northward to Eglinton Avenue. The sewer begins at Dixie Road and discharges to the west bank of Etobicoke Creek. Existing condition drainage mosaic figures in **Appendix C** illustrate that the trunk sewer collects major and minor event runoff from approximately 102.2 ha (Catchments 10-1 and 10-2), including Eastgate Parkway and light industrial/commercial lands. The sewer also collects minor event runoff from approximately 1.8 ha of Dixie Road. The *Stormwater Management Report – Eastgate Parkway Extension* (Dillon Consulting Ltd., February 1993) document indicates that the Eastgate Parkway trunk sewer was designed to convey minor and major system flows up to the Regional storm event for 95.48 ha and to accommodate any future flows generated by the BRT.

Outlet 11 – Etobicoke Creek West: Minor event runoff from approximately 520 m of Eglinton Avenue (Catchment 11-2) drains via storm sewer to the Etobicoke Creek outfall on the south side of Eglinton Avenue. Major event runoff from this stretch of Eglinton Avenue along with major event runoff from approximately 7.73 ha of the development south of Eglinton Avenue (Catchment 11-1) is conveyed via sheet flow to the sag on Eglinton Avenue (and Outlet 12, discussed below) immediately east of Etobicoke Creek.

Outlet 12 – Etobicoke Creek East: Major and minor event runoff from approximately 369 ha east of Etobicoke Creek (Catchments 12-1 to 12-4) and major event runoff from 11.39 ha west of Etobicoke Creek (Catchments 11-1 and 11-2) drain to this outlet via sheet flow along roadways and storm sewer. Note that some portion of the major event flows from west of Etobicoke Creek is discharged directly to the creek via the deck drains on the existing bridge structure. All runoff is eventually collected within the 3000 mm diameter Eglinton Avenue storm sewer and conveyed to the Etobicoke Creek outfall, south of Eglinton Avenue. East of Etobicoke Creek, the catchment area includes commercial development, part of the Highway 401 corridor and Eglinton Avenue. Drainage from north of Highway 401 is collected by ditches and culverts and conveyed via storm sewer through the commercial development to the Eglinton Avenue storm sewer.

The design criteria for the BRT drainage system are drawn from the *MTO Highway Drainage Design Standards* for a freeway. They include:

- Minor system to be designed for the 10 year event;
- Major system to be designed for the 100 year event;
- Either an overland flow route (swale, ditch or realigned watercourse) or a storm sewer shall convey external runoff from the point of interception to the receiving watercourse. The capacity of this flow route shall be sufficient to convey the major system design flow; and
- Minimum culvert sizes are:
    - 800 mm minimum diameter for circular culverts
    - 800 mm minimum rise for elliptical or arch culverts
    - 900 mm minimum rise for box culverts.

The criteria identified above allow for the Preliminary Design of conveyance systems within and external to the BRT and preliminary sizing of stormwater management measures. During Detail Design, additional criteria/standards identified within the *MTO Highway Drainage Design Standards* must be applied to complete the Detail Design of the BRT drainage system including but not limited to: storm sewer sizing, catchbasin spacing, bridge deck drainage, sag and spread analyses, and ditch and culvert sizing.

Design criteria for the stormwater management strategy have been established in consultation with CVC, TRCA, City of Mississauga, MTO, and available documentation. These criteria include:

Provision of post-to-pre water quantity control for the 2 year to 100 year storm events for all runoff discharged to the Highway 403 drainage system, municipal sewers, Cooksville Creek and Little Etobicoke Creek:

- Provision of Enhanced water quality control for runoff from all new development; and
- Provision of 48 hour detention time (or the maximum possible) of the 25 mm event for erosion control for runoff within the jurisdiction of the TRCA.

4.1.9 Noise

A detailed noise assessment was undertaken in 1991 as part of the provincial Environmental Assessment and is documented in Appendix N of the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992). Portions of the assessment were later updated based on design revisions. Those noise assessment updates were documented in Appendix C of the Mississauga Transitway Environmental Assessment Addendum (City of Mississauga 2004). It should be noted that the 2004 noise assessment works were only completed for select portions of the BRT facility where alignment revisions were proposed. None of the assessed areas included as part of the 2004 noise assessments are included in the works being assessed under this *CEAA* Screening (i.e. BRT East and BRT West).

The study area is currently a mix of "Residential (Low Density)", "Business Employment", "Parkway Belt West" and "Industrial". The BRT alignment is generally found within the Parkway Belt West which is an undeveloped area with the exception a variety of public infrastructure (highways, hydro transmission mains, pipelines, etc). As a result, the majority of the BRT alignment is "buffered" from adjacent land uses by the Parkway Belt West.

Most receptors are located at least 50m from the busway however there are some exceptions. The closest sensitive receptors are on the north side of the BRT in the vicinity of the Winston Churchill Station and the Erin Mills Station (along Colombo Crescent and Radisson Crescent respectively). The property lines of those properties are approximately 15m from the north side of the stations. There are no other sensitive receptors (e.g. hospitals, daycares, seniors residences) in such close proximity to the alignment. Other areas where residential uses are in close proximity include areas on the north side of the alignment from Winston Churchill Boulevard to Erin Mills Parkway and on the south side of the alignment from Hurontario Street to Cawthra Road. The receptor locations are depicted in **Appendix D**. Additional details regarding land use are provided in **Sections 4.2.1** and **4.2.2**.

The existing sound environment is typical of an urban/suburban setting. There are several sources of noise with the primary source being vehicular traffic. As noted in **Section 4.2.7**, there are numerous roadways within the study area including arterial and collector roads and Highway 403 (including interchange ramps). The 1991 noise assessment predicted future sound levels to the year 2021. That assessment also predicted sound levels in 2021 without the implementation of the BRT. Those levels ranged from 46 to 67 dBA for the 16 hour day time descriptor (7:00a.m. to 11:00p.m.) (see **Table 5.1.1.8-1** and **Table 5.1.1.8-2**) and confirmed that the sound environment is typical of an urban/suburban setting.

Relevant information from the 1991 noise assessment is documented in **Section 5.1.1.8** and a copy of relevant noise assessment documentation can be found in **Appendix D**. Although the 1991 noise assessment work is dated the information is still valuable as the previous noise assessment work considered potential noise effects associate with foreseeable future developments many of which have since been built. As discussed in **Section 5.1.1.8**, an

updated noise analysis will be completed and submitted to the Ontario Ministry of the Environment, Transport Canada and Infrastructure Canada as part of the Preliminary Design phase. The Responsible Authorities will determine if further Federal Authority review is required.

4.2 DESCRIPTION OF SOCIO-ECONOMIC ENVIRONMENT

4.2.1 Existing Land Use

The Mississauga BRT facility stretches across central Mississauga, through a variety of land uses. Most of the BRT facility is located in the Parkway Belt West, a broad swath of public lands stretching across the western half of the Greater Toronto Area. The Parkway Belt is reserved and designated for major interregional linear facilities, including hydroelectric transmission lines, pipelines, highways, and transit lines.

The land use designation plans for the BRT corridor, including the Churchill Meadows, Central Erin Mills, City Centre, Rathwood, Northeast, and Airport Corporate are provided in **Appendix F**.

The following description focuses on the land uses immediately adjacent to the busway.

Winston Churchill Boulevard to Erin Mills Parkway

In this segment, the busway is to be located between Highway 403 and the Hydro One transmission corridor. Several oil and gas pipelines have easements within and to the north of the Hydro corridor. The lands to the north of the Parkway Belt are developed for single family residential use; the homes back on the Parkway Belt and do not have direct access to the corridor.

Hurontario Street to Cawthra Road

The busway is located in the south part of the Parkway Belt, between Highway 403 and a vacant 30 m wide strip held for future Parkway Belt uses. South of that strip there is a condominium office complex immediately east of Hurontario Street, single family residential lands from there east to Central Parkway, and a mix of town houses and high-rise residential properties east of Central Parkway. On the west side of Cawthra Road, where the busway crosses to the north of Eastgate Parkway, there is a large church and cultural centre.

Cawthra Road to Fieldgate Drive

The busway in this segment is still in the Parkway Belt West, and runs between the Hydro One / pipeline corridor and the north side of Eastgate Parkway. The land uses along the north side of the Parkway Belt are largely warehouse industrial, although there is a two-pad arena at Tomken Road and the publicly-owned lands between Cawthra Road and Tomken Road are vacant. A

high earth berm runs along most of the south side of Eastgate Parkway; south of the berm is a 30 m strip preserved for future Parkway Belt uses, then a single family residential neighbourhood. The homes back on the Parkway Belt and do not have direct access to the corridor.

Fieldgate Drive to Etobicoke Creek

The busway leaves the Parkway Belt West in this segment to run along the east side of Eastgate Parkway and the north side of Eglinton Avenue. Land use to the east of Eastgate Parkway and on both sides of Eglinton Avenue is prestige large-scale office (several buildings in place and others still planned). The west side of Eastgate Parkway north of the Parkway Belt is occupied by low-rise commercial/industrial buildings.

Etobicoke Creek to Renforth Drive

The busway runs along the north side of Eglinton Avenue in a narrow strip of land reserved for that purpose. Properties to the north are office commercial, as part of the Airport Corporate Centre; some properties have yet to be developed. The buildings are mixed in size, quality, and orientation, although none front on the busway corridor. Lands on the south side of Eglinton Avenue lie in the City of Toronto and are generally in small- to medium-scale commercial / office use. Much of the Eglinton Avenue frontage is occupied by Centennial Park, a large-scale regional park featuring a wide variety of recreational uses (although the lands fronting on Eglinton are largely lightly-used open space or part of a municipal golf course). The segment of the BRT corridor east of Orbitor Drive again lies in the Parkway Belt West.

4.2.2 Future Land Use

The Mississauga BRT corridor is relatively mature, although substantial potential for development and intensification (residential and commercial / office) remains in the City Centre area west of Hurontario Street. The Airport Corporate Centre and vacant lands east of Fieldgate Drive will continue to be filled in over time with prestige office and commercial uses.

There is no vacant land immediately adjacent to the facility that would be suitable for residential development. The vacant property east of Cawthra Road and north of Eastgate Parkway is designated by the City as future employment and public open space, but there are no specific plans currently associated with that block.

4.2.3 Landscape

The landscape within which the project is to be constructed is a vegetated open space corridor flanked by roadways, hydro-electric transmission facilities, and/or commercial/industrial development. Given the functional requirements of the other users of the Parkway Belt West (utilities, highways / interchanges, hydro-electric transmission lines, buried pipelines, stormwater

management ponds, earth berms) almost all the corridor has been previously disturbed and the landscaping generally consists of unmaintained ground cover (grasses, shrubs, weeds, successional bush). A few small and isolated pockets of less-disturbed vegetation remain, and there are small wetlands. Please refer to **Section 4.1.3** for further details regarding vegetation and wetlands.

The segments of the busway alignment adjacent to Hurontario Street and Eglinton Avenue that pass adjacent to existing commercial development are generally landscaped as an extension of the landscaping treatment of the private development (although this more formal landscaping is on public lands and has been a requirement of the City to developers pending the construction of the busway).

An earth berm of varying height (up to 5 m) is located intermittently along the south side of the Parkway Belt between Hurontario Street and Fieldgate Road, to protect adjacent single family residences from the noise and visual impact of existing roads (Highway 403, Eastgate Parkway). Plantings have struggled to gain and maintain a foothold on the berm, so it is mostly covered in grasses, weeds, and low ground cover.

4.2.4 Archaeology and Heritage

4.2.4.1 Archaeology

New Directions Archaeology Ltd. was retained to undertake a Stage 1 Archaeological Assessment of the study area. The Archaeological Assessment was carried out with the objectives of identifying known archaeological sites and determining the archaeological potential of the study corridor.

The Stage 1 Archaeological Assessment involved a review of documents pertaining to the corridor including, but not limited to, historic maps. The Ontario Ministry of Culture was contacted for current information on registered archaeological sites and previous archaeological assessments undertaken in the vicinity of the study area.

Based on historic populations in the study area and the fact that the study area is located near early roadways suggests a fairly high probability of locating historic sites along the subject corridor.

A survey of the Ministry of Culture archaeological site registry database in Toronto revealed that there are no registered sites located within the Mississauga BRT corridor. There are, however, 32 registered sites within a two kilometre radius of the corridor. This is a fairly high frequency of archaeological sites near the study area.

Of the sites close to the Mississauga BRT corridor, there are nine historic Euro-Canadian sites and the remainder are prehistoric sites. Of the prehistoric sites for which the age was

determined, there is one Late Archaic site, one Late Paleo-Indian site, one Early Woodland period site, one Late Woodland Iroquoian period site and two Late Woodland period village sites. The remaining 17 sites are simply identified as prehistoric because no culturally or temporally diagnostic artifacts were recovered.

A preliminary field assessment to examine the condition of this corridor was completed on November 27, 2007. It was found that the corridor appears to be relatively undisturbed by previous construction activities (such as Highway 403 and the adjacent residential construction), nor does it appear to have been affected by the adjacent residential construction or the hydro corridor. Given the historical use of the area and fallow condition of the corridor, it was determined that the majority of this corridor will require a Stage 2 Archaeological Assessment. The entire stretch of the BRT West corridor will be subject to a Stage 2 Archaeological Assessment. The areas requiring further assessment include areas that have not been previously disturbed within BRT East as noted on figures in **Appendix G**.

Discussions are ongoing with property owners regarding permissions to enter property to complete the Stage 2 Archaeological Assessment. The exact schedule for completion of the Stage 2 Archaeological Assessment work is unknown as it is subject to field conditions and property access; however, the assessment will be completed as soon as possible during Detail Design.

4.2.4.2 Heritage

There are no known built heritage resources displaced by the project. During the Provincial Environmental Assessment and the 2004 Provincial Environmental Assessment Addendum no built heritage features were noted within the BRT East and BRT West corridors. In addition, the study area is generally represented by relatively contemporary buildings and new development.

4.2.5 Recreation

The Parkway Belt West contains some open space that is used unofficially by local residents for passive recreation (dog walking, etc.). The only formal pathway within the corridor (other than sidewalks on crossing roads) is a brief segment along the north edge of the Parkway Belt east of Glen Erin Drive.

There are only two formal recreation facilities bordering on or near the BRT facility: the Tomken Arena (twin ice surfaces) which is adjacent to the north side of the Hydro corridor on the east side of Tomken Road near the Tomken BRT station; and Centennial Park, a large regional multi-purpose recreational area on the south side of Eglinton Avenue between Orbitor Drive and west of Commerce Boulevard. The facilities near Eglinton Avenue include an indoor soccer field, a cricket pitch, a baseball diamond, part of a golf course, and some open space. Orbitor Drive lies opposite the northern park entrance (although the main park facilities are to the south, with access from Rathburn Road).

4.2.6 Navigability

Transport Canada's Navigable Water Protection (NWP) Office has confirmed that the Etobicoke Creek is the only navigable waterway for the purposes of the *Navigable Waters Protection Act* (see correspondence in **Appendix E**).

4.2.7 Transportation

The Mississauga BRT corridor lies adjacent to major roads over its entire length:

- Winston Churchill to Erin Mills: Highway 403 – eight lane controlled access freeway
- Hurontario Street to Cawthra Road: Highway 403
- Cawthra Road to Eglinton Avenue: Eastgate Parkway – four lane limited access high-standard arterial
- Eastgate Parkway to Renforth Drive: Eglinton Avenue – four / six lane limited access high-standard arterial

Highway 403 features a High Occupancy Vehicle lane in each direction. When the highway is congested, buses are permitted to operate on the shoulders (bus bypass shoulders) between the Erin Mills Parkway and Mavis Road interchanges.

The corridor is crossed by a regularly-spaced grid of arterial and collector roads:

- Winston Churchill Boulevard: high standard four lane arterial
- Glen Erin Drive: four lane major collector
- Erin Mills Parkway: high standard six lane arterial
- Hurontario Street: high standard six lane arterial
- Central Parkway: four lane major collector
- Cawthra Road (Highway 403 ramps): high standard four lane arterial
- Tomken Road: high standard four lane arterial
- Dixie Road: high standard six lane arterial
- Fieldgate Drive: two lane collector
- Tahoe Boulevard: four lane collector
- Bell Mobility entrance road (opposite north Tahoe Boulevard at Eglinton): two lane service road
- Spectrum Way: four lane collector
- Satellite Drive: two lane collector
- Orbitor Drive: four lane collector
- Explorer Drive: four lane collector
- Commerce Boulevard: four lane collector

None of the roads along or crossing the corridor currently feature marked or designated bicycle lanes. The only pedestrian / cycle path crossing the corridor is along the bottom of the Etobicoke Creek valley (with links to Eglinton Avenue)

Public transit services in the corridor are provided by Mississauga Transit (local) and GO Transit (interregional). There is no intercity bus service currently in operation in the corridor. Mississauga Transit operates a variety of express, regular, and feeder / shuttle bus routes, using all the arterials and most collectors in the corridor (although not every road in the Eglinton Corridor has a route). GO Transit operates along Highway 403, stopping at the Mississauga City Centre. GO Transit also serves the Credit Valley Hospital on Erin Mills Parkway north of Highway 403.

4.2.8 Utilities

Pipelines

There are eight pipelines (with five owners) running along the BRT corridor, along with various other crossing pipes. The pipeline operators were involved in both the 1992 Provincial Environmental Assessment (EA) and the 2004 EA Addendum for the Mississauga BRT. Specific crossing/relocation details were not identified at that time.

In the BRT West study area, the following pipelines are present:

- Enbridge Pipelines Inc.: 762 mm diameter oil pipeline (formerly Interprovincial Pipeline) within a 3.048 m wide leased easement within the south side of the Hydro One corridor
- Enbridge Gas Distribution Inc.: 900 mm diameter natural gas pipeline parallel to and south of the Enbridge oil pipeline; also, two parallel north-south gas pipelines (20" and 250 mm high pressure) cross the corridor approximately 50 m west of Winston Churchill Boulevard.
- Sun-Canadian Pipe Line Company: parallel 200 mm and 300 mm diameter oil pipelines, running east-west immediately north of the hydro towers, at the Winston Churchill site only; the pipelines cross to the south of Highway 403 east of the interchange.
- Imperial Oil – Sarnia Products Pipeline: parallel 250 mm and 300 mm diameter oil pipelines running east-west approximately 20 m north of the hydro towers at the Winston Churchill site only; the pipelines also cross to the south of Highway 403.

In the BRT East, the pipelines are present between Cawthra Road and Fieldgate Drive only. At Cawthra station, the Sun-Canadian pipelines are on the north side of the hydro corridor. The 300 mm Sun-Canadian pipeline does, however, swing to the south of the hydro line for 400 m at Tomken Road, to get around the hydro substation there. Both Sun-Canadian pipelines stay to the north of the hydro lines for the rest of the segment.

The two Imperial Oil (Sarnia Products) pipelines run along the north edge of the corridor from Cawthra to Fieldgate.

East of Cawthra, the Enbridge oil pipeline shifts from the north side of the Parkway Belt to run along the south side of the hydro corridor to east of Fieldgate. The Enbridge gas line stays north

of the Parkway Belt until east of Dixie Road, where it swings south to run alongside the Enbridge oil line to east of Fieldgate.

Two Trans-Northern oil pipelines (250 mm and 300 mm diameter) enter the Parkway Belt from the south, midway between Cawthra and Tomken. They split to get around the Tomken hydro substation, the 300 mm pipe staying to the south and the 250 mm pipe skirting the site to the north. They rejoin the Sun-Canadian and Imperial Oil (Sarnia Products) pipelines east of Tomken, to create a six-pipe corridor between the hydro towers and the north property line of the Parkway Belt. Along with the two Enbridge pipes to the south of the hydro line, this makes eight pipelines between Tomken and Fieldgate.

There is a 406 mm thick casing over the Trans-Northern 273 mm pipeline crossing Dixie Road. Pipelines crossing Tomken road must be investigated for any casings before the design. These casings may have to be extended beyond the road.

Over the course of the development of the Mississauga BRT plans, efforts have been made to avoid affecting the pipelines. However, some conflicts may be unavoidable. **Table 4.2.8-1** summarizes discussions between the Project Team and the pipeline operators regarding National Energy Board (NEB) applicability and requirements related to possible effects associated with the Mississauga BRT. Although the study area includes pipelines regulated by the NEB none of the works will result in the need for a permit from the National Energy Board.

Table 4.2.8-1 Summary of Activities by Project Phase

Pipeline	Pipeline Category / NEB Regulation	Agreement Requirements	
		Crossing	Relocation (with mutually acceptable design and cost sharing solution)
Sun-Canadian Pipe Line Company Limited	Provincial: not regulated by NEB	All crossings and relocations would only require agreement from Sun-Canadian Pipe Line Company Limited.	
Imperial Oil (Sarnia Products Pipeline)	Provincial: not regulated by NEB	All crossings and relocations would only require agreement from Imperial Oil.	
Enbridge Pipelines (Oil)	Interprovincial: NEB regulated	Crossing agreement would be required from Enbridge Pipelines.	NEB permit required only if relocation exceeds 100 m or is within 30 m of a body of water. *Note: relocation is not required for the proposed work; therefore, NEB approval is not required.*
Enbridge Consumers Gas	Local: not regulated by NEB	No NEB regulated pipelines in corridor. All crossings and relocations would only require agreement from Enbridge	

Pipeline	Pipeline Category / NEB Regulation	Agreement Requirements	
		Crossing	Relocation (with mutually acceptable design and cost sharing solution)
	Interprovincial: NEB regulated (none within corridor)	Consumers Gas.	
Trans-Northern Pipelines	Interprovincial: NEB regulated	No NEB approvals required for crossings.	NEB approvals required for relocations. *Note: relocation is not required for the proposed work; therefore, NEB approval is not required.*

Other Utilities – BRT West

The following utilities are present within BRT West (please note that storm sewers are described separately, under **Section 4.1.8**):

- Rogers Cable: buried fibre optic cable line along the east edge of Winston Churchill Boulevard; aerial fibre optic cable running north-south approximately 175 m east of the centre line of Winston Churchill Boulevard
- Bell Canada: Buried cable along east side of Winston Churchill Boulevard, south of Highway 403, and conduit along east side of Winston Churchill Boulevard, conduit approximately 10 m west of Erin Mills Parkway, buried cable along east side of Erin Mills Parkway
- Hydro One: two 230 kV overhead power lines (east-west) north of Highway 403 in the utility corridor. In addition, Hydro One is investigating a potential new line-tap to the transformer site in the north-west quadrant of the Winston Churchill Boulevard/Highway 403 interchange.
- Enersource (Hydro Mississauga): both buried and aerial hydro facilities at the Winston Churchill Boulevard site, and buried hydro facilities at the Erin Mills Parkway site.
- Region of Peel (water):
  - two parallel feeder water mains running north-south, approximately 45 m east of the centre line of Erin Mills Parkway – one 300 mm diameter and the other 1050 mm diameter;
  - one 1050 mm diameter water feeder main in the median of Erin Mills Parkway north of the E-N/S ramp intersection, then skirting the interchange by shifting approximately 55 m to the west of the centre line of Erin Mills Parkway;
  - 400 mm diameter concrete water main running north-south, approximately 30 m east of the centre line of Winston Churchill Boulevard;
  - 400 mm diameter concrete water main running north-south, approximately 30 m west of the centre line of Winston Churchill Boulevard (parallel to and immediately east of the pair of north-south Enbridge gas pipelines)

- Region of Peel (electrical): various buried electrical ducts within the arterial right-of-way, providing power to the traffic signals at the E-N/S ramp terminal intersections.
- Ministry of Transportation of Ontario: High Mast Light standards at varying intervals (100 m – 250 m), approximately 25 m north of the edge of pavement of Highway 403; powered by buried electrical cable in PVC duct running along the outside edge of both interchanges (offset approximately 5 m from the edge of ramp pavement).

Other Utilities – BRT East

Between Hurontario Street and Cawthra Road, the BRT corridor encounters MTO high mast light standards at both interchanges, along with power and communications lines related to the Ministry's Traffic Management System on Highway 403.

Region of Peel water mains are present as follows:

- N-S along Central Parkway
- N-S east of Cawthra road (600 mm)
- N-S along Tomken Road (1200 mm and 250 mm)
- N-S just west of Little Etobicoke Creek (regional Hanlan feeder main)
- N-S along Dixie Road (250 mm)
- N-S along the west side of Eastgate Parkway, Fieldgate to Eglinton (300 mm)
- E-W along the north side of Eglinton Avenue, Eastgate to Satellite (400 mm)
- E-W along the north side of Eglinton Avenue, Spectrum to Explorer (300 mm)
- N-S feeder to Bell Mobility building opposite Tahoe / Eglinton intersection
- N-S along Spectrum Way (300 mm)
- N-S along Satellite Drive (400 mm)
- N-S along Orbitor Drive (300 mm)
- N-S along Explorer Drive (300 mm)

There are Region of Peel sanitary sewers along most of the roads in the BRT East study area:

- At Central Parkway, a 600 mm sanitary sewer crosses the BRT corridor
- There is a 250 mm sanitary sewer under the southbound lanes of the north-south leg of Eastgate Parkway between Fieldgate and Eglinton
- There is a trunk sanitary sewer in the Etobicoke Creek valley; a sanitary sewer runs along the north side of Eglinton Avenue from Explorer Drive to Etobicoke Creek, increasing in size from 375 mm diameter in the east to 525 mm at the Creek. A 250 mm sewer runs along the south side of the Bell Mobility site, connecting it to the Etobicoke Creek trunk line.
- 375 mm diameter sanitary sewers serve Spectrum, Satellite, Orbitor, and Explorer, feeding the Eglinton Avenue line

Storm sewers are described separately in **Section 4.1.8**.

An Enersource pole line angles through the Parkway Belt in the vicinity of Cawthra Road. It continues along the north side of Eastgate Parkway to Fieldgate, along the west side of Eastgate from Fieldgate to Eglinton Avenue, and along the north side of Eglinton easterly to Renforth Drive. At Fieldgate, the Enersource lines are buried as they cross the Hydro One corridor, to avoid conflicts with Hydro One's east-west high-voltage lines.

Rogers Cable TV lines use the Enersource poles along Eglinton Avenue.

Between Cawthra and Fieldgate, the twin 230 kV Hydro One overhead lines run in the utility corridor. A major Hydro One substation is located just north of the corridor, immediately west of Tomken Road.

There is an aerial Bell line along Dixie Road, and another running along the north side of Eastgate Parkway (on the Enersource poles) from Dixie to Fieldgate, continuing along the west side of Eastgate to Eglinton. On Eglinton, the Bell pole line runs along the south edge of the roadway, connecting with pole lines on the north-south crossing roads. Electrical services and control boxes are provided at each signalized intersection in the corridor.

5.0 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATION, COMMITMENTS TO FUTURE WORK AND SIGNIFICANCE

The environmental effects assessment process was designed to meet the information requirements outlined in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT received in November 2007. The potential environmental effects outlined in this *CEAA* Screening Report are based on the Preliminary Design of the project.

The mitigation measures documented in this report have been developed with due consideration for the full range of potential adverse effects of the project. The identified mitigation measures will be carried forward through the Detail Design, construction, operation and maintenance phases of the project, as applicable. Refinements and enhancements to the mitigation measures will be made as warranted throughout all phases of the project to ensure that this project does not result in any significant adverse environmental effects. As the project progresses, Transport Canada and Infrastructure Canada will be provided with information regarding any substantial changes to the identified mitigation measures and will be provided with an opportunity to review and comment on those revisions.

The potential effects to valued ecosystem and social components identified in this chapter focuses on the following key steps:

- determine whether or not there are potential environmental effects and, if so, whether they are adverse;
- identify mitigation measures to mitigate potential adverse environmental effects;
- determine whether the residual adverse effects are significant; and
- determine whether significant adverse environmental effects are likely based on probability of occurrence and scientific certainty.

This chapter has been organized based on the factor areas identified in the *CEAA* Scoping Document (**Appendix A**) prepared by the FRT. The one exception is Surface Water Quality and Quantity. Since this factor area is so closely linked to water features it is documented in the Fish and Fish Habitat, Vegetation and Wetlands, and Stormwater Management sections (**5.1.1.1**, **5.1.1.2** and **5.1.1.7**). A separate section has been included to address navigability (**Section 5.1.2.3**).

This chapter is structured as follows:

- **Section 5.1** outlines the potential environmental effects and mitigation measures during the construction and operation/ maintenance phases of the project for the various factor areas identified in the *CEAA* Scoping Document (**Appendix A**). It also includes a summary of the assessment of the significance of the potential environmental effects based on the methodology and evaluation outlined in **Section 5.6**;

- **Section 5.2** outlines the potential environmental effects as a result of accidents and malfunctions;
- **Section 5.3** outlines the potential effects of the environment on the project;
- **Section 5.4** outlines the potential environmental effects of decommissioning;
- **Section 5.5** outlines cumulative effects assessment;
- **Section 5.6** includes a summary of the significance of the potential environmental effects; and
- **Section 5.7** provides a summary of the mitigation measures and commitments to future work.

5.1 ENVIRONMENTAL EFFECTS ANALYSIS, MITIGATION MEASURES AND ASSESSMENT OF SIGNIFICANCE DURING THE CONSTRUCTION AND OPERATION/MAINTENANCE PHASES OF THE PROJECT

5.1.1 Biophysical Environment

This section provides a review of the potential environmental effects of the BRT on the various ecosystem components during the construction and operation / maintenance phases of the project, and outlines the mitigation measures developed to mitigate potential adverse environmental effects. As well, residual effects and their significance, following implementation of the mitigation measures, are summarized. The construction effects analysis is based on the general footprint of the project. The extent of the footprint will be finalized during Detail Design, based on the final design and associated grading limits. The effects analysis and mitigation measures will be refined accordingly, and the mitigation measures incorporated in the construction contract documents. This process will continue to involve consultation with the CVC and TRCA, as appropriate. As the project progresses, Transport Canada and Infrastructure Canada will be provided with information regarding any substantial changes to the identified mitigation measures and will be provided with an opportunity to review and comment on those revisions.

5.1.1.1 Fish and Fish Habitat

Of the six watercourses located within the project limits, only Little Etobicoke Creek and Etobicoke Creek are crossed along open reaches of their channels. The remaining four watercourses are 'crossed' along reaches that have been previously enclosed (or on reaches where flow has been previously diverted). Therefore, the construction works pose very little risk to the four enclosed watercourses.

The potential effects of the construction and operation on Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek are highlighted below. Relevant standard and site specific mitigation measures identified. The preliminary HADD determinations made by CVC and TRCA are outlined later in this section.

Potential Construction Effects

Obvert Lowering at Cooksville Creek

The project requires the lowering of the obvert of the twin cell box culvert carrying Cooksville Creek under Hurontario Street and Rathburn Road. The existing culvert is 2.7 m high and approximately 180 m long. The proposed modified segment would be 2.2 m high over a 25 m long internal segment of the culvert. During construction, the affected segment of culvert would be exposed. Flow would be channelled to one of the two cells while the other would be sealed at the upstream end; the sealed cell would have its deck removed and replaced at the new elevation. It would be cleaned and opened, the flow redirected to the lowered cell, and the process repeated for the other cell. Once complete, there would be no evident physical or other change to the upstream or downstream open flow segments of the creek. The works will take approximately two to three months. The timing of the work would be restricted to the warmwater construction-timing window (between March 15 and July 1) and low-flow periods to avoid the risk of a regional storm.

Culvert Extension on Little Etobicoke Creek

The project requires a 13 m extension of the existing 3-cell open footing box culvert on the north/upstream side.

As an 'enhancement' component of the extension, the Jersey barrier and rip rap material along the north side of existing culvert opening and the concrete weir across the channel at the culvert inlet will be removed, and the channel and flow conveyance 're-naturalized'. Therefore, positive effects of the extension include the enhancement of fish movement opportunities, as well as enhancement of flow conveyance and local hydrologic characteristics.

Potential adverse effects of the extension and associated channel enclosure include:

- Localized removal of riparian vegetation, which is dominated by old field herbs and grasses, with minimal removal of woody vegetation.
- Localized alteration of the channel banks and bed, comprised of riffle / flat morphology with 40% boulders and 60% cobbles substrate, within the 13 m reach to be enclosed. This type of morphology and substrate are common throughout this section of the watercourse and the existing channel bed and banks, and associated habitat conditions, have been altered / modified in the past. No specialized or unique habitat features will be affected.
- Flow will be temporarily diverted around the construction zone during installation of the 13 m extension, and there is potential for erosion and downstream sediment transport if poor construction or restoration techniques are used.

Widening of Existing Structure at Etobicoke Creek

The existing Eglinton Avenue structure will be utilized for the crossing of Etobicoke Creek thereby avoiding the adverse effects of a new crossing on the watercourse and surrounding valley system. The existing structure will be widened by 5 m upstream on the north side. The existing pier columns and footings, which are located on the concrete-faced banks, will be extended by approximately 5 m along the concrete armouring. Therefore, there will be no new footprint on the stream bed as works will be largely related to the superstructure. Some temporary disturbance along the channel edges may occur during construction, since it is anticipated that the concrete bank armouring may require extension or partial removal and re-instatement. However, potential effects to the watercourse will be managed with the implementation of standard mitigation measures as outlined below.

No new deck drains will be installed through the 5 m extension. The potential opportunity to re-direct the existing deck drains to the storm sewer system is discussed in **Section 5.1.1.7**. In association with the potential for the stormwater re-direction to the existing storm sewer on the south side of the existing structure, opportunities to rehabilitate the gabion walls on either side of the existing stormwater outlet will be considered during Detail Design.

Given the minor extension and existing concrete facing on the channel banks, potential adverse effects of the extension are limited to:

- Localized disturbance of vegetation for construction access, staging and construction works however, floodplain vegetation is manicured or cultural in character. Tree removal will be minimal given the limited woody riparian vegetation found on either bank. The floodplain vegetation is common throughout the valley system and will quickly re-establish after construction.
- Potential for erosion and downstream sediment transport during construction staging can occur if poor construction or restoration techniques are used.

Other Watercourses

As previously noted, the other watercourses are all crossed along enclosed and/or diverted reaches. Therefore, potential adverse construction-related effects are limited to possible introduction of sediment or other potential contaminants that could be conveyed to receiving reaches during construction if the existing culverted sections require replacement or rehabilitation. These effects can be managed using standard good construction practices.

Potential Operational and Maintenance Effects

The daily operation and maintenance of the BRT system will have limited adverse effects on the watercourses/surface water crossed along the alignment. As with any transportation facility, there is some potential for effects to the quality of the groundwater or surface water that reaches

the watercourses as a result of runoff during storm events. Potential water quality effects are associated with the increased potential for generation of runoff contaminants (including salt) and right-of-way management issues (e.g., fertilizer, herbicides, pesticides). However this is an existing condition along the roadway system and within the urbanized area generally.

General maintenance activities in the long-term may involve repair or replacement of the bridge structure or culverts which could potentially have localized adverse effects on watercourses. The effects of such works will be limited to temporary, localized disturbances during construction of the repairs. These effects are generally predictable, temporary and limited in extent, and will be managed with the implementation of standard mitigation measures.

Mitigation and Commitments to Future Work

Commitments to future work and mitigation measures to minimize effects design, construction, and operation and maintenance effects at the Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek crossings are discussed below.

Design-Related Measures

Design measures have been implemented to minimize potential adverse effects at the Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek crossings.

The design of the Cooksville Creek twin box cell culvert is such that it allows work to be done on one cell at a time without any effect on the creek flow in the other cell. There will be no temporary or permanent alteration to the Cooksville Creek channel or flow characteristics as a result of the lowering of a segment of culvert obvert at the busway crossing.

At the Etobicoke Creek crossing, the BRT alignment was shifted to utilize the existing Eglinton Avenue structure, thereby avoiding the adverse effects of a new crossing on the watercourse and surrounding valley system. Specifically, the alignment avoids footprint effects on the normal flow channel, avoids encroachment on the ‘natural banks’ and avoids adverse effects on local fluvial geomorphologic conditions that new piers upstream of the existing piers would have otherwise created.

At the Little Etobicoke Creek, a shift was incorporated into the original alignment to bring it closer to the adjacent roadway in order to reduce the overall extent of culvert enclosure and enable removal of the seasonal fish barrier at the existing crossing. This shift also avoids (with the possible exception of edge disturbance) the wetland pocket located east of Little Etobicoke Creek that supports Digger Crayfish.

In addition, the following design measures will be implemented at the Little Etobicoke Creek:

- The extension of the existing Little Etobicoke Creek crossing structure will be designed and installed to enhance flow conveyance/fluvial processes, channel stability and fish movement opportunities.
- The existing low concrete weir/seasonal barrier to fish movement and the Jersey barrier will be removed, and the portions of channel disturbed to install these features and the culvert footing extensions will be re-instated using naturalized approaches that will enhance channel stability and fluvial processes.
- A stable low flow channel through the east cell extension will be created. The invert of the east cell will be 'set' at the existing channel invert to convey the low flow, however the inverts of the central and west cells will be 'set' above the low flow cell so that they function only to convey overbank and 'flood' flows. This will require re-grading and transitioning of the floodplain into the inlet ends of these cells, with stable 'ramping down' into the existing culverts (to avoid loss of hydraulic capacity but prevent flow from entering these cells until desired elevation).
- The new low flow and bankfull channel sections will be installed to transition smoothly with the upstream channel section. Riffle/flat habitat and substrate will be maintained or created/re-instated along the low flow channel through the east cell.
- The grade change at the weir will be addressed through design of a stable riffle or riffle ramp, or series of riffles through the channel section (depending on the specific gradient change required).
- All disturbed bank and valley areas will be re-vegetated, with consideration of enhancement of the existing woody riparian cover.

Construction-Related Mitigation Measures and Commitments to Future Work

Based on the character of the habitat conditions and resident fish communities, the following commitments to future work and standard mitigation measures will be implemented to mitigate potential adverse effects during construction:

- A warmwater construction-timing window restriction (between March 15 and July 1) will be used for all required instream works.
- All works will be completed as per the Greater Golden Horseshoe Area Conservation Authorities' (2006) *Erosion and Sediment Control for Urban Construction* document will be implemented to prevent erosion and migration of sediment-laden runoff from the construction zone to the watercourses. A copy of that document can be provided upon request. The general approach is to prepare a detailed sediment and erosion control plan that implemented prior to and adapted during construction. The plan generally includes common measures such as:
    - inspection and maintenance of sediment control measures until final cover is established; and
    - vegetation management to preserve, protect and restore riparian vegetation including: minimizing the removal of riparian vegetation, particularly woody vegetation, replacing

removed woody riparian vegetation with appropriate native species, and encouraging the planting to enhance riparian cover. Additional measures pertaining to vegetation replacement and valley slope stability (at Etobicoke Creek) are outlined in **Section 5.1.1.2**.

All works will be completed in accordance with the City of Mississauga's Sediment and Erosion Control Bylaw. A copy of the bylaw can be provided upon request.

- Appropriate temporary flow diversion/bypass measures will be employed during construction of the Little Etobicoke Creek extension and at the Cooksville Creek culvert, to isolate the construction zone and maintain clean flow downstream flow at all times. The appropriate means of flow management will be developed during Detail Design by the project hydrologist based on the flow regime, in consultation with the project biologist. If temporary cofferdams or flow barriers are used, they will be constructed of non-sediment generating materials (i.e. gravel bags, clean stone with no fines). If temporary disturbance along the channel edges is required to install the footings, appropriate containment measures (e.g., coffer dam systems) will be used to isolate the temporary work areas.
- In accordance with a commitment made during the Provincial Environmental Assessment, sample monitoring for water quality and siltation will be undertaken at Cooksville Creek and Etobicoke Creek for a period of one year following completion of construction. The monitoring plan will be developed during Detail Design.
- Any required temporary water intake hoses used for temporary dewatering / flow transfer (i.e., at Little Etobicoke Creek) will be screened.
- Any fish stranded in the isolated work zone (i.e., at Little Etobicoke Creek) will be captured and transferred up or downstream of the work zone.
- Appropriate settling and energy dissipation measures will be used for discharge of water for all temporary flow transfer and/or dewatering activities.
- No fording of the watercourses will occur without authorization by TRCA or CVC (as appropriate).
- All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response.
- All debris and potential contaminants (e.g. concrete and structural materials, paint and solvents, sand-blasting) generated the construction works will be properly contained to prevent debris from entering the watercourses, and all debris will be properly disposed of off-site. This will include use of appropriate isolation measures (e.g., contained platforms) during construction of the extended bridge deck platform at Etobicoke Creek.

Operational and Maintenance Mitigation Measures and Commitments to Future Work

Commitments to future work and standard mitigation measures associated with operation and maintenance of the BRT will include:

- Surface runoff will be directed to storm water management facilities to provide Enhanced (Level 1) quality control. Details are included in **Section 5.1.1.7**. These measures were designed with input from the project biologists to protect potentially sensitive functions of the natural features.
- Pesticide applications will be avoided unless essential (low maintenance right-of-way strategy). The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction.
- All precautions will be taken to avoid spills during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response.
- The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management.

Similar construction-related mitigation measures and commitments to future work as those outlined above will be employed for any rehabilitation activities associated with future watercourse culvert or structure replacement or repair, or any other general transitway-rehabilitation works that affect areas draining to watercourses. Specifically:

- All relevant construction-related measures outlined above will be identified and applied to address potential effects specific to the rehabilitation works and potentially affected watercourse.
- Standard measures will include sediment and erosion control and restoration of disturbed

surfaces draining to the watercourse, temporary timing, fish protection and flow management measures for any instream works, and standard management practices for handling of equipment, potential contaminants and construction related debris.

- CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.

Preliminary HADD Determinations

TRCA provided preliminary Harmful Alteration, Disruption or Destruction (HADD) determinations for works at the Little Etobicoke Creek and Etobicoke Creek at the site meeting on June 18th, 2008 (see meeting notes in **Appendix E**). TRCA concluded that with the implementation of the mitigation measures noted previously, none of the works is likely to result in HADD. These determinations are based on the assumption that the design and mitigation measures will not change significantly during Detail Design.

CVC provided a preliminary HADD determination for works at Cooksville Creek at a meeting on January 12th, 2009 (see meeting notes in **Appendix E**). CVC concluded that if the lowering of the Cooksville Creek culvert obvert is constructed as proposed the works are not likely to result in a HADD. This determination is based on the assumption that the design and mitigation measures will not change significantly during Detail Design.

It is worth noting that both the TRCA and CVC have a Level III agreement with DFO. As a result, TRCA and CVC have the authority to review projects for potential HADDs on behalf of DFO under Section 35 of the *Fisheries Act*. Section 35 of the *Fisheries Act* deals with the management and protection of fish habitat. TRCA and CVC also have the authority to issue a Letter of Advice outlining how the proponent can mitigate any potential effects to fish and fish habitat. In addition, TRCA and CVC have the authority to work with a proponent and DFO to prepare a fish habitat compensation plan (if required).

Ongoing consultation will occur with TRCA and CVC during Detail Design in order to obtain any necessary Letters of Advice. If for any reason it is determined that a HADD is likely, TRCA/CVC will forward the project to the local DFO office for authorization under the *Fisheries Act*. As the project progresses DFO will be involved as appropriate and necessary in accordance with the Level III agreement between the TRCA/CVC and DFO.

Significance

The greatest potential for adverse effects in relation to fish habitat and watercourses occur during the construction phase. With the application of the identified mitigation measures, which should also result in a net improvement in fish movement and habitat opportunities in Little Etobicoke Creek, and commitments to future work potential for adverse effects will be minimized and no significant residual effects will occur.

Potential effects during the operational and maintenance phases relate primarily to increased stormwater runoff. Additional stormwater runoff is not anticipated to result in a significant adverse environmental effect as it will be addressed by the implementation of the stormwater management measures identified in **Section 5.1.1.7**.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.2 Vegetation, Wetlands, Wildlife and Migratory Birds

The project will result in permanent footprint effects on local terrestrial ecosystem components. Potential indirect and temporary effects are also anticipated during construction and operation/maintenance of the facility.

Given the existing culturally dominated characteristics, urbanized setting of the project and extent of the project, the potential for significant adverse effects as a result of the construction and operation is limited. Nonetheless, the value of the terrestrial ecosystem components within the local landscape context was recognized during the development of mitigation measures. These effects are discussed and addressed in the following sections, moving from west to east along the project limits:

Potential Construction Effects

BRT West

While the project results in permanent removal of cultural meadow and associated meadow habitat, the effect is limited given the common, tolerant nature of the vegetation communities. The incremental removal of this vegetation on a local scale is noted; however, specific efforts to replace this community are not warranted given its characteristics and the urban setting. As noted in **Section 4.1.2**, there are 14 vegetation units within BRT West representing a total area of 2.98 ha. Of the 17 vegetation units only five of the units are affected by the project. The total affected area is 0.67 ha or 0.22% of the total area of the 14 existing vegetation units.

In addition to the removal of cultural meadow, the BRT West will result in the following effects to vegetation features:

- Removal of 0.28 ha (87%) of Unit W5, a Cultural Woodland patch located north of Highway 403 and east of Winston Churchill Boulevard. This patch contains maple, Red and White Oak, White Pine, White Ash and Trembling Aspen in the canopy with groundcover dominated by old field and invasive species.
- Removal of 0.8 ha (95%) of Unit W11, a Cultural Woodland patch located just west of Glen Erin Drive. This patch is comprised of tolerant early successional woody species (Trembling Aspen, White Ash, Sugar Maple, Austrian Pine, and Red Osier Dogwood). Ground cover is

dominated by old field species such as Canada Goldenrod, Tufted Vetch, Red Clover and grass species. This vegetation community is cultural in character and of low quality and sensitivity.

- Removal of three small isolated pockets of mineral meadow marsh and mineral shallow marsh vegetation present along the north side of Hwy 403, east and west of Winston Churchill Boulevard (Units W3, W4 and W9). These wetland pockets range in size from 0.02 to 0.05 ha with the exception of Unit W4 which is 0.2 ha. Total removal associated with the three Units is 0.27 ha. All are considered to be of low quality and sensitivity, almost exclusively dominated by either Reed Canary Grass or Narrow-leaved Cattail with some Phragmites, and Purple Loosestrife. All of these species are aggressive and tend to out-compete other wetland plants to form homogeneous mats, and the latter species is also non-native. As described above, these wetland pockets are cultural in origin, having formed in shallow depressions along the infrastructure corridor where water collects seasonally / following storm events on the till-based soils.

Although these features contribute local diversity, aesthetic and woody cover functions to the cultural habitat mosaic, their common, tolerant character and cultural origins/influence limits the effects of their removal. Therefore, specific efforts to retain and protect those features are not warranted. However, in consideration of the urban-dominant landscape, lack of woody cover, and the City's natural area management objectives, efforts to minimize removals and protect the remaining areas will be integrated in the design as feasible. Further, plantings to replace and supplement the woody vegetation features with appropriate landscape plantings will also be integrated in the design, as outlined in the mitigation measures.

BRT East

As noted above, the project will result in permanent removal of cultural meadow and associated habitat. However, the effect will be limited given the common, tolerant nature of this vegetation community, habitat type and associated wildlife complement. As noted in **Section 4.1.2**, there are 43 vegetation units within BRT East representing a total area of approximately 83.18 ha. Of the 43 vegetation units only 23 of the units are affected by the project. The total affected area is 13.65 ha or 16.4% of the total area of the 43 existing vegetation units.

In addition to the removal of cultural meadow, the BRT East will result in the following effects to individual vegetation components or inclusions within the cultural meadow mosaic along the project limits:

- Removal of 1.3 ha (44%) of City of Mississauga Natural Area RW1 (Unit E5). As outlined in **Section 4.1.2**, this Unit is a linear patch of deciduous forest. Outside of the valley systems and Natural Area NE4 to the north of the project limits, this is the only 'natural forest' along the project limits. Three locally rare and uncommon plant species were identified within the Unit, generally, by the City (2006) however these specimens were not re-located during

Ecoplans field surveys, as discussed in **Section 5.1.1.3**. Secondary effects to retained vegetation and associated local wildlife habitat may occur during tree clearing and other construction activities. Also, construction activities can potentially disturb the urban tolerant wildlife and migratory bird nesting and foraging.

- Encroachment into the southern portion of NE4SMA will result from the Cawthra station, the associated parking facility and access ramp system. This will result in:
  - removal of 0.25 ha (58%) of Unit E8, a small Narrow-leaved Cattail Mineral Marsh (MAS2-1b) in the southwest corner;
  - removal of 0.03 ha (5%) of a small portion of Unit E9, a Purple Loosestrife dominated Mineral Meadow Marsh pocket (MAM2-b). This unit is mapped within the TRCA Generic Regulation Limits; and
  - encroachment / removal and realignment of a long drainage ditch extending along the north side of Eastgate parkway, containing a Narrow-leaved Cattail Mineral Shallow Marsh located in the roadside ditch along the north side of Eastgate Parkway. Given that this feature is dominated by common and tolerant plant species, the effect of relocation of the drainage ditch is considered negligible. A realigned drainage system can easily be re-established with the same species assemblages.

  For the most part, these features have developed on the generally poorly drained clay soils in the lower lying depressional areas originally created by land disturbance associated with the utility corridor activities (hydroelectric corridor, pipelines and other infrastructure, earthen berms, re-grading/fill placement). Natural Area NE4 (300 meters north of BRT alignment) will not be affected.
- Removal of 0.1 ha and 0.04 ha respectively in two Mineral Meadow Marsh wetland pockets located on the east and west sides of Tomken Road (no Unit numbers), south of Eastgate Parkway as a result of the expansion of an earthen berm. The expansion of the berm is being undertaken to mitigate social / cultural effects (provide additional screening to adjacent residences). These wetland pockets are very small and are comprised of common wetland vegetation species with non-native/invasive species present. The effect of removal of these wetland pockets is considered negligible.
- Works at Little Etobicoke Creek will result in localized removal of riparian vegetation to extend the existing Little Etobicoke Creek structure, as well as temporary disturbance for construction access. Affected vegetation and associated habitat comprised of common, tolerant, well represented vegetation types. Specific effects are:
  - removal of 0.5 ha (53%) of Unit E16, a Cattail Mineral Shallow Marsh (MAS 2-1) on the west side of Little Etobicoke creek. Minor edge encroachment (~ 5 m) into the south portion of the Phragmites Mineral Meadow Marsh (MAM2). The area (ha) affected includes the encroachment / removal and realignment of a long drainage ditch extending along the north side of Eastgate parkway, west and east of Little Etobicoke Creek, containing the Mineral Meadow Marsh (MAM2). Given that this feature is dominated by Phragmites, an aggressive species, the effect of relocation of the drainage ditch is considered negligible. A realigned drainage system will likely quickly colonize with similar species assemblages; and

  - temporary disturbance of Units E18 and E19; two Cattail Mineral Shallow Marsh (MAS 2-1) wetland pockets on the east side of Little Etobicoke creek. Direct effects to these Units were largely avoided by shifting the BRT alignment during Preliminary Design. Minor and temporary disturbance of these feature may occur during the installation of the stormwater management facility and outlet, depending on the final drainage design (to be determined during Detail Design); however, any effects will be localized to the edge area along the existing berm and ditch system. Any such edge disturbance is not anticipated to affect the habitat the Digger Crayfish in the north portion of Unit E18.
- Removal of 0.17 ha (48%) of Unit E20 and 0.09 ha (60%) of Unit E21 already affected / removed by the hydro access road and culvert. This includes removal of most of the 0.3 ha pocket by the westerly entrance road to the BRT station at Dixie Road.
- Removal of 0.17 ha (84%) of Unit E24 and 0.14 ha (63%) of Unit E25; two small wetland pockets of Narrow-leaved Cattail dominated Cattail Mineral Shallow Marsh (MAS2-1b) located east of Dixie Road, north of Eastgate Parkway.
- Removal of 0.008 ha (57%) of Unit E28 and 0.003 ha (15%) of Unit E29; two very small wetland pockets of Purple Loostrife dominated Mineral Meadow Marsh and Reed Canary Grass Mineral Meadow Marsh located east of Dixie Road.
- Removal of 0.05 ha (68%) of Unit E33 and 0.02 ha (59%) of Unit E34; two very small wetland pockets that occur adjacent to the bend at Eastgate Parkway. Both of the features are wet or seasonally wet depressions on the south side of an existing earthen berm. Both wetland pockets will be removed with the expansion of the earthen berm. The expansion of the earthen berm is being undertaken to mitigate social / cultural effects (provide additional screening to adjacent residences). The effect of removal of these wetland pockets is considered negligible.
- Removal of 0.9 ha (98%) of Unit E35, a narrow vegetated area adjacent to Eastgate Parkway (on property dedicated to the City for the Mississauga BRT), south of the intersection of Eastgate Parkway and Eglinton Avenue. As this unit is cultural in origin and is surrounded by manicured lawn, the effect of removal is considered negligible from an ecological perspective.
- Minor edge disturbance and limited vegetation removal in the Etobicoke Creek Valley. Other than scattered successional woody growth on the west valley slope and the meadow vegetation on the road embankments, vegetation effects will be limited to localized tree removal on the disturbed edge of the deciduous forest (Unit 38) at the top of the east valley slope. A small number (<10) of Sugar Maple and Basswood will require removal. Total area affected is <0.01 ha. The groundcover and understory is non-existent or highly disturbed in this area given previous works. No effects are anticipated to any of the species of conservation concern identified in the valley, as they are outside the construction zone and the alignment will be kept within the existing bridge structure (see **Section 5.1.1.3**). No Butternut has been observed within the crossing area. Twinleaf is located ~200 m north of the alignment; no effects are associated with this species.

As previously noted, all wetland pockets affected have developed on the generally poorly drained clay soils in the lower lying depressional areas originally created by land disturbance associated with the utility corridor activities (hydroelectric corridor, pipelines and other infrastructure, earthen berms, re-grading/fill placement).

Other potential effects, including indirect or temporary disturbances to vegetation, habitat and wildlife generally as a result of construction activities include:

- Potential disturbance to adjacent vegetation outside the construction footprint during clearing, or as a result of temporary construction storage activities.
- Potential disturbance or accidental harm to wildlife or nesting birds encountered during construction. Although most wildlife will move away from the area during construction, smaller, less mobile animals could be affected, as well as nesting birds and their eggs or young. Cliff Swallows, a migratory bird species, were observed by Ecoplans nesting on the underside of the bridge structure crossing Etobicoke Creek. The *Migratory Birds Convention Act* (MBCA) prohibits harm to migratory birds and their nests, eggs and young.
- Release of construction generated sediment to vegetation, and particularly wetland pockets or riparian vegetation where water is present, potentially impairing health and growth.
- Potential changes in the local surface water regimes that support the small wetland pockets retained adjacent to the project. As outlined, the hydrological regimes appear to be dominated by surface drainage retained in depressions on the poorly drained soils, rather than groundwater relationships, and the wetland communities are not particularly sensitive to hydrological variations).
- Possible spread of invasive species with the movement of topsoil, live plants and other seed sources across the project limits.
- Possible spills (fuel, oil, other construction products) that could reach natural vegetation areas.

These potential effects can be managed using standard construction-related mitigation measures summarized later in this section.

Potential Operational and Maintenance Effects

Potential effects to vegetation and associated habitat and wildlife as a result of operational and maintenance activities include:

- Generation of runoff contaminants (including salt and salt spray).
- Temporary disturbance during structure and facility maintenance or future rehabilitation.
- General wildlife disturbance and noise; as noted, the environs are already subject to noise associated with the highway and roadways.
- Potential changes in the local hydrology that supports the wetland pockets associated with the stormwater management system outfalls (as noted, the wetland communities in these wetland pockets are not particularly sensitive to hydrological variations).
- Lighting disturbance to wildlife; again this effect is already present throughout the project

limits and vicinity.
- Right-of-way management (fertilizer, herbicides, pesticides).

CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.

General rehabilitation activities in the long-term may involve repair or replacement of the culvert and bridge structures over Little Etobicoke Creek and Etobicoke Creek respectively, or general rehabilitation activities to other components of the transitway and station facilities. The activities may involve limited temporary disturbance of vegetation and wildlife. These effects are generally predictable, temporary and limited in extent, and can be managed with the implementation of standard construction-related mitigation measures.

Mitigation and Commitments to Future Work

Design-related Measures

As noted above, design measures were implemented to minimize potential adverse effects at the Etobicoke Creek crossing. The BRT alignment was shifted at the Etobicoke Creek crossing to utilize the existing Eglinton Avenue structure, thereby avoiding the adverse effects of a new crossing on the watercourse, as well as the valley slopes and associated vegetation. The alignment was also shifted at the Little Etobicoke Creek crossing to protect Unit E18, a Cattail Mineral Shallow Marsh (MAS 2-1) on the east side of the creek that supports Digger Crayfish habitat along its north edge.

The location of the alignment of the BRT was also shifted, during the design process, in order to avoid direct effects to a small (~0.3 ha) pocket Cattail Mineral Shallow Marsh (MAS 2-1) located along the south side of Eglinton Avenue West, just west of Renforth Drive. The marsh is dominated almost entirely by Narrow-leaved Cattail. This marsh would have been removed with the original BRT alignment and location of a previously proposed parking area.

Construction-Related Mitigation Measures and Commitments to Future Work
- Implement protection measures and proper clearing techniques during construction to protect retained vegetation and local habitat including:
  - Minimize the removal of vegetation, particularly woody vegetation, to that required for the BRT project.
  - Clearly delineate vegetation areas adjacent to the BRT corridor to be protected (e.g., on Contract drawings and in the field), including erection of temporary tree protection where appropriate (e.g., RW1, Etobicoke Creek east valley slope, Little Etobicoke valley) to preclude construction equipment access, temporary storage and other construction activities. Maintain fencing throughout construction.

  - Fell trees away from retained vegetation and watercourses to avoid damage and disturbance.
  - Restrict grubbing of trees to the required footprint zone; in adjacent areas of the right-of-way within the natural areas, tree stumps will be cut flush to the ground and grubbing avoided in order to minimize soil disturbance, particularly in erosion prone areas on the Etobicoke Creek valley slope.
  - 'Repair' or remove trees damaged during clearing.
- Employ appropriate sedimentation and erosion control measures as per the Erosion and Sediment Control for Urban Construction (Greater Golden Horseshoe Conservation Authority 2006) and the City of Mississauga's Erosion and Sediment Control Bylaw. A copy of both documents can be provided upon request.
- Maintain the general local drainage areas to the wetland pockets (e.g., avoid extensive diversion of surface flows into or away from these features), and manage any stormwater management outfalls to avoid large changes to the frequent storm runoff regime.
- Prevent disposal of wetland material containing *Phragmites* or Purple Loosestrife (or other invasive species) in or near retained wetland pockets.
- Site temporary storage areas away from the remnant woody vegetation areas and away from the valley slopes.
- Appropriately dispose of all construction-related debris following construction.
- Ensure an environmental inspector is on site during construction to ensure compliance with mitigation measures.
- Implement the City's typical vegetation replacement and enhancement protocols for both woody vegetation and the wetland pockets removed by the project, based on CVC and/or TRCA's guidelines, with consideration of landownership and usage, including utilities. Specific vegetation replacement is anticipated to be required for RW1, as well as the larger regulated wetland pockets. Candidate areas that exhibit the best potential for vegetation and habitat enhancement are the Etobicoke Creek floodplain, the NE4SMA area east of Cawthra Road, and the Little Etobicoke riparian corridor. Other opportunities such as acquisition of existing forest areas will also be explored. Related consultation with TRCA and CVC will continue during Detail Design (see **Appendix E** for related correspondence and meeting notes).
- Supplement/enhance existing vegetation cover with planting of native species, including the restoration of disturbed areas, and within those areas highlighted above. Enhancement of woody cover along the City's identified 'Natural Linkage' area to improve the quality of the local wildlife habitat and linkage functions will also be considered in consultation with the landowners and utility operators.
- Re-stabilize and re-vegetate disturbed valley slopes and creek banks following construction.
- Prevent harm to any wildlife encountered incidentally during construction. Consider contractor-awareness training to emphasize avoidance of disturbing or harassing wildlife.
- All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of

Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response.

- In order to avoid potential adverse environmental effects on migratory bird species that may breed in the project area the following measures will be implemented:
  - Any construction, maintenance, operation and decommissioning activities with the potential to destroy or disturb migratory birds shall not take place in migratory bird habitat during the breeding season that, in this location, is generally defined to be from May 1 – July 31.
  - If the proponent must conduct works that could potentially destroy migratory birds or their nests within breeding bird habitat during the identified breeding season for migratory birds, a nest survey will be conducted by a qualified avian biologist prior to commencement of the works to identify and locate active nests of species covered by the *Migratory Birds Convention Act*. A mitigation plan (which may include establishing appropriate buffers around active nests) would then be developed to address any potential effects on migratory birds or their active nests, and would be reviewed by Environment Canada prior to implementation.
- Review design opportunities further during Detail Design, in consultation with City staff, to minimize encroachment and maintain wildlife movement opportunities along the City's Linkage Area in relation to design of slopes, location of fencing, plantings, etc. This may include identification of opportunities to improve the linage function where feasible and practical. Objectives related to wildlife movement must ultimately recognize the nature of the project limits and the adjacent land uses.

Operation and Maintenance Mitigation Measures and Commitments to Future Work

- Employ a low maintenance right-of-way management approach to reduce or avoid the need for fertilizer and pesticide applications, other than what may be needed for the initial establishment of planted trees. The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction.
- Incorporate native vegetation plantings in the landscape design
- Implement the stormwater management measures outlined in **Section 5.1.1.7**.
- Use appropriate mitigation measures as outlined previously to minimize the extent of temporary disturbance required during maintenance and future rehabilitation activities, and implement restoration measures as required.
- The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of

wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management.

- Implement mitigation measures to protect nesting migratory birds during maintenance activities (e.g., bridge / culvert repair).
- CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.

Significance

Construction Phase

No significant adverse effects to vegetation are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The vegetation and habitat associates are common, tolerant and cultural in character, and the spatial extent of the project and associated vegetation and habitat removals is limited. The implementation of identified mitigation measures will manage potential for effects to an appropriate level. Nonetheless, the incremental removal of the local vegetation and associated habitat, and particularly the small wetland and woody patches, is recognized on a local scale in the context of the highly urbanized landscape, as reflected in the general recommendations for replacement and enhancement plantings.

Similarly, no significant adverse effects to wildlife are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The wildlife in the area will be tolerant of development and transportation infrastructure generally given the decades of exposure, the amount of habitat removal is relatively small and no significant or unique habitat features are removed and no new habitat fragmentation will result.

With the implementation of the above noted mitigation measures and commitments to future work, potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

Operation and Maintenance Phase

No significant adverse effects to vegetation, wetlands, wildlife or migratory birds are anticipated during operation and maintenance, with proper implementation of the identified mitigation measures as well as the implementation and maintenance of standard stormwater management measures outlined in **Section 5.1.1.7**.

With the implementation of the above noted mitigation measures and commitments to future work potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.3 Species of Conservation Concern and Species at Risk

Fish

Since Redside Dace are considered extirpated from the Etobicoke Creek system, there will be no construction or operational effects on fish species of conservation concern. The works and future operation and maintenance activities will not preclude any future efforts to re-introduce this species or enhance habitat potential for them.

Flora

No Butternut were recorded within the limited woody vegetation areas along the project limits. Therefore, there are no construction or operation / maintenance effects anticipated for this species. Similarly, American Ginseng, Harbinger-of-spring and Twinleaf are either located well north of the project limits or may no longer persist in the area generally. Therefore, there are no anticipated construction or operation / maintenance effects, or potential for significant residual adverse effects anticipated for these flora species of conservation concern.

The only TRCA L-ranked rare flora that will be directly affected is White Oak (L2); several of the scattered trees that occur along the project limits will be removed, however the majority of the occurrences of this species along and in the vicinity of the project limits will not be affected.

As noted in **Section 4.1.4**, three regionally and municipally uncommon/rare species were recorded in RW1; Sharp-lobed Hepatica (uncommon within the City), Squirrel-corn (rare within the City, uncommon within the Region) and Bellwort (uncommon within the City). These species were not re-located during Ecoplans 2008 field surveys and therefore, construction and operation / maintenance effects to these species are not anticipated; however, additional surveys will occur during Detail Design once the grading footprint is finalized. The survey results will be provided to Transport Canada and Infrastructure Canada who will determine whether or

there is a warrant for review by any Federal Authorities. It is noteworthy that none of these species are listed under the *Species at Risk Act*.

The other 'local' species of conservation concern that may occur within the project limits will be associated with the more intact portions of the larger natural areas remnant natural areas and valley stream corridors in the BRT East project limits (e.g., NE4/NE4SMA, Etobicoke Creek, and to a lesser extent Little Etobicoke Creek). Therefore, the potential for effects on these species is limited.

Commitments to future work during Detail Design include:

- Completion of additional in-season botanical surveys for Squirrel Corn, Bellwort and Sharp-leaved Hepatica in RW1.
- Completion of additional in-season botanical surveys for locally rare (L rank: L1, L2 and L3) species in the wetland pocket in NE4SMA may be warranted should the footprint of the BRT alignment change (with final grading limits developed during Detail Design or any other shifts to the alignment).
- Preparation of appropriate salvage and re-instatement measures (e.g. transplant, seed bank salvage, sod mats, seed harvest) for any relevant species that may be identified.

Based on the landscape and habitat characteristics and extent of the project effects with the implementation of the identified mitigation measures, the project will not result in any significant residual adverse effects on flora species of conservation concern.

Wildlife

No Species at Risk (SAR) designated by the COSEWIC or COSSARO, or provincially rare (S-rank: S1, S2, S3) species identified by NHIC were observed by Ecoplans or during the City's or TRCA's natural area inventories, or are recorded in the NHIC database in or within the immediate vicinity of the project limits.

Based on Ecoplans' query of Environment Canada's SAR search tool, 13 species designated as SAR by COSEWIC and/or COSSARO are indicated as potentially being present in a broader area that encompasses the project limits. As outlined in **Section 4.1.3**, the habitat along the project limits does not provide suitable habitat for most of the species indentified, with the exception of the Monarch. Adjacent to the project limits, there is some potential for Eastern Milksnake and Northern Map Turtle to use habitat in the Etobicoke Creek valley. While there may be potential for Eastern Ribbon Snake and Eastern Milksnake to use similar habitats to what is found along the project limits (small wetland pockets surrounded by meadow), the likelihood of their presence along the project limits is very low given the setting (major transportation facilities, local roads, urban development and other anthropogenic disturbances).

Although some displacement and disturbance of cultural meadow habitat that exhibits potential for Monarch will occur as a result of the construction, this habitat is common throughout most of the surrounding area and southern Ontario. No areas of concentrated Common Milkweed (*Asclepias syriaca*) growth were identified. Potential operational and maintenance effects also include the loss of habitat through the use of herbicides for 'weed' control.

The following mitigation measure, in combination with the mitigation measures for protection of wildlife generally as outlined above, will minimize negative effects and may provide a net benefit to the potential Monarch habitat:

- Native seed mixes containing Common Milkweed will be used when re-establishing vegetation within disturbed areas of the right-of-way.

Implementation of construction related mitigation measures identified for protecting terrestrial and aquatic habitat (please refer to **Section 5.1.1.3**) will also protect wildlife generally, including TRCA L- 3 and 4 rank species identified as present generally within the vicinity of project limits and any species of conservation concern.

Significance

With the implementation of the above noted mitigation measures and commitments to future work, potential for adverse effects to species of conservation concern can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.4 Air Quality

Potential Construction Effects, Mitigation and Commitments to Future Work

Construction activities may result in the creation of dust. Dust impacts will be mitigated by ensuring that proper watering and/or other dust suppressant techniques, as identified in Ontario Provincial Standard Specification (OPSS) 506, are used during the construction phase. OPSS 506 outlines the requirements for dust suppressants and their application including application. Following construction, any open, unpaved areas will be seeded.

In addition to potential adverse dust effects there is the potential for increased emissions from construction equipment. To mitigate these potential adverse effects, the Contractor will be required to keep equipment in good operating conditions and efforts will be made to minimize the idling of equipment, especially during smog alerts. When smog advisories are issued, the City of Mississauga will discuss the scheduled activities with the Contractor to determine what

steps can be taken to further limit air emissions without unduly affecting the Contractor's schedule.

Construction effects to air quality are not anticipated to be significant as they are relatively short-term in duration and can be effectively mitigated through the use of standard construction mitigation measures.

Potential Operational and Maintenance Effects, Mitigation and Commitments to Future Work

Operational and maintenance effects will be managed through the use of best management practices such as those identified for construction works (e.g. dust control, operation of equipment in good operating order, minimize idling).

In accordance with a requirement made during the Provincial Environmental Assessment, air pollution levels in adjacent areas will be measured prior to and following the commencement of operations along the busway at potentially affected residential sites. Details regarding the measurement requirements and locations will be determined during Detail Design.

The forecast vehicle fleet that will be operating on the busway consists of a mix of current Mississauga Transit and GO Transit vehicles, with potential use in part by the Toronto Transit Commission. The vehicles currently being employed by these agencies include:

- Standard Bus: New Flyer Industries D40LF (with rear mount A/C)
- Intercity Bus: Motor Coach Industries D4500CT
- Double-Deck Bus: Alexander Dennis Enviro 500 12.8m LH Body
- Articulated Bus: New Flyer Industries D60LF (with rear mount A/C)
- Representative BRT Bus: New Flyer Industries DE60LF-BRT

The current bus fleets are entirely diesel-fuelled. As the City of Mississauga and GO Transit decommission vehicles and update their fleet, consideration will be given to employing alternative fuel technologies (Compressed Natural Gas [CNG], diesel-electric, low sulphur diesel, biodiesel, etc). It should be noted that the funding agreement (City, Provincial and Federal government) for the Mississauga BRT Project included an allowance for the purchase of new BRT-specific vehicles (indicated above as "Representative BRT Bus"); however, the propulsion system to be employed will be identified as part of a separate study.

The following provides details regarding an air quality assessment completed by RWDI AIR Inc. The air quality assessment was designed such that the results of the assessment could also be used to support a detailed air quality assessment, if deemed necessary in the future. A worst-case modelling approach was employed for both the incremental (transitway) and combined

(transitway and Highway 403) scenarios. The worst-case scenario outlines potential effects at the most affected receptors. Potential effects at all other receptor will be less.

Contaminant Profiles

Contaminants of Concern (CoCs) considered as part of the air quality assessment included inhalable (coarse) particulate matter (PM_{10}) and respirable (fine) particulate matter ($PM_{2.5}$). These contaminants were chosen for this level assessment because they are representative of both tailpipe and roadway dust emissions. Additionally, these contaminants usually have the greatest potential to exceed ambient air quality guidelines since background concentrations are often elevated compared with other vehicle-related pollutant emissions. Historical ambient air quality measurements for the CoCs presented in the Ministry of the Environment (MOE) annual Air Quality in Ontario Reports for the most recent 5 years were compiled and summarized. Concentration data for each contaminant from MOE monitoring station 46109 (Frank McKechnie Community Centre, 310 Bristol Road East) were tabulated and 90th percentile concentration values calculated using 2005 monitoring data results. Station 46109 was selected because it was the monitoring station considered to provide the most representative air quality data for the study area.

Emissions and Dispersion Modelling

Future tailpipe emission factors were estimated using the United States Environmental Protection Agency's (US EPA) MOBILE6.2 emissions based on the year 2017. Similarly, roadway dust emission rates were estimated based on published emission factors in the US EPA's AP-42. Emissions were estimated based on assumed silt loading values for Highway 403 and the transitway. Both MOBILE6.2 and AP-42 are accepted regulatory methods and have been used extensively to evaluate emissions from highways and other transportation-related projects in Ontario.

The emission factor data, traffic volumes and meteorological data were then inputted into the U.S. EPA's CAL3QHCR air dispersion model in order to estimate future air concentrations at critical sensitive receptor locations representing schools and daycares in the study area. The worst-case section of roadway with the highest traffic volumes was modelled, which corresponded to the section of Highway 403 between Hurontario Street and Cawthra Road. RWDI was provided with average daily traffic volumes, which were varied by hour of day based on a published distribution to explicitly account for coincident traffic volumes and meteorological conditions on an hour-by-hour basis. Representative surface meteorological data from Pearson and upper air data from Buffalo for the Year 2005 were compiled and used as input into the dispersion model. Predicted concentrations of PM_{10} and $PM_{2.5}$ at the sensitive receptor locations were then estimated for the incremental (transitway) and combined (transitway and Highway 403) scenarios.

The dispersion modelling results were also used to produce concentration versus distance profiles for the incremental and combined scenarios. The profiles generated represent worst-case 24-hours concentrations. These have been included for reference so that effects at sensitive locations (e.g., residence, nursing home, school, place of worship, daycare facility, etc.) 20 m to 500 m beyond the model domain can be determined by comparing the distance from the edge of roadway of the receptor of interest with the concentration versus distance profiles.

The section of the roadway and the sensitive receptor locations considered in the modelling assessment (i.e. R1-R4) are shown in **Figure 5.1.1.4-1**.

Criteria and Health Effect Assessment

Potential effects to air quality and health were determined by plotting the applicable provincial and federal ambient air quality criteria for $PM_{2.5}$ and PM_{10} with the concentration versus distance profiles. Potential human health effects associated with the increase in contaminant concentrations due to the project over the existing ambient background concentrations are qualitatively discussed below.

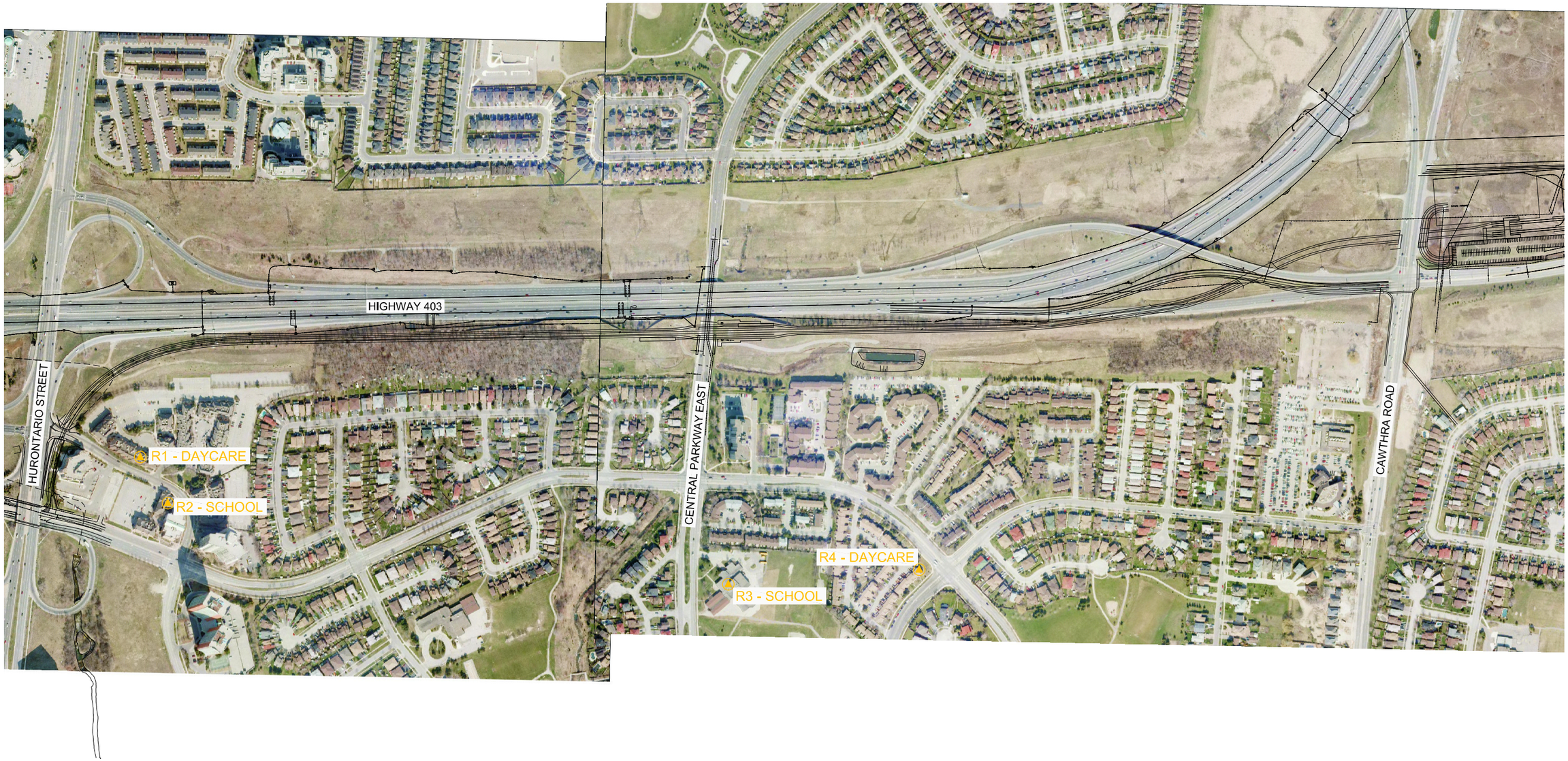
Results of the Air Quality Assessment

Background, incremental and combined concentrations of $PM_{2.5}$ and PM_{10} at various receptor locations are given in **Tables 5.1.1.4-1** and **5.1.1.4-2**, respectively. Similarly, the concentration versus distance profiles for $PM_{2.5}$ and PM_{10} are given in **Figures 5.1.1.4-2** and **5.1.1.4-3**, respectively. The significance of these results is discussed below.

$PM_{2.5}$: The maximum predicted concentration of $PM_{2.5}$ associated with emissions from the transitway or the transitway plus Highway 403 were estimated at approximately 2.6 $\mu g/m^3$ at receptor locations RN1 and RS1 (see **Table 5.1.1.4-1**). Overall, the incremental increase in $PM_{2.5}$ concentrations are considerably less than the local background concentration of 22$\mu g/m^3$. The results indicate that emissions associated with the transitway are not expected to contribute significantly to background levels.

It is also worth noting that when emissions from the transitway, Highway 403 and local background levels are combined, the predicted concentrations are less than the Canada Wide Standard (CWS) of 30 $\mu g/m^3$ at all receptor locations (see **Figure 5.1.1.4-2**).

Overall, it is unlikely that vehicle emissions associated with the transitway are likely to contribute to adverse health effects to area residents. As a result no significant adverse effects are anticipated.



LEGEND:

Receptor

0 100 250m

Site Plan Showing Location of Modelling Domains and Receptors

True North

Mississauga BRT - Mississauga, Ontario

Project #W08-5148

Drawn by: NTN	Figure: 5.1.1.4-1	RWDI
Approx. Scale: 1:6000		
Date Revised: July 17, 2008		

Table 5.1.1.4-1 $PM_{2.5}$Concentrations at Receptor Locations

	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	Background (µg/m³)	Predicted + Background (µg/m³)	Predicted Concentration (µg/m³)	Background (µg/m³)	Predicted + Background (µg/m³)
Sensitive Receptors						
R1 Daycare	0.81	22	22.8	0.42	22	22.42
R2 School	0.63	22	22.6	0.31	22	22.31
R3 School	0.50	22	22.5	0.20	22	22.20
R4 Daycare	0.46	22	22.5	0.19	22	22.19
R5 MOE Station 4610	0.23	22	22.2	0.10	22	22.10
Receptor Profile[1]						
North Receptor Profile						
RN25	0.52	22	22.5	0.24	22	22.24
RN24	0.53	22	22.5	0.25	22	22.25
RN23	0.54	22	22.5	0.25	22	22.25
RN22	0.56	22	22.6	0.25	22	22.25
RN21	0.57	22	22.6	0.26	22	22.26
RN20	0.59	22	22.6	0.26	22	22.26
RN19	0.60	22	22.6	0.27	22	22.27
RN18	0.62	22	22.6	0.28	22	22.28
RN17	0.64	22	22.6	0.28	22	22.28
RN16	0.67	22	22.7	0.29	22	22.29
RN15	0.71	22	22.7	0.30	22	22.30
RN14	0.75	22	22.7	0.32	22	22.32
RN13	0.79	22	22.8	0.34	22	22.34
RN12	0.83	22	22.8	0.36	22	22.36
RN11	0.88	22	22.9	0.39	22	22.39
RN10	0.94	22	22.9	0.41	22	22.41
RN9	1.01	22	23.0	0.44	22	22.44

[1] Receptor Profile locations represent a variety of sensitive receptors located 20m-500m north or south of Highway 403.

	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	**Background (µg/m³)**	**Predicted + Background (µg/m³)**	**Predicted Concentration (µg/m³)**	**Background (µg/m³)**	**Predicted + Background (µg/m³)**
RN8	1.08	22	23.1	0.47	22	22.47
RN7	1.16	22	23.2	0.50	22	22.50
RN6	1.27	22	23.3	0.54	22	22.54
RN5	1.39	22	23.4	0.58	22	22.58
RN4	1.54	22	23.5	0.63	22	22.63
RN3	1.76	22	23.8	0.69	22	22.69
RN2	2.06	22	24.1	0.76	22	22.76
RN1	2.56	22	24.6	0.87	22	22.87
South Side Receptor Profile						
RS1	2.58	22	24.6	1.61	22	23.61
RS2	1.83	22	23.8	1.04	22	23.04
RS3	1.45	22	23.4	0.78	22	22.78
RS4	1.21	22	23.2	0.63	22	22.63
RS5	1.05	22	23.1	0.53	22	22.53
RS6	0.95	22	22.9	0.45	22	22.45
RS7	0.87	22	22.9	0.40	22	22.40
RS8	0.80	22	22.8	0.36	22	22.36
RS9	0.75	22	22.7	0.33	22	22.33
RS10	0.70	22	22.7	0.31	22	22.31
RS11	0.66	22	22.7	0.30	22	22.30
RS12	0.63	22	22.6	0.28	22	22.28
RS13	0.60	22	22.6	0.27	22	22.27
RS14	0.58	22	22.6	0.26	22	22.26
RS15	0.56	22	22.6	0.25	22	22.25
RS16	0.54	22	22.5	0.25	22	22.25
RS17	0.52	22	22.5	0.23	22	22.23
RS18	0.51	22	22.5	0.21	22	22.21
RS19	0.49	22	22.5	0.20	22	22.20
RS20	0.48	22	22.5	0.19	22	22.19
RS21	0.47	22	22.5	0.19	22	22.19

	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	**Background (µg/m³)**	**Predicted + Background (µg/m³)**	**Predicted Concentration (µg/m³)**	**Background (µg/m³)**	**Predicted + Background (µg/m³)**
RS22	0.46	22	22.5	0.18	22	22.18
RS23	0.45	22	22.4	0.18	22	22.18
RS24	0.43	22	22.4	0.18	22	22.18
RS25	0.42	22	22.4	0.17	22	22.17

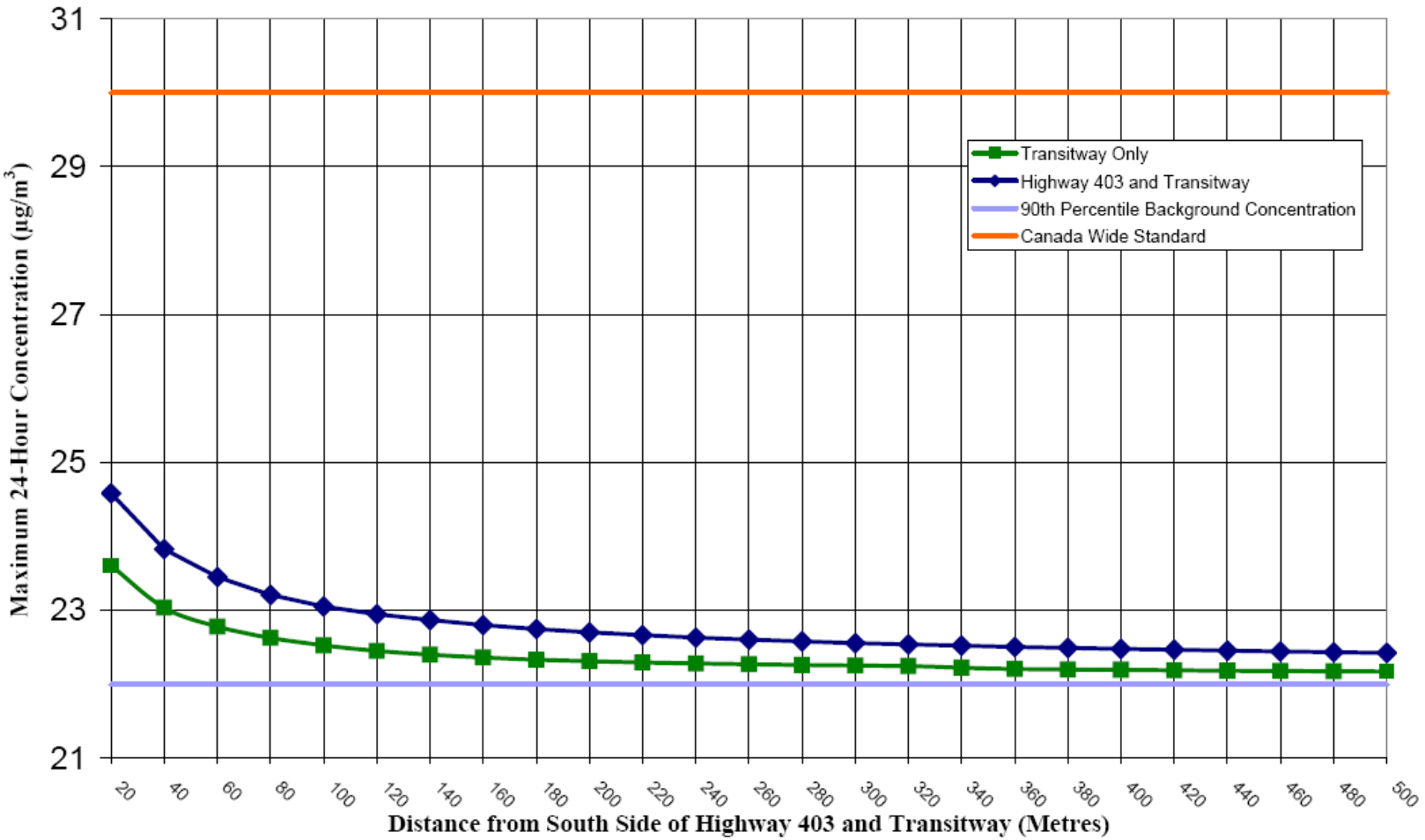
Table 5.1.1.4-2 PM_{10}Concentrations at Receptor Locations

	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	**Background (µg/m³)**	**Predicted + Background (µg/m³)**	**Predicted Concentration (µg/m³)**	**Background (µg/m³)**	**Predicted + Background (µg/m³)**
Sensitive Receptors						
R1 Daycare	7.16	37	44.2	2.65	37	39.7
R2 School	5.55	37	42.6	2.00	37	39.0
R3 School	4.49	37	41.5	1.26	37	38.3
R4 Daycare	4.13	37	41.1	1.19	37	38.2
R5 MOE Station 4610	2.24	37	39.2	0.65	37	37.7
Receptor Profile[2]						
North Receptor Profile						
RN25	4.62	37	41.6	1.52	37	38.5
RN24	4.71	37	41.7	1.54	37	38.5
RN23	4.81	37	41.8	1.56	37	38.6
RN22	4.93	37	41.9	1.59	37	38.6
RN21	5.06	37	42.1	1.62	37	38.6
RN20	5.20	37	42.2	1.66	37	38.7
RN19	5.35	37	42.4	1.70	37	38.7
RN18	5.53	37	42.5	1.74	37	38.7
RN17	5.73	37	42.7	1.78	37	38.8
RN16	5.95	37	43.0	1.83	37	38.8
RN15	6.19	37	43.2	1.88	37	38.9
RN14	6.52	37	43.5	1.96	37	39.0
RN13	6.88	37	43.9	2.08	37	39.1
RN12	7.30	37	44.3	2.21	37	39.2
RN11	7.76	37	44.8	2.36	37	39.4
RN10	8.28	37	45.3	2.51	37	39.5
RN9	8.88	37	45.9	2.67	37	39.7

[2] Receptor Profile locations represent a variety of sensitive receptors located 20m-500m north or south of Highway 403.

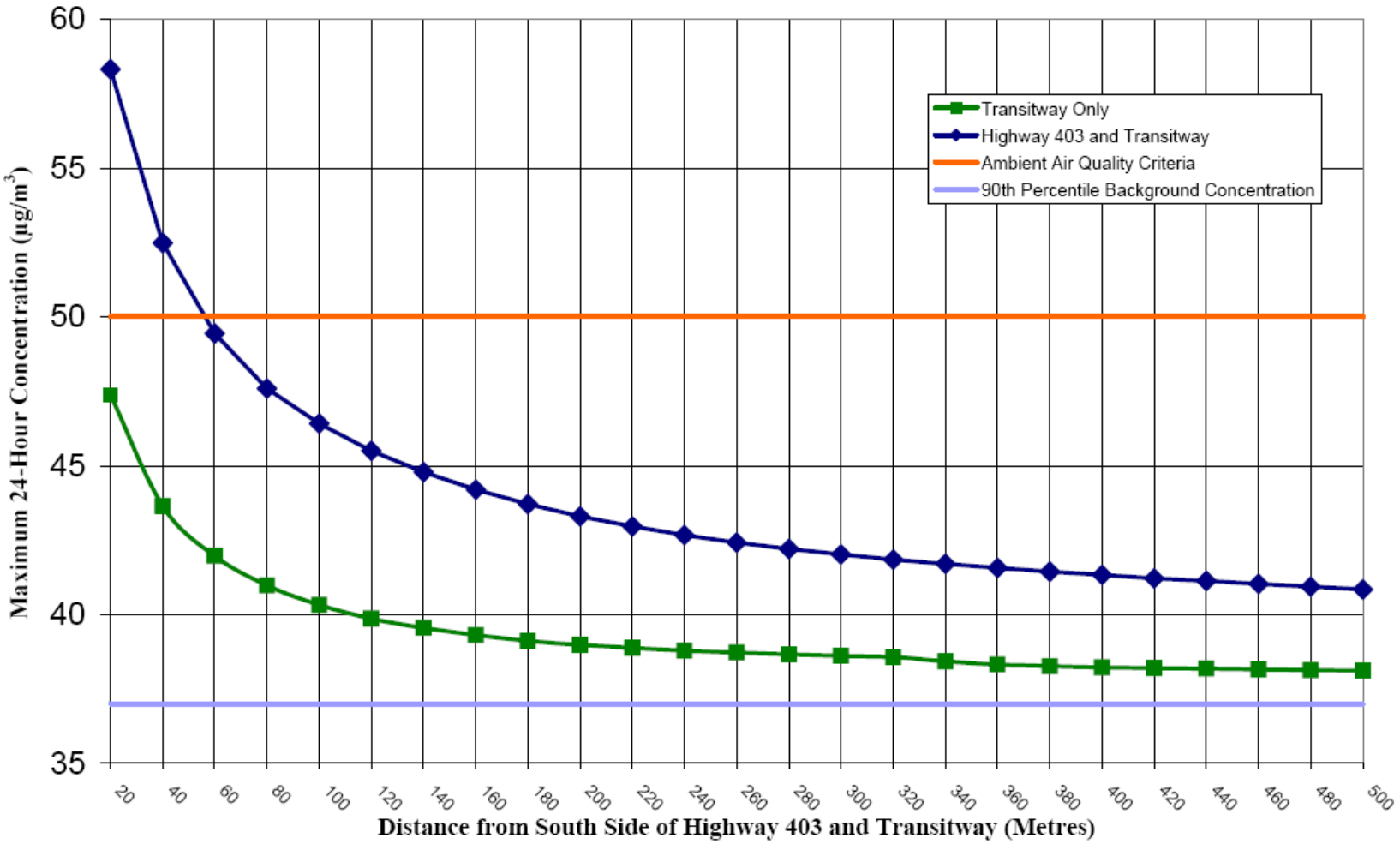
	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	**Background (µg/m³)**	**Predicted + Background (µg/m³)**	**Predicted Concentration (µg/m³)**	**Background (µg/m³)**	**Predicted + Background (µg/m³)**
RN8	9.56	37	46.6	2.86	37	39.9
RN7	10.37	37	47.4	3.06	37	40.1
RN6	11.34	37	48.3	3.30	37	40.3
RN5	12.51	37	49.5	3.56	37	40.6
RN4	14.07	37	**51.1**	3.88	37	40.9
RN3	16.20	37	**53.2**	4.28	37	41.3
RN2	19.31	37	**56.3**	4.77	37	41.8
RN1	24.58	37	**61.6**	5.44	37	42.4
South Side Receptor Profile						
RS1	21.32	37	**58.3**	10.38	37	47.4
RS2	15.48	37	**52.5**	6.64	37	43.6
RS3	12.44	37	49.4	4.97	37	42.0
RS4	10.59	37	47.6	3.98	37	41.0
RS5	9.42	37	46.4	3.33	37	40.3
RS6	8.50	37	45.5	2.86	37	39.9
RS7	7.79	37	44.8	2.55	37	39.6
RS8	7.20	37	44.2	2.31	37	39.3
RS9	6.71	37	43.7	2.12	37	39.1
RS10	6.30	37	43.3	1.98	37	39.0
RS11	5.96	37	43.0	1.88	37	38.9
RS12	5.67	37	42.7	1.79	37	38.8
RS13	5.42	37	42.4	1.72	37	38.7
RS14	5.21	37	42.2	1.66	37	38.7
RS15	5.02	37	42.0	1.61	37	38.6
RS16	4.85	37	41.9	1.57	37	38.6
RS17	4.70	37	41.7	1.43	37	38.4
RS18	4.57	37	41.6	1.32	37	38.3
RS19	4.44	37	41.4	1.27	37	38.3
RS20	4.33	37	41.3	1.23	37	38.2
RS21	4.22	37	41.2	1.20	37	38.2

	Hwy 403 and Transitway			Transitway Only		
	Predicted Concentration (µg/m³)	**Background (µg/m³)**	**Predicted + Background (µg/m³)**	**Predicted Concentration (µg/m³)**	**Background (µg/m³)**	**Predicted + Background (µg/m³)**
RS22	4.13	37	41.1	1.18	37	38.2
RS23	4.03	37	41.0	1.16	37	38.2
RS24	3.94	37	40.9	1.13	37	38.1
RS25	3.85	37	40.9	1.11	37	38.1



Note: Canada Wide Standard for $PM_{2.5}$ is 30 µg/m³
The 90th percentile background concentration from MOE Station No. 46109 for Year 2005 for $PM_{2.5}$ is 22 µg/m³

Figure 5.1.1.4-2 Concentration Profile for $PM_{2.5}$ – Year 2017 with Background Concentrations



Note: MOE's 24-hr AAQC for PM_{10} is 50 µg/m³
The 90th percentile background concentration from MOE Station No. 46109 for Year 2005 for PM_{10} is 37 µg/m³

Figure 5.1.1.4-3 Concentration Profile for PM_{10} – Year 2017 with Background Concentrations

PM_{10}: As shown in **Table 5.1.1.4-2**, the maximum predicted concentration of PM_{10} associated with emissions from the transitway plus Highway 403 were estimated at approximately 24.6µg/m^3 at receptor location RN1 whereas, the maximum concentration at sensitive receptor locations was 7.2 µg/m^3. Similarly, the maximum predicted PM_{10} concentration associated with emissions from the transitway alone was predicted to be 10.4µg/m^3 at receptor location RS1 and the maximum concentration at sensitive receptor locations was 2.7µg/m^3. The local background concentration of PM_{10} is 37µg/m^3. While the relative contribution to PM_{10} levels at sensitive receptor locations is relatively minor, the contribution at other receptor locations might be an important contributor to local background concentrations.

When emissions from the transitway, Highway 403 and local background levels are combined, the predicted concentrations are greater than the MOE Ambient Air Quality Criterion (AAQC) of 50 µg/m^3 at receptor locations located within 60 m of the roadway (see **Figure 5.1.1.4-3**). This result indicates that under worst-case conditions, PM_{10} has the potential to exceed the standard at these receptor locations. It should be noted that the major contributor to high ambient background concentrations is believed to be Highway 403 based on the location of the monitoring station, which was also accounted for in the modelling. Therefore, the results are likely conservative as there is a certain amount of double-counting of the effects of Highway 403. In contrast, when emissions from the transitway are considered alone, then the predicted concentrations including background are less than the AAQC at all receptor locations. This result suggests that adverse health effects to area residents under this scenario are unlikely. As a result no significant adverse effects are anticipated.

Other Substances

As summarized in **Table 5.1.1.4-3**, ambient concentrations for other common air pollutants measured at the MOE monitoring station located at the Frank McKechnie Community Centre were tabulated and 90th percentile concentration values calculated. The concentrations of carbon monoxide (CO), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2), which are substances present in vehicle exhaust, were considerably less than the applicable AAQCs. Although there are no AAQCs for benzene, 1,3-butadiene and acrolein, the concentrations measured are typical of concentrations measured in urban air throughout the province. It is anticipated that emissions of these substances due to the transitway will be relatively minor in comparison with background levels.

While ozone (O_3) was occasionally detected at concentrations greater than the AAQC, ozone levels are associated with long range transport and complex chemical interactions in the atmosphere. Furthermore, ozone is not directly discharged as a vehicular emission.

Table 5.1.1.4-3 Ambient Pollutant Concentrations at MOE Monitoring Station

Pollutant	Statistic	2002	2003	2004	2005	2006	Average
CO (ppm)	1-hr Max	5.98	5.36	1.87	2.65	2.98	3.77
	8-hr Max	3.71	3.34	1.19	1.66	2.48	2.48
	Annual Mean	0.7	0.66	INS	0.38	0.35	0.52
	1hr-90th Percentile	1.23	1.43	0.66	0.63	0.55	0.9
	Times > 1-hr AAQC (36,200)	0	0	0	0	0	0
	Times > 8-hr AAQC (15,700)	0	0	0	0	0	0
NO_2 (ppb)	1-hr Max	95	71	87	89	75	83.4
	24-hr Max	47	43	53	54	42	47.8
	Annual Mean	20	INS	16	17	15	16.93
	1hr-90th Percentile	34	37	34	36	33	34.8
	Times > 1-hr AAQC (200)	0	0	0	0	0	0
	Times > 24-hr AAQC (100)	0	0	0	0	0	0
$PM_{2.5}$ TEOM (µg/m³) [4]	1-hr Max	119	67	67	78	53	76.8
	24-hr Max	38	45	40	47	34	40.8
	Annual Mean	9	8	8	9	8	8.26
	1hr-90th Percentile	19	17	18	22	17	18.6
	24hr-90th Percentile	19	15	16	22	15	17.26
	Times > CWS (30)	5	7	10	12	3	7.4
PM_{10} TEOM (µg/m³) [5]	1-hr Max	198	112	112	130	88	128
	24-hr Max	63	75	67	78	57	68
	Annual Mean	14	13	13	15	13	13.77
	1hr-90th Percentile	32	28	30	37	28	31
	24hr-90th Percentile	32	24	26	37	25	28.77

Pollutant	Statistic	2002	2003	2004	2005	2006	Average
	Times > 24-hr AAQC (50) *	n/a	n/a	n/a	n/a	n/a	n/a
SO_2 (ppb)	1-hr Max	162	103	95	66	20	89.2
	24-hr Max	17	16	16	9	8	13.2
	Annual Mean	INS	3	INS	3	INS	2.55
	1hr-90th Percentile	8	6	4	5	5	5.6
	Times > 1-hr AAQC (250)	0	0	0	0	0	0
	Times > 24-hr AAQC (100)	0	0	0	0	0	0
O_3 (ppb)	1-hr Max	111	110	82	102	90	99
	24-hr Max	62	76	58	74	71	68.2
	Annual Mean	23	25	21	23	22	22.82
	1hr-90th Percentile	45	45	39	47	43	43.8
	Times > 1-hr AAQC (80)	72	61	1	54	14	40.4
Benzene (µg/m³) [6]	24-hr Max	3.2	2.9	2.3	n/a	n/a	2.8
	Annual Mean	0.9	n/a	n/a	n/a	n/a	0.9
	1hr-90th Percentile	1.4	2	1.5	n/a	n/a	1.63
	Times > AAQC	n/a	n/a	n/a	n/a	n/a	n/a
1,3-Butadiene (µg/m³) [6]	24-hr Max	0.5	0.4	0.3	n/a	n/a	0.4
	Annual Mean	0.1	n/a	n/a	n/a	n/a	0.1
	1hr-90th Percentile	0.2	0.2	0.2	n/a	n/a	0.2
	Times > AAQC	n/a	n/a	n/a	n/a	n/a	n/a
Acrolein (µg/m³) [7]	24-hr Max	0.69	0.32	0.13	n/a	n/a	0.38
	Annual Mean	0.11	0.13	0.06	n/a	n/a	0.1
	1hr-90th Percentile	0.16	0.28	0.08	n/a	n/a	0.17
	Times > AAQC	n/a	n/a	n/a	n/a	n/a	n/a

Notes:

(1) Year 2002 data from MOE Station No. 46110 (Mississauga, Mississauga General Hospital). PM2.5 24 hr-90th percentile based on 1 hour concentrations as hourly data was not available to calculate the 24 hr-90th percentile.

(2) Year 2003 data from MOE Station No. 46110 (Mississauga, Mississauga General Hospital)

(3) Year 2004 through 2006 PM2.5, SO2 data from MOE Station No. 46109 (Mississauga, Frank McKechnie Community Centre (Bristol Road East)). Year 2004 through 2006 NO2 data from MOE Station No. 46089 (Brampton, 525 Main St. N., Peel Manor). Year 2005 through 2006 CO data from MOE Station No. 35125 (Toronto West, 125 Resources Rd.).

(4) Canada Wide Standard for PM2.5 established for the year 2010 based on the 98th percentile ambient measurement annually, averaged over three consecutive years

(5) Year 2002 through Year 2006 PM10 data was unavailable for MOE Stations, therefore the MOE equation of PM10 = PM2.5/0.6 was used to predict Year 2002 through 2006 PM10 data.

(6) Year 2002 through Year 2004 data from NAPs Station No. 60428 (Brampton, 525 Main St. N.). Year 2005 through 2006 data unavailable.

(7) Acrolein data from MOE Station in Windsor.

* Interim AAQC

TEOM – Tapered Element Oscillating Microbalance (Continuous Monitor)

AAQC – Ambient Air Quality Criterion

n/a – data not available

INS - Site does not meet requirement of 75% valid data per quarter; INS represents insufficient data for a valid mean.

Data is presented as reported in government documents.

Summary of Findings

In conclusion, the results indicate that emissions associated with the transitway are relatively minor compared with local background concentrations. $PM_{2.5}$ concentrations including background levels for all scenarios are less than the CWS of 30 µg/m^3, which indicates that adverse health effects are unlikely. PM_{10} emissions might be an important contributor to local background concentrations under some conditions. Under these situations, individuals could experience some minor health effects, but these are expected to be infrequent and transient in nature.

It should be noted that the maximum predicted concentrations are associated with the worst-case meteorological conditions, therefore, most of the time the concentration would be significantly lower. Furthermore, these predicted cumulative concentrations are similar to those on comparable highways in Ontario.

Overall, the project is not expected to result in any significant adverse air quality effects either locally or regionally during the operations phase, as the Mississauga BRT system is anticipated to reduce the number of personal vehicles travelling within the study area.

The existing air quality environment in the study area is dominated by emissions from automobiles, as opposed to heavy industry. There are major commuter arteries including Highway 403 which bring automobile traffic into the City of Mississauga. In addition, future development will occur regardless of the completion of the Mississauga BRT facility. In the absence of the Mississauga BRT facility, there will be a notable increase in commuter traffic from these developments into the City Centre and along the Mississauga BRT corridor.

It is anticipated that the project will likely have local and regional air quality benefits during the operations phase, as it is anticipated to reduce the dependency of automobile use within the City of Mississauga. The projected 75% increase in peak period transit passengers in Mississauga generated by the implementation of the BRT program will have benefits to both local and regional air quality as those riders would likely either be using cars or diesel buses if the BRT system was not constructed.

Significance

There is the potential for adverse environmental effects to air quality during construction as a result of dust and emissions from construction equipments. However, these adverse effects are relatively short-term and with the implementation of mitigation measures (e.g. dust control, properly maintained equipment) and commitments to future work, adverse effects during construction can be minimized and no significant residual effects will occur.

As discussed above, the project is not expected to result in any adverse or residual local or regional air quality effects during operations and maintenance. In fact, air quality will likely be improved when compared to a future situation that does not include the Mississauga BRT as part of the transportation network.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.5 Contaminated Sites, Waste Management and Storage of Excess Materials

Potential Construction Effects and Mitigation

As noted in **Section 4.1.6** and **Figures 4.1.6-1** to **4.1.6-4**, some portions of the study area have a high to moderate potential for contamination. A contaminant investigation including subsurface investigation (i.e. boreholes) will be carried out in the areas of high and moderate potential for contamination identified in **Section 4.1.6** with the exception of Area 10 (Etobicoke Creek). The purpose of the subsurface investigations is to ascertain the presence or absence of soil and/or groundwater contamination in order to develop appropriate measures to manage excess materials during the construction. Discussions are ongoing with property owners regarding permissions to enter property to complete the work. The exact schedule for completion of the contaminant investigation work is unknown as it is subject to field conditions and property access; however, the site investigations will be completed as soon as possible during Detail Design. A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada for their review.

Construction activities will include substantial earthwork (excavation cut and fills) to accommodate the required profile grade. This will result in the generation of large quantities of excess soil and shale bedrock which will require appropriate management. Soil and rock management principles aid in appropriately identifying how excess materials will be segregated, staged, transported and reused within the corridor or disposed of off-site.

The following outlines how excess material will be managed and classified to ensure it is appropriately handled and disposed:

Soil Management

Segregation

Since the flow of the excavated material through excavation activities will be determined by its physical, chemical and aesthetic (visual and olfactory) composition, the main task during excavation is to ensure proper source segregation. The following outlines how this will be done.

Physical Segregation

Potentially reusable soil (i.e. reused elsewhere within the BRT corridor) will be kept separate from environmentally impacted soil during construction. All soil stockpiles shall be maintained in good condition and constructed of materials compatible with the material being stored. Stockpiles shall not be placed within 30 metres of a surface water body.

Chemical Segregation

Based on the Contamination Overview Study (see **Section 4.1.6** for further details) the following outline the potential chemical issues that could be encountered.

- **Road Salt** – road salt (predominantly sodium chloride) is used as a de-icing and anti-icing chemical for winter road maintenance. These salts can enter the surface water, soil and groundwater resulting in local or widespread impacts. Since the study has a large proportion of high-use roadways, road salt impacts to the surface and subsurface soil in proximity to roadways is a potential concern.
- **Oil Pipelines** – oil pipelines exist within the study area, primarily along the north side of Highway 403 from west of Winston Churchill Boulevard easterly to Fieldgate Drive. If the pipelines are not adequately maintained leaks and/or spills may occur in the surrounding environment which could impact the soil.
- **Hydro Transmission Lines** – a hydro transmission corridor runs throughout the BRT corridor; generally located on the north side of Highway 403/Eastgate Parkway. Historical spraying of vegetation with pesticides may have occurred within the corridor resulting in chemical accumulation in the shallow soil.
- **Commercial/Industrial Land Uses** – Potential site contamination may exist within or surrounding the study area as a result of the following identified land uses:
  - Hydro substation at Rathburn Road west of Hurontario Street.
  - Commercial businesses on the north side of Eastgate Parkway from 250 m east of Tomken Road to west of Dixie Road.
  - Commercial/industrial businesses on Eastgate Parkway from south of Fieldgate Drive to Eglinton Avenue (west).
  - Fuel service station located south of Eglinton Avenue and west of Centennial Park Boulevard.
  - Registered waste generators and a dry cleaning facility located near the east limit of the study area.

As previously discussed, a contaminant investigation will be carried out for the areas of high and moderate potential for contamination identified in **Section 4.1.6** with the exception of Area 10 (Etobicoke Creek). A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada for their review. That investigation will characterize the chemical quality of the soil, in light of the potential impacts identified in the

Contamination Overview Study. This will facilitate appropriate soil management options per O. Reg. 153/04 and O. Reg. 347 during construction; and will provide timely data required to maintain and improve excavation progress and, thereby, minimize work delays. O.Reg. 153/04 and O.Reg. 347 are regulations under the Ontario *Environmental Protection Act*. O.Reg. 153/04 details the requirements that property owners must meet in order to file a Record of Site Condition including requirements related to site assessment and clean-up. In order to file a Record of Site Condition, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use proposed to take place on the property. O. Reg. 347 identifies hazardous wastes through a series of listings and tests and outlines requirements for on-site handling, mixing, and processing of waste, on-site storage of hazardous and liquid industrial wastes, and the requirements for waste disposal sites and waste management systems.

Aesthetic Screening Segregation

On-site aesthetic field screening of soils and other materials excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works.

During excavation activities, any soil that exhibits visual or olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options.

Disposal

Where practical, attempts will be made to reuse excess non-contaminated soil on-site and on or near to the locations where it was generated. Examples of how excess soil can be used on-site include berming, landscaping and grading.

Suitable projects or other opportunities for reuse of non-contaminated soil off-site will be identified as the Detail Design progresses. Examples of other project uses include:

- Use as aggregate supply by a soil or gardening centre.
- Use as fill or landscaping material on other construction projects.
- Incorporation of excess soil for public or recreational uses.

If no suitable use for excess non-contaminated soils generated during construction can be found, the material would need to be disposed of at a landfill facility willing to accept it as cover material.

Excess contaminated soil (hazardous and non-hazardous) will be disposed of at a MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.

Rock Management

As previously indicated, construction activities will generate large quantities of excess shale bedrock which will require appropriate management.

Segregation

Since the flow of the excavated material through excavation activities will be determined by its physical, chemical and aesthetic (visual and olfactory) composition, the main task during excavation is proper source segregation.

Physical Segregation

Shale bedrock will be physically separated from the soil material and stockpiled away from active work areas.

Chemical Segregation

Shale is the predominant bedrock formation within and surrounding the study area. The MOE conducted a study to sample shale across Ontario in order to characterize the concentration of naturally occurring elements in the late 1990s (MOE 1998). The results of the study demonstrated that the elemental chemical composition of the shale varies significantly across the shale formations in Ontario and that the shale itself and the soil associated with it frequently exceeded the MOE Standards and Guidelines. Most notable elemental chemical exceedances included beryllium, copper, cobalt and nickel. The study indicated that in order to determine appropriate disposal of the shale, chemical sampling of the shale would be required.

As previously discussed, a contaminant investigation will be carried out for the areas the areas of high and moderate potential for contamination identified in **Section 4.1.6** with the exception of Area 10 (Etobicoke Creek). That investigation will include comprehensive testing of the shale bedrock to characterize its environmental quality to assist with disposal options. The testing results will be documented in the contaminant investigation report. A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada.

Aesthetic Segregation

On-site aesthetic field screening of shale bedrock excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works. During excavation activities, any shale bedrock that exhibits visual or

olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options.

Disposal

Where practical, attempts will be made to reuse excess bedrock material on-site and on or near to the locations where it was generated. Similar to excess soil, non-contaminated bedrock could be used on-site for berming, landscaping and grading.

Suitable projects or other opportunities for reuse of non-contaminated rock (i.e. similar uses referred to under "Soil Management") will be identified during Detail Design. If no suitable use for excess non-contaminated rock generated during construction can be found, the material will be disposed of at a landfill facility willing to accept it as cover material.

Excess contaminated rock (hazardous and non-hazardous) rock will be disposed of at a MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.

TRCA and CVC will be consulted with as necessary during Detail Design regarding the placement of fill and any associated requirements for permits.

Non-Soil/Rock Material Management

All non-soil/rock material (e.g. concrete, masonry, asphalt, wood, metals etc.) will be separated from excess soil and bedrock generated during construction, as each of these materials follow a different waste stream. During the course of excavation activities, temporary stockpiling of non-soil/rock material will likely occur. All stockpiled material will be located away from active work areas and either disposed of at an off-site recycling facility or licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.

Potential Operational and Maintenance Effects, Mitigation and Commitments to Future Work

Upon completion of the Mississauga BRT project periodic inspections and maintenance will be required for the facilities. Equipment, chemicals, and other materials may need to be used to facilitate inspection and maintenance activities. The BRT operator will assume all maintenance and inspection activities associated with the operation of the BRT facility. Please refer to **Section 5.2** for details regarding spills prevention and management.

Significance

As discussed above, there is potential for effects on contaminated sites during construction and potential for waste impacts to land during operations and maintenance. With the implementation

of the above noted mitigation measures and commitments to future work potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.6 Groundwater

Areas of potential groundwater susceptibility have been identified based on a review of available secondary source information, and are shown on **Figure 5.1.1.6-1** and **Figure 5.1.1.6-2**.

Potential Construction Effects, Mitigation and Commitments to Future Work

The following provides details regarding groundwater interference/interception that may be a result of the construction works.

BRT West

Based on Preliminary Design drawings, the average depth of cuts required to accommodate the BRT West is between 1.5 m and 2.5 m. Based on known groundwater depths recorded for water wells within the study area (BRT West and BRT East) the average depth to groundwater ranges from approximately 11 m bgs to 21 m bgs, which is well below the expected depth of cuts required. No supplemental evidence indicating shallow groundwater was uncovered during this study, though it is possible that shallow, discontinuous groundwater zones could be intercepted during construction. Therefore, no potential adverse effect to groundwater are anticipated.

BRT East

The average depth of cuts required to accommodate the BRT East is between 4 m and 11 m. Based on known groundwater depths recorded for water wells within the study area (BRT West and BRT East) the average depth to groundwater ranges from approximately 11 m bgs to 21 m bgs, which is at or below the expected depth of cuts required. No supplemental evidence of shallow groundwater was uncovered though it is possible that shallow, discontinuous groundwater zones could be intercepted during construction. This is most probable in the vicinity of the more notable surface watercourse such as Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek, where vertical hydraulic gradients may increase. The following three areas have the greatest potential for groundwater interception during construction:

- Vicinity of Cooksville Creek near Hurontario Street;
- Vicinity of Little Etobicoke Creek east of Tomken Road; and
- Vicinity of Etobicoke Creek near Spectrum Way.

MISSISSAUGA BRT PROJECT
No.: 177-R-06

AREAS OF POTENTIAL GROUNDWATER SUSCEPTIBILITY

WEST SECTION

Legend

- > 15 m depth to water
- 5 m to 15 m depth to water
- 0 m to 5 m depth to water
- **Watercourse**
- **Waterbody**
- Area of Potential Groundwater Susceptibility
- **Study Area (50 m buffer)**

Source: Aerial Photograph provided by the City of Mississauga

ecoplans Limited

SCALE: 1:10,000

0 100 200 400 600 800
Meters

DATE: JULY 2008

DRAWN BY: K. GAYDON

PROJECT: 07-3272

CHECKED BY: N. LEVESQUE

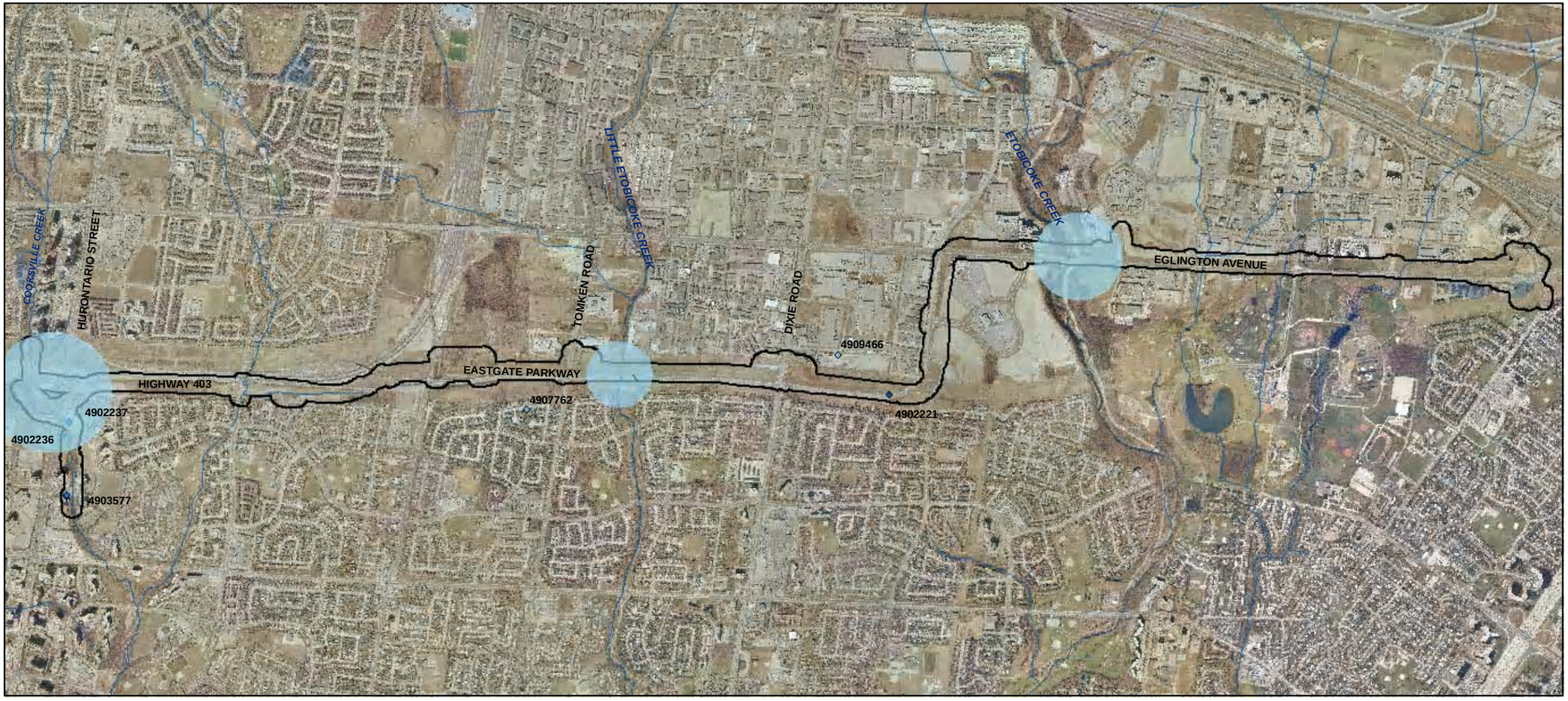
FIGURE No.

5.1.1.6-1

MISSISSAUGA BRT PROJECT
No.: 177-R-06

AREAS OF POTENTIAL GROUNDWATER SUSCEPTIBILITY

EAST SECTION



Legend

- 0 m to 5 m depth to water
- 5 m to 15 m depth to water
- > 15 m depth to water
- Watercourse
- Waterbody
- Study Area (50 m buffer)
- Area of Potential Groundwater Susceptibility

Source: Aerial Photograph provided by the City of Mississauga

ecoplans Limited

SCALE: 1:26,000

0 250 500 1,000 1,500 2,000

Meters

DATE: JULY 2008	DRAWN BY: K. GAYDON	FIGURE No.
PROJECT: 07-3272	CHECKED BY: N. LEVESQUE	5.1.1.6-2

Based on the water well records for the study area in combination with Preliminary Design drawings, three water wells may be directly impacted by improvements/construction activities:

- MOE Well 4902237 – north side of Sherwoodtown Boulevard and east of Hurontario Street;
- MOE Well 4902236 – south side of Sherwoodtown Boulevard and east of Hurontario Street; and
- MOE Well 4902221 – east of Eastgate Parkway and north of Copseholm Trail.

It is important to note that although there are records of water wells within the study area, the well locations and uses have not been confirmed at this time and it is possible that the wells are no longer present. In addition, given the availability of municipal water servicing it seems unlikely that any of the water wells are being used as a source of potable water. During Detail Design, these water wells will be verified in the field to determine their presence or absence and exact location, as the geographic coordinates supplied by the MOE may not be accurate or may contain a substantial degree of error (e.g. accurate to within 200 m). If these wells are confirmed to be located within construction zones they will be decommissioned in accordance with Ontario Regulation 903 under the *Ontario Water Resources Act* (OWRA). If they are still in use (by businesses or private owners) an alternate source of water will be provided to those owners. Consideration will also be given to potential indirect effects to any water wells and appropriate mitigation will be developed as warranted. During Detail Design Transport Canada and Infrastructure Canada will be provided with an update regarding the existence and use of water wells and any additional mitigation measures that are identified towards ensuring that water wells and water well use are not adversely affected by the project.

It should be noted that any water taking in Ontario that exceeds 50,000 litres/day requires a Permit to Take Water (PTTW) from the Ministry of the Environment (MOE). This could be either for consumptive use (e.g. dust control, compaction, hydro-demolition, etc.) or non-consumptive use (e.g. dam and pump operation for culvert replacement, stream diversion, excavation dewatering, etc.).

Water takings in Ontario are governed by the OWRA and the Water Taking and Transfer Regulation (O.Reg. 387/04). There are three PTTW categories as stipulated under O.Reg 387/04 based on the potential adverse risk that the water taking may pose on the natural environment, groundwater users, and existing permit holders in the area of water taking. There are also various technical requirements and assessments required for the different categories, in addition to whether the water taking is from surface water, groundwater, or both.

Construction activities associated with the project such as culvert works, road improvements and in-or-near stream modifications/diversions have the potential to affect shallow groundwater and surface water resources within the study area. As a result, it is possible that a PTTW will be required for one or more components of the construction works. During Detail Design the PTTW requirements for the construction works will be identified in consultation with the MOE.

All PTTW applications and supporting documents will be prepared and signed by a Qualified Person in accordance with MOE requirements.

In addition to any mitigation developed as part of the PTTW process, construction mitigation measures will be implemented to control the release of debris from construction activities, and fabrication and landscaping activities from potentially adversely effecting the environment. These measures are outlined in **Section 5.2**.

Potential Operation and Maintenance Effects and Mitigation

Potential effects to groundwater during operation and maintenance of the BRT facility are anticipated to be limited to potential effects associated with spills and potential changes to local water quality and quantity. Please refer to **Section 5.2** for additional details regarding spills prevention and management. Please refer to **Section 5.1.1.7** for details regarding stormwater management.

Significance

As discussed above, there is potential for effects on groundwater during construction, operation and maintenance. With the implementation of the above noted mitigation measures and commitments to future work potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.7 Stormwater Management

Potential Construction Effects

The following provides an overview of the hydraulic and stormwater management criteria for this project. Standard measures to prevent erosion and sedimentation will be implemented during construction. TRCA and CVC will be consulted with as necessary during Detail Design regarding the placement of fill and any associated requirements for permits.

Hydraulic Criteria

The drainage system for the Mississauga BRT will be designed based on the *MTO Highway Drainage Design Standards* (MTO 2008) for a freeway. As such, the design criteria for the Preliminary Design are as follows:

- Minor system to be designed for the 10 year event;
- Major system to be designed for the 100 year event;

- Either an overland flow route (swale, ditch or realigned watercourse) or a storm sewer shall convey external runoff from the point of interception to the receiving watercourse. The capacity of this flow route shall be sufficient to convey the major system design flow; and
- Minimum culvert sizes are as follows:
  - 800 mm minimum diameter for circular culverts;
  - 800 mm minimum rise for elliptical or arch culverts; and
  - 900 mm minimum rise for box culverts.

The criteria identified above allow for the preliminary design of conveyance systems within and external to the BRT and preliminary sizing of stormwater management measures. At the Detail Design stage, additional criteria/standards identified within the *MTO Highway Drainage Design Standards* (MTO 2008) will be applied to complete the detailed design of the drainage system including but not limited to: storm sewer sizing, catchbasin spacing, bridge deck drainage, sag and spread analyses, and ditch and culvert sizing.

Stormwater Management Criteria

In consultation with CVC, TRCA, City of Mississauga, MTO, and available documentation, design criteria for the stormwater management strategy have been established. These criteria include:

- Provision of post-to-pre water quantity control for the 2 year to 100 year storm events for all runoff discharged to the Highway 403 drainage system, municipal sewers, Cooksville Creek and Little Etobicoke Creek;
- Provision of Enhanced water quality control (i.e., 80% long-term removal of suspended solids), as identified in Table 3.2 of the MOE *Stormwater Management Planning and Design Manual* (MOE 2003), for runoff from all new development; and
- Provision of 48 hour detention time (or the maximum possible) of the 25 mm event for erosion control for runoff within the jurisdiction of the TRCA.

The future conditions drainage mosaics are depicted in **Appendix C**.

The following is a brief description of the stormwater management plan for the project.

BRT West

The stormwater management plan for the west segment of the BRT project relies on three existing outlets:

1. twin 1200 mm diameter pipes (Outlet 1A) and twin 2590 mm diameter trunk sewer (Outlet 1B);
2. twin 2400 mm diameter pipes east of Glen Erin Drive; and
3. culvert at Erin Mills Parkway.

The same three outlets will be utilized under proposed drainage conditions and the existing drainage regime will not be greatly altered under proposed conditions. Existing peak flow rates at each outlet will not be exceeded under proposed conditions. Enhanced water quality control will be provided for all new development.

Construction of BRT West will require installation of nine new culverts and relocation of several ditches to maintain existing drainage across the BRT and the Highway 403 interchanges at Winston Churchill Boulevard and Erin Mills Parkway.

The design will include:

- on-site controls such as parking lot storage, to minimize the land requirement of stormwater management facilities;
- oil grit separators used in combination with flat bottom grass swales to provide a treatment train and ensure that enhanced water quality control is provided;
- at the Detail Design stage, catchbasin spacing and storm sewer sizing within the BRT be designed in accordance with the MTO Highway Drainage Design Standards; and
- sizing of each of the new culverts will be re-examined at the final design stage as parking lot grading may require that additional flow be directed to some of them.

BRT East

Nine outlets (numbered 4 to 12) have been identified under existing drainage conditions within the BRT East area including:

1. Outlet 4 – Twin 1850 x 1000mm CSPA and Municipal Sewer;
2. Outlet 5 – Central Parkway Municipal Sewer and East Branch of Cooksville Creek;
3. Outlet 6 – MTO Highway 403 Stormwater Management Facility 5 - (MTO Pond 5);
4. Outlet 7 – Intermittent Drainage Channel and Municipal Sewer;
5. Outlet 8 – Little Etobicoke Creek West;
6. Outlet 9 – Little Etobicoke Creek East;
7. Outlet 10 – Eastgate Trunk Sewer;
8. Outlet 11 – Etobicoke Creek West; and
9. Outlet 12 – Etobicoke Creek East

The same nine outlets will be utilized under proposed drainage conditions and the existing drainage regime will not be greatly altered under proposed conditions. Existing peak flow rates to each outlet will not be exceeded under proposed conditions except at Outlet 11 where no water quantity control is required.

Existing peak flow rates to the wet pockets on either side of Little Etobicoke Creek will not increase under proposed conditions. Runoff volumes to the wet pockets on either side of Little Etobicoke Creek will increase under proposed conditions; however, measures can be taken to prevent this increase if required.

Enhanced water quality control will be provided for all new development.

Construction will require installation of eight new culverts and relocation of several ditches to maintain existing drainage characteristics.

The existing MTO Pond 5 (Outlet 6) will be utilized to provide enhanced water quality control and quantity control for BRT runoff directed to Outlet 6. The existing facility must be lengthened by approximately 35 m to accommodate the additional flow. MTO is aware of the proposed use of Pond 5 and is currently reviewing the stormwater management plan. In the event that approval by MTO is not provided for this plan, alternative measures for providing the required enhanced water quality control and post-to-pre water quantity control (e.g. oil and grit separators and/or enhanced grassed swales and surface and/or underground attenuation storage) will be implemented upstream of Outlet 6.

Water quantity control for the BRT corridor and its associated parking areas and stations will be provided by a combination of pipe, ditch, pond and parking lot storage. Water quality control for the BRT corridor and its associated parking areas and stations will be provided by a combination of stormwater management basins, flat bottom grass swales and oil and grit separators.

The extension of the Little Etobicoke Creek and Etobicoke Creek crossing structures will have a negligible impact on flood levels during the 100 year and Regional storm events.

Potential Construction Effects, Mitigation and Commitments to Future Work

It is critical that the system perform as designed and in a reliable, consistent manner. The City of Mississauga has vast experience in managing and operating stormwater management systems, and the BRT-related improvements will be absorbed within the overall municipal program. The management of the construction process and the addition of new or revised system elements will focus on avoiding disruption to the existing system, again using experienced contractors and close oversight by the proponent, working closely with the appropriate Conservation Authority (i.e. CVC or TRCA) and local property owners (e.g. MTO).

Potential Operation and Maintenance Effects, Mitigation and Commitments to Future Work

Once the BRT facility is operational, there will be no special ongoing operational or maintenance effects on the stormwater management / drainage system. The new culverts, pipes, and expanded ponds / ditches will be added to the inventory of such structures in Mississauga and will follow conventional inspection, maintenance and rehabilitation schedules.

Significance

The stormwater management and drainage system for the Mississauga BRT project is notable, not only for the busway itself, but for all the roads and properties within the catchment area. Revisions to the existing system afford the opportunity to enhance its performance and bring it up-to-date using current standards. With the implementation of the above noted mitigation measures and commitments to future work potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.1.8 Noise

A detailed noise assessment was undertaken in 1991 as part of the provincial Environmental Assessment process and is documented in Appendix N of the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992). Portions of the assessment were later updated based on design revisions. Those noise assessment updates were documented in Appendix C of the Mississauga Transitway Environmental Assessment Addendum (City of Mississauga 2004). It should be noted that the 2004 noise assessment works were only completed for select portions of the BRT facility where alignment revisions were proposed. None of the assessed areas included as part of the 2004 noise assessments are included in the works being assessed under this *CEAA* Screening (i.e. BRT East and BRT West).

Relevant information from the 1991 noise assessment is documented below and a copy of relevant noise assessment documentation can be found in **Appendix D**. The 1991 noise assessment included predicted future sound levels to the year 2021. The existing sound environment is typical of an urban/suburban setting. Although the noise assessment work is dated the information is still valuable as the previous noise assessment work considered potential noise effects associate with foreseeable future developments many of which have since been built. In addition, they type and scale of the proposed project is similar. As discussed later in this section, an updated noise analysis will be completed and submitted to the Ontario Ministry of the Environment, Transport Canada and Infrastructure Canada as part of the Preliminary Design phase. The Responsible Authorities will determine if further Federal Authority review is required. Please refer to **Table 5.1.1.8-3** for a sample comparison of findings in the vicinity of Radisson Court from the 1991 noise assessment and the draft updated noise assessment.

Noise Assessment - 1991

The following provides an overview of the findings from the 1991 noise assessment. It should be noted that the 1991 noise assessment was completed for the entire length of the busway; however, the following summary is limited to the relevant assessment information for the works being assessed under this *CEAA* Screening (i.e. BRT East and BRT West).

The primary source of noise associated with the BRT system is bus operation along the busway as well as within the stations. Other sources of noise include automobile traffic within the designated parking lots. Noise emitted from the buses would be due to bus exhaust, engines, tire/ground interactions (dependent on bus sped and pavement type). Local ambient noise is predominately associated with local roadways and Highway 403.

The study area is currently a mix of "Residential (Low Density)", "Business Employment", "Parkway Belt West" and "Industrial". The BRT alignment is generally found within the Parkway Belt West which is an undeveloped area with the exception a variety of public infrastructure (highways, hydro transmission mains, pipelines, etc.). As a result, the majority of the BRT alignment is "buffered" from adjacent land uses by the Parkway Belt West.

The closest sensitive receptors are residences along Colombo Crescent and Radisson Crescent which are to the north of the Winston Churchill Station and the Erin Mills Station respectively. The property lines of those properties are approximately 15m from the north side of the stations. There are no other sensitive receptors (e.g. hospitals, daycares, seniors residences) in such close proximity to the alignment. Other areas were residential uses are in close proximity include areas to the north side of the alignment from Winston Churchill Boulevard to Erin Mills Parkway and to the south side of the alignment from Hurontario Street to Cawthra Road. Additional details regarding land use are provided in **Sections 4.2.1** and **4.2.2**.

The traffic noise prediction model used for the 1991 noise assessment (see **Appendix D**) between stations was ORNAMENT. The computerized version of the model use for that assessment was STAMSON 3.0. In order to assess the worst-case scenario, the volume of buses was taken to be 125 per hours per direction, a figure likely only to be achieved in specific segments in the very long-term, if ever.

The primary sources of noise within bus stations are acceleration, deceleration, idling and general movement of buses. Such activities generate different peak sound levels and the time or duration of the event may be different. As the ORNAMENT model could not address such a complex evaluation, sound levels due to bus activities within the stations were calculated using computer programs developed by the noise specialist (S.S. Wilson and Associates). Please refer to **Appendix D** for additional details regarding those programs.

An important component of the noise assessment was traffic due to vehicular movements on the major roadways (e.g. Highway 403, Eglinton Avenue, etc.) in the study area. Roadway vehicular traffic is a notable element of the local ambient sound. Roadway vehicular traffic was assessed using the ORNAMENT model and was based on roadway and traffic data available at the time of assessment.

The results of the 1991 noise assessment were based on examination of the average hourly bus movements during the daytime against the average ambient due to traffic represented by the 16 hour (7:00a.m. to 11:00p.m.) descriptor (Leq16) and the 8 hour (11:00p.m. to 7:00a.m.) night-time descriptor (Leq8).

For the purpose of the assessment, several receptor locations (62 in total) were selected to represent the closest points of reception to both the busway and the stations. In addition, many of the select receptors were located further away from the arterial roads in order to provide a more conservative approach in calculating the ambient sound levels while still keeping the distance as close as possible to the busway. Receptor elevations were considered as a typical second storey level in a dwelling unit when calculating the station sound levels since less ground attenuation would be included in the calculation of the sound propagations factors. The receptor locations are depicted in **Appendix D**.

Table 5.1.1.8-1 and **Table 5.1.1.8-2** summarizes the results of the 1991 noise assessment. The receptors documented in those tables represent the worst-case receptors in the various sections. All predictions were made for the year 2021 and considered potential noise effects associate with foreseeable future developments many of which have since been built. The results presented in these tables are based on the 16 hour (7:00a.m. to 11:00p.m.) daytime descriptor (Leq16) as the BRT is most active during that time and represents a relatively higher noise impact when compared to the night-time descriptor (Leq8). The predicted sound environment in 2021 without the BRT was found to be typical of an urban/suburban setting with Leq16 ranging from 46 to 67 dBA. The results of 1991 noise assessment indicated that in no instance is the operation of the Mississauga BRT (i.e. BRT East, BRT West) anticipated to result in noise levels exceeding the ambient by an amount requiring consideration of mitigation (i.e. >5dB).

Table 5.1.1.8-1 1991 Noise Assessment - Predicted Sound Levels Due to Busway Traffic, Worst-Case Receptor[1]

Link From To	Receptor	Predicted Sound Levels in 2021 (dBA)			Excess Over Future Ambient Sound Levels (dB)	Mitigation
		Future Ambient[2] (Do Nothing)	**Transitway Traffic**	**Total Combined Sound Levels[3]**		
Winston Churchill Glen Erin	A5	62	54	63	+1	Not required
Glen Erin Erin Mills	A11	57	54	59	+2	Not required
Hurontario Central Parkway	B6	67	62	68	+1	Not required
Central Parkway Cawthra	B11	62	56	63	+1	Not required
Cawthra Tomken	B14	58	45	58	0	Not required
Tomken Dixie	C3	48	52	53	+5	Not required
Dixie Fieldgate	C7	49	49	52	+3	Not required
Fieldgate Spectrum/Satellite++	Typical Receptor	61	53	62	+1	Not required
Spectrum/Satellite Orbitor/Renforth++	Typical Receptor	61	53	62	+1	Not required

[1] Sound Levels predicted at receiver locations in the vicinity of the proposed busway with no impact from stations activities. All results represent the daytime descriptor (Leq16)
[2] Future ambient sound levels are due to vehicular traffic on Highway 403 and local roads.
[3] Total Combined Sound Levels refers to future ambient sound levels combined with and busway traffic sound levels.
++ Along Eglinton Avenue

Table 5.1.1.8-2 1991 Noise Assessment - Predicted Sound Levels at the Stations, Worst-Case Receptors [1]

Location/Station	Predicted Sound Levels in 2021 (dBA)				Excess Over future Ambient Sound Levels (dB)	Mitigation[5]
	Future Ambient[2] (Do Nothing)	**Stations Activities[3]**	**Transitway Traffic**	**Total Combined Sound Levels[4]**		
Winston Churchill	60	54	53	62	+2	Not required
Glen Erin (North Alignment)	62	57	52	64	+2	Not required
Central Parkway	63	56	60	65	+2	Not required
Cawthra	53	45	45	54	+1	Not required
Tomken	56	51	51	58	+2	Not required
Dixie	56	52	49	58	+2	Not required
Fieldgate*	45	46	46	50	+5*	Not required
Spectrum/Satellite	64	61	53	66	+2	Not required
Orbitor/Explorer	64	61	53	66	+2	Not required
Renforth	63	54	N/A	64	+1	Not required

[1] Sound levels predicted at receptor locations in the vicinity of the stations. All results represent the daytime descriptor (Leq16)
[2] Future ambient sound levels are due to vehicular traffic on Highway 403 and local roads.
[3] Station activities include buses entering into, exiting from, manoeuvring and idling within the station boundaries as well as cars entering into, existing from and idling within the Kiss & Ride and Park & Ride Facilities (where applicable).
[4] Total Combined Sound Levels refers to future ambient sound levels combined with both station activities sound levels and busway traffic sound levels.
[5] Consideration of mitigation required if >5dBA
* Worst-case location (of four alignment alternatives). The preferred alternative represents a notable reduction in potential noise effects at the receptor site (i.e. <5dB increase)
Note: At the time of the assessment the Hurontario bus layover was not assessed as the layout and design and the surrounding land development were not complete/available at that time.

Commitment to Future Work – Updated Noise Assessment

In addition to the mitigation measures outlined below, the City of Mississauga is committed to completing an updated noise assessment prior to the completion of Preliminary Design. The updated noise assessment will reflect current design plans, land use, and will assess noise associated with the vehicles proposed to be used along the busway. The updated noise assessment will be provided to Transport Canada, Infrastructure Canada and the Ontario Ministry of the Environment for review. The Responsible Authorities will determine if further Federal Authority review is required.

The general approach to undertaking the updated noise assessment is outlined in **Appendix D**.

As previously mentioned, the 1991 noise assessment does provide a good baseline understanding of potential effects as it considered the potential noise effects on existing and planned future developments (many of which are now built). In addition, the assumptions made about the operational characteristics of the busway and future traffic conditions on adjacent facilities are similar to the current assessment. Some preliminary results from the current assessment are available. **Table 5.1.1.8-3** provides a sample comparison of findings in the vicinity of Radisson Court from the 1991 noise assessment and the draft updated noise assessment. Radisson Court has been selected as it represents one of the receptors that is located the closest to the BRT facilities.

Table 5.1.1.8-3 Comparison of Noise Assessment Findings for a Receptor at Radisson Court

Measurement for Receptor at Radisson Court	1991 Noise Assessment[1]	Draft Updated Noise Assessment[2]	Difference
Future Sound Level Without the BRT	61 dBA	60.6 dBA	Marginal difference (0.4 dBA) between the two estimates, especially when considering rounding used in 1991.
Future Sound Level With the BRT	62 dBA	60.8 dBA	Marginal difference (1.2 dBA) between the two estimates. The updated noise assessment predicts a lower future sound level.
Difference Between Future Sound Levels (With Minus Without)	+1dBA	+0.2 dBA	Marginal difference (0.8 dBA) between the two estimates. The updated noise assessment predicts a lower future sound level.

[1] Receptor A12
[2] Receptor Rw12

It is possible that the updated noise assessment will identify potential noise effects that will warrant a review of the application of noise mitigation measures. Should mitigation be warranted the updated noise assessment will include a review of appropriate noise control measures with consideration given to the technical, administrative and economic feasibility of the various alternatives.

Construction Noise

Worst-case construction noise levels have the potential to be very loud during some short periods of time. However, noise effects from construction are relatively short compared to operational noise effects, and therefore, they are usually better tolerated by the community at large. As previously noted, the closest sensitive receptors are residences along Colombo Crescent and Radisson Crescent which are to the north of the Winston Churchill Station and the Erin Mills Station respectively. The property lines of those properties are approximately 15m from the north side of the stations. There are no other sensitive receptors (e.g. hospitals, daycares, seniors residences) in such close proximity to the alignment. Most receptors are located at least 50m from the busway..

Heavy construction (e.g. earthmoving, grading, excavation, structures, paving, etc.) in any one segment of the project is anticipated to be limited to one construction season (typically April to November). Minor follow-up work (e.g. landscaping, electrical, station fitout, etc.) could occur in a second season. Construction work for the project as a whole will be spread out over the 2009 – 2013 period.

Table 5.1.1.8-4 provides an overview of typical construction equipment sound levels.

Table 5.1.1.8-4 Typical Construction Equipment Sound Levels

EQUIPMENT DESCRIPTION	SOUND LEVEL dBA at 15 m Reference Distance
Idling Truck	73
Trucks Unloading	78
Truck Movement	83
Bulldozer	85
Front End Loader	85
Chain Saw	78
Scraper	88
Roller	80
Backhoe	85
Crane	83
Diesel Generator	78

EQUIPMENT DESCRIPTION	SOUND LEVEL dBA at 15 m Reference Distance
Grader	85
Compactor	74
Curb Machine	89
Concrete Truck (Unloading)	73
Cable Trencher	85
Asphalt Machine	74
Jack Hammer	85
Compressor	85

With the application of the following noise mitigation, it is not anticipated that there will be significant adverse noise effects during construction:

- Restricting noisy activities to daytime hours where possible;
- Limiting general construction to the time periods outlined in the City of Mississauga's Noise Control By-law which limits the times during which construction equipment can be operated. If construction activities are required outside of these hours, exemptions will be sought in advance by the Contractor, directly from the City of Mississauga. Exemption will only be sought for works that will not produce substantial noise. For example, exemptions will not be sought for noisy activities such as blasting or pile driving; and
- Implementing the noise control procedures during construction.

To minimize the potential for construction noise effects, the following provisions will be written into the contract documentation for the contractor.

- General construction will be limited to the time periods outlined in the City of Mississauga's Noise Control By-law which limits the times during which construction equipment can be operated. If construction activities are required outside of these hours, exemptions will be sought in advance by the Contractor, directly from the City of Mississauga. Exemption will only be sought for works that will not produce substantial noise. For example, exemptions will not be sought for noisy activities such as blasting or pile driving.
- There will be explicit indication that contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws will be the responsibility of the City of Mississauga for all work done by contractors.
- All equipment will be properly maintained to limit noise emissions in compliance with MOE NPC-115 guidelines. As such, all construction equipment will be operated with effective muffling devices that are in good working order.
- The contract documents will contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect.
- In the presence of persistent noise complaints, all construction equipment will be verified to comply with MOE NPC-115 guidelines.

- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.
- Construction mitigation alternatives include but are not limited to:
  - Re-scheduling of noisy operations to daytime hours, where possible;
  - Use of alternate, quieter equipment or methods, where available; and
  - The use of portable, localized noise barriers for critical areas.
- A monitoring program will be implemented to monitor for potential effects due to construction noise. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design. MOE will be consulted as necessary in the development of the program.
- Noise monitoring reports will be submitted to Transport Canada and Infrastructure Canada at appropriate intervals during construction.

Operational Noise

Although mitigation measures were not deemed to be warranted, the 1991 noise assessment did indicate that efforts should be made to reduce noise through design. In addition, it was recommended that consideration be given to the provision of visual barriers or screens in the vicinity of residential areas. If implemented, these measures could improve both the noise perceived at the nearby receptor, by the transit system riders and by any bystanders.

Opportunities to reduce operational noise effects through design will be identified and reviewed during Detail Design. In addition, in accordance with the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992) the City of Mississauga is committed to ensuring that noise levels are monitored prior to and during the operation of the busway. The noise monitoring program requirements will be identified during Detail Design and MOE will be consulted as necessary in the development of the program. It is possible that the monitoring may identify noise effects that will warrant a review of the application of new or modified noise mitigation measures. Should additional mitigation be warranted a review of appropriate noise control measures will be completed with consideration given to the technical, administrative and economic feasibility of the various mitigation alternatives.

It is also worth noting that an earth berm of varying height (up to 5 m) is located intermittently along the south side of the Parkway Belt between Hurontario Street and Fieldgate Road, to protect adjacent single family residences from the noise and visual impact of existing roads (Highway 403, Eastgate Parkway). The berms to the east and west sides of Tomken Road, south of Eastgate Parkway, will be expanded to provide additional screening to adjacent residences towards mitigating indirect aesthetic effects of the project. To the east of Tomken Road, the base of the existing berm will be extended southerly by approximately 25m between

Tomken Road and Little Etobicoke Creek, resulting in a footprint increase in the order of 4,750m^2 for the berm. To the west of Tomken Road, the berm will be extended southerly to approximately 30m north of the private property line, resulting in a footprint increase of approximately 21,400m^2 for the berm.

Maintenance Noise

Worst-case maintenance noise levels have the potential to be very loud during some short periods of time. However, noise effects from maintenance activities are relatively short compared to operational noise effects, and therefore, they are usually better tolerated by the community at large.

With the application of the below noted noise mitigation, it is not anticipated that there will be significant potential noise effects during future maintenance activities:

- Restricting noisy activities to daytime hours where possible; and
- Adhering to the City of Mississauga's Noise Control By-law and seeking and obtaining exemptions as warranted. Exemption will only be sought for works that will not produce substantial noise.

Significance – Construction Noise

Noise effects resulting from construction are anticipated to be relatively short-term in duration and with the implementation of the mitigation measures and best management practices disturbances can be minimized. As a result, no significant adverse environmental effects or significant residual effects are anticipated during construction.

Please refer to **Table 5.6-1** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

Significance – Operation Noise

Noise effects resulting from operations are not anticipated to be significant and, as previously discussed, mitigation is not warranted. Although mitigation is not warranted opportunities to reduce noise (e.g. berming, use of sound-absorptive materials) will be explored during Detail Design. In addition, the City of Mississauga is committed to ensuring that noise levels are monitored prior to and during the operation of the busway. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design. MOE will be consulted as necessary in the development of the program.

Please refer to **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

Significance – Maintenance Noise

Noise effects resulting from maintenance are anticipated to be relatively short-term in duration and with the implementation of the mitigation measures and best management practices disturbances can be minimized. As a result, no significant adverse environmental effects or significant residual effects are anticipated during maintenance activities.

Please refer to **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.2 Other Factors of Interest to the Federal Government

5.1.2.1 Health and Wellbeing

Potential Construction, Operation and Maintenance Effects and Mitigation

As noted in **Section 5.1.1.4** and **Section 5.1.1.8**, with the implementation of identified mitigation measures this project will not result in significant or residual adverse effects to air quality or noise during the construction, operation or maintenance of the project. In fact, this project will likely result in benefits to air quality and will assist the City of Mississauga in meeting the goals and objectives set out in their Official Plan (City of Mississauga 2005) and in particular the goals and objectives associated with developing a more sustainable transportation network. Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

It is also worth noting that a fence will separate the project from all adjacent private lands.

Given that this project will assist the City of Mississauga in meeting goals and objectives outlined in the City's Official Plan (City of Mississauga 2005) and will not result in any significant noise or air quality effects, it can be concluded that this project will not result in adverse effects to human health and will likely result in some benefits. In addition, the BRT system will benefit both the people that use it, and the City and Region in general.

The following lists are based on the City of Mississauga's *Backgrounder on Mississauga's BRT* (City of Mississauga 2008).

The BRT will make riders' travel better through:

- *Increased reliability*: trips will be less likely to be affected by traffic congestion, so riders get where they need to go on time;
- *Reduced travel time*: trips will be faster in relation to both current transit options and automobile travel, so riders will spend less time commuting and more time doing the things they want to do;
- *Greater convenience*: improved security, protection from the elements and improved service

information mean a more comfortable ride; and
- *Greater accessibility*: more transit means better options for those without access to a car.

The BRT will enhance Mississauga and the surrounding communities through:
- *Increased capacity*: Mississauga will be able to move significantly more people without having to add to the costly public road network;
- *Reduced automobile traffic*: the BRT system is projected to divert thousands of riders a day from private automobiles to higher-order transit, reducing automobile traffic significantly during high-volume periods;
- *Reduced emissions*: with vehicle emissions contributing significantly to climate change; reduced traffic means better air for everyone;
- *Increased density*: the BRT will support increased intensity and density of development along the corridor through Mississauga and the Greater Toronto Area, supporting the healthy growth of residential and employment centres; and
- *Increased safety*: public transit is the safest form of transportation, with the rates of injury or death due to accident significantly lower for public transit versus private automobile.

Significance

As discussed above, no adverse environmental effects are anticipated from a health and wellbeing perspective and in general the effects, including any residual effects, are anticipated to positively influence health and wellbeing.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.2.2 Archaeology and Heritage

5.1.2.2.1 Archaeology

Potential Construction Effects, Mitigation and Commitments to Future Work

As noted in **Section 4.2.4.1**, a Stage 1 Archaeological Assessment of the corridor has been undertaken. The purpose of this investigation was to identify areas of archaeological concern and identify any additional archaeological assessments that will be required prior to construction. Given the historical use of the area and fallow condition of the corridor, it was determined that the majority of the corridor will require a Stage 2 Archaeological Assessment. The areas requiring further assessment include areas that have not been previously disturbed within BRT East as noted on figures in **Appendix G**.

Discussions are ongoing with property owners regarding permissions to enter property to complete the Stage 2 Archaeological Assessment. The exact schedule for completion of the Stage 2 Archaeological Assessment work is unknown as it is subject to field conditions and

property access; however, the assessment will be completed as soon as possible during Detail Design.

The following outlines the mitigation and commitments to future work required to mitigate potential adverse environmental effects to archaeological resources:

- Undertake a Stage 2 Archaeological Assessment for works in the identified undisturbed areas. If archaeological finds are discovered, Stage 3-4 mitigation will be undertaken as required in accordance with the guidelines and policies of the Ministry of Culture. Consultation will occur with the Ontario Ministry of Culture and, if applicable, potentially interested First Nations to discussion mitigation strategies if sites are found as part of the Stage 2 Assessments. Copies of the Stage 2 Archaeological Assessments will be provided to Transport Canada and Infrastructure Canada for their review.
- Submit any additional Archaeological Assessments a minimum of 90 days prior to construction to the Ministry of Culture.
- Should buried archaeological deposits be found along any section of the corridor during construction activities, the Ministry of Culture and any relevant First Nations will be notified immediately.
- In the event that human remains are encountered during construction activities the Ministry of Culture, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations, the Peel Regional Police and any relevant First Nations will be notified immediately.

As noted above, the commitment has been made to complete all necessary archaeological assessments towards ensuring that the proposed works do not result in any significant adverse effects. The following provides a description of Stage 2, 3 and 4 Archaeological Assessments.

Stage 2 Archaeological Assessment: This stage covers the initial field assessment of the identified undisturbed areas. The areas will be assessed by employing a test pit survey strategy, with all transects spaced at a 5 metre interval or by ploughing the subject properties and walking the ploughed fields to observe. Ploughing will be the preferred approach to assessment. A test pit survey will only be employed where site conditions or conditions of property access do not allow for ploughing. When employing the test pit survey strategy, all topsoil from each 30 cm pit will be sieved through ¼" mesh hardware cloth. If any artifacts are located, their position will be recorded and they will be collected.

Stage 3 Archaeological Assessment: This covers the archaeological testing of any sites located during the Stage 2 assessment. Stage 3 is used to determine if sites are significant and whether they require further work.

Stage 4 Archaeological Assessment: Any sites deemed to be significant during the Stage 3 assessment will require Stage 4 mitigation. Mitigation can include either excavation or avoidance.

Potential Operational and Maintenance Effects

No adverse environmental effects to archaeological resources are anticipated during the operation and maintenance phase of the project as no additional land will be impacted.

Significance

The potential for archaeological finds in areas of construction exists at some relatively undisturbed sites. With the implementation of the above noted mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.2.2.2 Heritage

Potential Effects, Mitigation and Significance

As noted in **Section 4.2.4.2**, there are no known built heritage features within the Mississauga BRT corridor. As a result, no mitigation is proposed, no significant adverse effects are anticipated and no significant residual effects will occur.

5.1.2.3 Navigability

Approvals under *Navigable Waters Protection Act* (*NWPA*) sections 5(1)(a), 6.(4), 16, and 20 trigger the need for an environmental assessment under the *CEAA*. However, environmental effects of the project on navigation are taken into consideration as part of the environmental assessment only when the effects are indirect, i.e. resulting from a change in the environment affecting navigation. Direct effects on navigation are not considered in the environmental assessment, but any measures necessary to mitigate direct effects will be included as conditions of the *NWPA* approval.

☐ Only direct effects were identified; therefore the effects of the project on navigation are not addressed in this environmental assessment.

☒ Indirect effects were identified and have been addressed in this environmental assessment.

As noted in **Section 4.2.6**, Transport Canada's Navigable Water Protection (NWP) Office has confirmed that within the study area Etobicoke Creek is the only navigable waterway for the purposes of the *NWPA* (see correspondence in **Appendix E**).

Potential Construction Effects, Mitigation and Commitments to Future Work

The widening of the Etobicoke Creek structure has been designed so as to maintain navigability. The widening of the Etobicoke Creek structure will be constructed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and people using the valley pathway below. As a result, potential adverse effects during and after construction are considered to be mitigated (approval under the *NWPA* will be required). The crossing of the Etobicoke Creek will require the following mitigation and commitment to future work:

- Apply to Transport Canada for approval under the *NWPA;*
- Consult with Transport Canada and the TRCA to finalize design, methodology and timing;
- Abide by all Conditions of Approval that may be identified in the approval under the *NWPA*; and
- Ensure debris does not fall into the water during construction.

It should be noted that all applications under the *NWPA* will be reviewed for its effect on navigation both temporary effects during construction and permanent effects following completion and during maintenance operations. Conditions of approval as necessary for the safety of navigation will be included in the *NWPA* approval and monitored and enforced by NWP Officers.

Operation and Maintenance Effects

No adverse effects are anticipated as the crossing will be designed to meet navigation requirements identified by Transport Canada.

Significance

As discussed above, all applicable structures have been designed to maintain navigable clearance. With application of the appropriate approval process and the implementation of appropriate mitigation measures potential adverse effects to navigation can be minimized and/or avoided during construction and operations and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.1.2.4 Pipelines

The presence of utilities and pipelines in particular is a guiding and constraining factor in the design and construction of the BRT project. The plans, profiles, structures, walls, and roadworks have all been adjusted during Preliminary Design in order to minimize effects on existing pipelines, both permanently and through the construction period.

The busway crosses pipelines in the following locations:

- West of Winston Churchill Boulevard: Enbridge gas (two north-south pipes)
- East of the Winston Churchill interchange: Sarnia Products and Sun Canadian lines (total of four pipes)
- Between Cawthra Road and Tomken Road: Trans-Northern Pipeline (two pipes)
- West of Fieldgate Drive: Enbridge gas, Enbridge oil, Sarnia Products, Sun Canadian, and Trans-Northern (total 8 pipes)

In all cases, the busway is at or above grade, and there is no pipeline relocation required. As outlined in **Section 4.2.8**, the design of the pipeline crossings requires pipeline owner agreement, but no NEB permits.

Stations and connecting ramps at Winston Churchill, Erin Mills, Tomken, and Dixie all involve BRT infrastructure in close proximity to existing buried pipelines. Avoiding the need to shift or otherwise affect pipelines is a key station design parameter, as is maintaining the ability for the pipeline owner to access, inspect, and maintain the pipeline without disrupting busway operations to an unacceptable degree. Ongoing liaison with the pipeline owners will occur through the Detail Design stage and all other stages as warranted.

Significance

The construction of the BRT facility, while requiring the crossing of some pipelines, is not anticipated to result in any significant adverse effects to the pipelines. The presence of the BRT facility is not expected to represent a significant adverse effect on the ability of pipeline owners in the corridor to carry out their regular operations and maintenance programs. As a result, no significant adverse effects are anticipated and no significant residual effects will occur.

Please refer to **Table 5.6-1** and **Table 5.6-2** for a summary of the significance of the potential environmental effects both prior to and following the application of mitigation.

5.2 ACCIDENTS AND MALFUNCTIONS

Accidents

Accidents that may occur during construction, operation, and maintenance of the facility are addressed by provincial legislation, policies, and procedures. One way to minimize the risk of accidents and the associated effects to the environment including, but not limited to, human health and wellbeing is to ensure that the BRT facility is used only by authorized, trained persons in a controlled and visible manner. Signage will be in place at all potential entry points to the busway and stations that clearly limits access to authorized vehicles and people only. Constant visual surveillance and camera monitoring will identify unauthorized users and staff will be sent to remove them. All maintenance staff / activities or any other use of the busway will need to be pre-authorized by the BRT operator.

Any BRT/motor vehicle or BRT/pedestrian/passenger accidents that occur will be immediately reported by the bus operator to the Peel Regional Police. The Peel Regional Police will be responsible for investigating the incident and for producing a formal accident report. The bus operators also have internal disciplinary procedures related to involvement in accidents or any other unsafe operational practice.

Over two decades of busway operating experience in Ottawa has demonstrated that accident rates on a facility such as is planned for Mississauga are significantly lower than for buses operating in general traffic on streets and highways. As a result of encouraging more of the travelling public onto transit and increasing the proportion of Mississauga Transit and GO Transit services that are able to operate out of general traffic conditions, the BRT project will improve passenger safety and operations and will reduce vehicular accidents within the project influenced area.

Vehicular accidents present the possibility of fuel spills to the environment and fire. Potential adverse effects associated with fuel spills will be address in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Potential adverse effects associated with fire will be address through the availability of fire suppressants, building sprinkler systems and rapid notification of, and response by, emergency services.

Spills

All precautions will be taken to avoid spills during construction and during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be

completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. In accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008), incidents that may result in possible contraventions of the City's Storm Sewer Bylaw will be referred to staff from the City's Transportation and Infrastructure Planning Division for investigation.

Within the City of Mississauga, Fire and Emergency Services and the Transportation and Works Department are able to provide and carry out a coordinated operational response to spills on a 24 hour basis. Both Fire and Emergency Services and Transportation and Works have available the necessary in-house and contracted material, equipment and personnel resources to provide a spill response. In particular, Fire and Emergency Services have a HAZMAT Team available to assist in spill incidents, while Transportation and Works have available an Emergency Response Vehicle that is stocked with supplies to handle minor spills. In addition, Transportation and Works have available on-call emergency spill response contractors.

During construction, measures will be implemented to control the release of debris from construction activities, fabrication and landscaping activities from entering watercourses. All fuels, oils, lubricants, paints, solvents, chemicals, etc. will be stored in clearly marked areas that have spill contingency plans in place. Any vehicle maintenance and fuelling will be carried out at the maintenance areas in the works facility or at commercial garages wherever possible. If refuelling of vehicles must occur on site, it will be carried out at a designated refuelling site where conditions will allow for the containment of any accidentally spilled fuel. Refuelling will not be permitted within 30 metres of any watercourse, 100 metres of any private wells or adjacent to sensitive areas. Refuelling will only be carried out by trained personnel. Furthermore vehicles will be maintained to minimize leaks and when detected, leaks will be repaired immediately. Care will be taken to prevent the release of fuel to the environment when refuelling small equipment in the field. The Contractor will be required to complete all works and spill response in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001) and have all necessary emergency equipment on site.

An example of a potential spill during construction is the potential for spill during the relocation of sewers. In particular, the Contractor will be required to ensure that the contents of stormwater and sanitary sewers are not released into the environment. As with all procedures, the Contractor will be required to make every effort to prevent a possible spill. Should a spill occur it will be addressed as outlined above.

If a spill does occur, the owner of the material or in control of the material is responsible for the spill. This person will take reasonable action to stop the spread of the spilled materials by blocking catch basins, digging trenches, creating dikes, and / or spreading absorbent materials.

If this person is unknown or unable to respond, and it is safe to do so, the Contractor shall follow the steps noted above. In all cases the MOE Spill Action Centre (1-800-268-6060), and the City of Mississauga and/or GO Transit (as appropriate) will be notified. If the spill occurs during construction the Contract Administrator will also be notified. Depending upon the nature of the accident or spill, different agencies and stakeholders will also need to be contacted. It is recognized that spill response depends on the cooperation of various participating agencies. Both local and regional municipalities, in conjunction with the Ministry of Environment and other agencies, may operate as a team in determining an appropriate level of response to a spill incident.

Clean-up and disposal of the spilled material is the responsibility of the owner or person having control of the material. If during construction another person does not take responsibility for clean-up, the Contract Administrator will be notified. Until determined otherwise, the Contractor will assume the overall responsibility for coordinating the clean-up of spilled material.

Potential spills during operation are anticipated to be primarily limited to the parking lot locations and maintenance facility. Potential for spills will generally come from gas or diesel powered passenger, delivery or maintenance vehicles. The potential contaminants include hydrocarbons (i.e. oil and gas) and detergents. Most maintenance activities (i.e. servicing and cleaning of vehicles) will be undertaken within buildings that will be designed to capture and contain contaminants prior to entering the local stormwater system.

The following mitigation measures will be implemented to minimize impacts of potential spills:

- Employee “Best Practices” for drainage design;
- Control areas of used for refuelling;
- Mandatory and immediate contact with the appropriate regulatory authorities (e.g. MOE Spills Action Centre, DFO) as appropriate;
- Immediate contact with spill clean-up contractors; and
- Monitor and record spill clean up and submit required reports.

Workplace Health and Safety

Workplace health and safety is addressed through provincial legislative requirements such as the *Occupational Health and Safety Act* and associated regulations.

5.3 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The *Canadian Environmental Assessment Act* requires the consideration of "any change to the project that may be caused by the environment". The primary environmental effect that may affect the Mississauga BRT Project is changes to rainfall patterns and quantity of rain. Flooding is a potential adverse effect of future rainfall. Potential effects resulting from flooding include, but may not be limited to increased sedimentation, erosion and contamination of waterbodies. Flooding has been addressed in the design of the facilities in accordance with Ministry of Transportation of Ontario Highway Drainage Design standards, and reflecting the 1992 Provincial Environmental Assessment (EA) and the 2004 Provincial EA Addendum, the current policies of the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation Authority (CVC), the City of Mississauga, Go Transit and MTO. The major drainage system components will be designed to manage a 100 year storm event (event statistically occurring once every 100 years). All minor system components (culverts) will be designed for the 10 year storm event. Given the rarity of a 100 year storm event, it is anticipated that the drainage and stormwater management system will effectively manage potential changes in rainfall patterns and quantity as a result of climate change. Additional details regarding stormwater management are provided in **Section 5.1.1.7**.

Many weather related events may potentially affect the Mississauga BRT Project. Severe snowstorms have the potential to result in operational impacts and damage to the facilities. Mitigation for snowfall is focused on effective snow removal. A snow removal program that maintains safe and efficient busway operation for vehicles and passengers will be developed and implemented by the facility operator. The snow removal plan will be developed with due consideration for potential effects to the surrounding environment (e.g. appropriate snow storage locations).

In the event of a tornado in the study corridor some infrastructure damage may be incurred as well as focused damage to the local landscape and habitat (e.g. vegetation damage, increased dust, etc.). Tornado events are generally temporary and the likelihood of such an event impacting the Mississauga BRT Project is remote. Accordingly, mitigation measures are limited to proper and regular maintenance programs. Although short-term operational effects may be realized, it is not anticipated that a tornado would result in any significant residual effects.

Although the City of Mississauga BRT Project is not located in an area prone to severe earthquake events, the possibility for a minor earthquake is always present. An earthquake has the potential to damage the facilities and affect operations (e.g. infrastructure damage and operational delays to allow for repairs). Mitigation measures are limited to proper and regular maintenance programs. Although short-term operational effects and facility damage may result from an earthquake, it is not anticipated that an earthquake would result in any significant residual effects.

Additional potential environmental effects include: severe ice, watercourse flooding, heat waves, smog alerts, fog and fire. Operating procedures, including proper facility maintenance and consideration of weather conditions warranting service suspension, will be developed during the implementation phase to address any potential operational impacts resulting from severe weather conditions.

The busway has several entry / exit ramps and sits within a grid of parallel and crossing roads that will allow stations or segments of the busway to be closed or restricted if necessary due to severe weather, with bus services rerouted to operate on roadways in general traffic or in temporary bus priority lanes. Similarly, parking facilities can be closed temporarily if necessary. The facility will be monitored at all times and decisions regarding operating procedures during periods of severe weather will follow protocols established by the City in consultation with GO Transit, the Ministry of Transportation, and emergency services.

In all cases, the safe operation of the BRT facility and implementation of appropriate measures to minimize/mitigate any adverse effects will be priorities. Necessary remedial actions (e.g. infrastructure repairs, re-vegetation of a disturbed slopes, etc.) will be undertaken in a timely manner and in accordance with all relevant legislation.

5.4 DECOMMISSIONING

Decommissioning is not applicable to the Mississauga BRT Project given that the facility is part of the City of Mississauga's long-term transportation vision and is considered permanent within the planning horizon (lifespan of the facilities). However, decommissioning of any project elements, if required, will be undertaken in accordance with applicable environmental regulations in place at that point in time.

5.5 CUMULATIVE EFFECTS

The *Canadian Environmental Assessment Act* requires an assessment of cumulative environmental effects. This assessment must consider the net environmental effects associated with the project in combination with the environmental effects of other past, present or reasonably foreseeable projects or activities to determine the potential for cumulative environmental effects. Cumulative effects can occur when there are residual environmental effects from the project that could combine with residual effects from other projects or activities that overlap in the same geographic area or occur over a common timeframe.

This section includes an assessment of cumulative effects considering those past, existing and reasonably foreseeable projects and activities, the effects of which have the potential to overlap in time and space with the environmental effects of the Mississauga BRT Project (construction and operation/maintenance phases).

5.5.1 Spatial and Temporal Boundaries

The spatial boundaries of the cumulative effects assessment extend approximately 4-5 km from the BRT Corridor with some projects being more regional in nature (e.g. Region of Peel Hanlan feedermain) and site-specific development applications being consider within approximately 0.5 km from the project. These spatial boundaries were selected, as it is believed that, given the urban nature of the study area, the boundaries are sufficient to provide a cumulative effects assessment that considers the potential effects while not diluting the effects by assessing an overly large area. The temporal boundaries of the assessment extend from the late 1960's when the study area started to transition from an agricultural area to a more developed urban area to approximately 8-10 years in the future (limited to reasonably foreseeable projects).

5.5.2 Likely Residual Effects of the Mississauga BRT Project

The predicted residual effects of the project have been outlined in column one of **Table 5.5-1** Cumulative Effects Assessment; these residual effects have been identified in more detail in **Section 5.1** and **Section 5.6**. Overall the potential residual environmental effects of the Mississauga BRT Project are anticipated to be relatively minor with the implementation of identified mitigation measures. The Mississauga BRT Project is expected to deliver a number of benefits including reduced traffic congestion and improved connections between communities.

5.5.3 Past, Present and Future Land Development and Infrastructure Projects

Table 5.5-1 outlines the Cumulative Effects Assessment for this project, column two specifically outlines the potential residual effects of the past, present and future projects that could interact cumulatively with the Mississauga BRT Project. Below are the past, present and future land development and infrastructure projects that were considered for the Cumulative Effects Assessment: Past and existing projects within the study area include:

- Construction of Highway 403 (construction completed in the early 1980s) and subsequent rehabilitation projects;
- Construction, rehabilitation and/or widening of local arterial and collector roads; and
- Construction of residential and commercial developments since the area transitioned from agricultural uses (see **Section 4.2.1** for existing land use information).

The planned projects within and adjacent to the study area include:

- Sawmill Creek Erosion Control south of Burnhamthorpe Road and behind Gazebo Court – construction anticipated to occur in 2013
- Mullet Creek erosion control upstream and downstream of Highway 403 – construction anticipated to occur in 2015
- Cooksville Creek erosion control – Highway 403 to Kingsbridge Garden Circle – construction anticipated to occur in 2015

- Cooksville Creek erosion control – Rathburn Road to Clarica Drive – construction anticipated to occur in 2014
- Rehabilitation of Neigbourhood 5D stormwater management facility #3601 located west of Highway 403 and north of Eglinton Avenue – construction anticipated to occur in 2010
- Rehabilitation of Eastgate Business Park stormwater management facility #2601A located north of the hydro corridor and west of Etobicoke Creek - construction anticipated to occur in 2010

Proposed developments within approximately 500m of the study area include:

- Region of Peel Recycling Facility – 1126 Fewster Drive
- Office and Warehouse – 1590 South Gateway
- Apartments and Townhouses – 1315 Bough Beeches Boulevard
- Office Buildings – 4701 Tahoe Boulevard
- Multi-Tenant Restaurant and Commercial Buildings – 4960, 4970, 4976 and 4980 Tahoe Boulevard
- Phase II of the Bell Canada Site Office Buildings – 5025 Creekbank Road
- Office Buildings – 5080 and 5040 Spectrum Way
- Office Buildings - 2950 Citation Place

Other projects that are known to potentially occur in or adjacent to the study area in the future include:

- Twinning of the existing Region of Peel Hanlan feedermain from the Lakeview Water Treatment Plant to the Hanlan Reservoir and Pumping Station (PS) in the City of Mississauga
- Roadworks along Burnhamthorpe Road East from Arista Way (just east of Hurontario Street) to Dixie Road
- Streetscaping along Burnhamthorpe Road between Grand Park Drive and Arista Way
- Widening of Cawthra Road from Burnhamthorpe Road East to Eastgate Parkway
- Implementation of higher-order transit along the Hurontario Major Transit Corridor along Hurontario Street between Lakeshore Road in Mississauga and Queen Street in Brampton (study commenced in May 2008)
- Implementation of higher-order transit along the Dundas Street Major Transit Corridor from the Toronto boundary in the east to the Oakville/Halton boundary in the west (study to commence in 2009)
- Works associated with the new City Centre Master Plan (study to commence in Fall 2008)

It is worth noting that the Ministry of Transportation does not have any plans (to 2011) for roadworks along Highway 403 in the vicinity of the study area (Ministry of Transportation 2007).

Based on a search of the Canadian Environmental Assessment Registry (search completed November 26, 2008) is believed that Transport Canada is not currently involved in any of the identified projects near or within the study area.

All of the projects outlined above were considered, or are being considered, within the context of the City of Mississauga's Official Plan (City of Mississauga 2005). The Official Plan was developed through a comprehensive planning exercise to identify strategies and policies in support of an integrated approach to planning for the economy, natural environment and the community. The Official Plan establishes the means for the City of Mississauga to achieve the following:

- Identification, protection and enhancement of natural forms, functions and linkages;
- Promotion of design which creates an interesting and satisfying built environment, and reflects the unique character of communities;
- Establishment of an urban form which is compact, efficient, comfortable and supportive of transit; and
- Continued application of sound financial practices.

5.5.4 Potential for Cumulative Effects

Please note, the past, existing and future projects discussed for the purpose of this Cumulative Effects Assessment support the planning vision of the City of Mississauga including maintaining the environmental integrity of the City of Mississauga and protecting key environmentally sensitive features.

Projects related to erosion control are being proposed to reduce sediment loading on watercourses in the area. The rehabilitation of the stormwater management facilities are being undertaken to include consideration of water quality, not just quantity (flood control). Therefore, both the erosion control projects and the stormwater facilities rehabilitation projects are being put in place to enhance the existing situations and protect the environment. These types of projects have a generally predictable range of environmental effects that will be responsive to standard mitigation measures and best management practices.

As earlier mentioned, the project area being considered for the Cumulative Effects Assessment is a relatively urbanized area. Therefore commercial, residential and future road development in the area will be occurring in an area that has already been disturbed by these types of development. That being said, minimal residual effects from these types of projects will still be experienced. Residual effects typically associated with these types of projects include increased stormwater run-off (e.g. increased paved areas), fringe effects to vegetation units, changes to watercourses (may include improvements), and minor and localized changes to air quality and noise. Overall, these types of projects have a generally predictable range of environmental effects that will be responsive to standard mitigation measures and best management practices.

In general, all of the projects noted above are subject to their own approvals and permitting processes. It is recognized that for these projects to be constructed they must meet or exceed the requirements of all existing and future provincial and federal legislation, city bylaws and policies (as applicable). In addition, it is anticipated that all projects have or will implement best management practices and necessary site-specific mitigation measures, as warranted, in order prevent any significant residual effects. Overall, it can be concluded that there will be no significant cumulative effects on the environment from the Mississauga BRT Project in combination with past, existing and reasonably foreseeable projects and activities.

Table 5.5-1 provides a summary of potential effects of the known surrounding projects. The potential effects of projects currently in the initial planning stages cannot reasonably be identified at this time. However, it is anticipated that, through the applicable planning, approval and permitting processes, potential adverse effects will either be avoided or mitigated to acceptable levels (i.e. no significant residual environmental effects).

Table 5.5-1 Cumulative Effects Assessment

Environmental Component and Potential Residual Effects of this Project[1]	Environmental Component and Potential Residual Effects of Past, Existing and Reasonably Foreseeable Projects/Activities[2]	Potential Cumulative Effects	Significance of the Effects	Mitigation Measures[3]	Residual Cumulative Effects and Significance
Fish and Fish Habitat: Site specific effects – culvert works and widening of structures over watercourses, stormwater run-off and maintenance effects	**Fish and Fish Habitat:** Site specific effects from past, existing and future roads and infrastructure including Highway 403 related rehabilitation projects such as culvert and/or structure rehabilitation and replacement or widening of these over watercourses Stormwater run-off and maintenance effects from past, existing and future urban development (roads, residential and commercial development).	Effects to fish habitat and watercourses due to removal of riparian vegetation, alteration of channel bed, flow diversion, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills.	NS	Not required	NS
Vegetation and Wetlands: Site specific effects – fringe effects, removal of small wetland pockets, stormwater run-off and maintenance effects	**Vegetation and Wetlands:** Site specific effects – fringe effects, removal of vegetation and/or wetlands from the construction of Highway 403 and from other past, existing and future urban development (roads, residential and commercial development). Stormwater run-off and maintenance effects from past, existing and future urban development (roads, residential and commercial development).	Effects to vegetation and wetlands – e.g. removal of vegetation communities, edge effects, removal of riparian vegetation, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills.	NS	Not required	NS
Wildlife and Migratory Birds: Site specific effects – removal and/or disturbance of habitat, stormwater run-off and maintenance effects.	**Wildlife and Migratory Birds:** Site specific effects – removal and/or disturbance of wildlife/migratory birds/habitat relating to past, existing and future road construction and urban development (roads, residential and commercial development). Stormwater run-off and maintenance effects from past, existing and future urban development (roads, residential and commercial development).	Effects to wildlife and migratory birds – e.g. removal or alteration of habitat, disturbance or accidental harm to wildlife or nesting birds.	NS	Not required	NS

Environmental Component and Potential Residual Effects of this Project[1]	Environmental Component and Potential Residual Effects of Past, Existing and Reasonably Foreseeable Projects/Activities[2]	Potential Cumulative Effects	Significance of the Effects	Mitigation Measures[3]	Residual Cumulative Effects and Significance
Species of Conservation Concern and Species at Risk: Site specific effects - habitat effects, stormwater run-off and maintenance effects	**Species of Conservation Concern and Species at Risk:** Site specific effects - removal and/or disturbance of habitat relating to past, existing and future road construction and urban development (roads, residential and commercial development). Stormwater run-off and maintenance effects from past, existing and future urban development (roads, residential and commercial development).	Effects to species of conservation concern and Species at Risk – e.g. removal or alteration of habitat, disturbance or accidental harm to species	NS	Not required	NS
Air Quality: Minor increase in dust during construction and maintenance. Improvements to air quality are anticipated during operations.	**Air Quality:** Increase in dust, particulate matter and other airborne materials from past, existing and future urban development (roads, residential and commercial development).	Effects to air quality – e.g. release of dust, decrease in local air quality, increased creation and release of air pollutants, decreased human health.	NS	Not required	NS
Contaminated Sites, Waste Management and Storage of Excess Materials: Site specific effects associated with the excavation and disposal of materials	**Contaminated Sites, Waste Management and Storage of Excess Materials:** Site specific effects associated with the excavation and disposal of materials from the construction of Highway 403 and from other past, existing and future urban development (roads, residential and commercial development).	Effects associated with contaminated sites, waste management and storage of excess materials – e.g. spills, contaminants carried in run-off, habitat and/or floodplain disturbance/alteration associated with storage.	NS	Not required	NS
Groundwater: Site specific effects associated with deep cuts. No anticipated adverse effects during operations/maintenance.	**Groundwater:** Site specific effects associated with deep cuts and impacts to any existing and active water wells from past, existing and future urban development (roads, residential and commercial development).	Effects to groundwater – e.g. water quality or quantity changes, groundwater interference or interception.	NS	Not required	NS
Stormwater Management: Site specific effects associated with stormwater run-off.	**Stormwater Management:** Site specific effects associated with stormwater run-off from past, existing and future urban development (roads, residential and commercial development).	Effects associated with stormwater management – e.g. water quality or quantity changes, removal or alternation of habitat, contaminants carried in run-off.	NS	Not required	NS

Environmental Component and Potential Residual Effects of this Project[1]	Environmental Component and Potential Residual Effects of Past, Existing and Reasonably Foreseeable Projects/Activities[2]	Potential Cumulative Effects	Significance of the Effects	Mitigation Measures[3]	Residual Cumulative Effects and Significance
Noise: Site specific construction noise and minor noise effects during operation and maintenance.	**Noise:** Site specific construction noise and minor noise effects during operation and maintenance from Highway 403 in particular and from other past, existing and future urban development (roads, residential and commercial development).	Effects associated with noise – e.g. nuisance noise, increase receptor overall noise exposure.	NS	Not required	NS
Health and Wellbeing: Minor nuisance effects (e.g. noise, traffic etc.) during construction. Improvements to health and wellbeing are anticipated during operations.	**Health and Wellbeing:** Nuisance effects (e.g. noise, traffic etc.) from past, existing and future urban development (roads, residential and commercial development).	Effects to human health - e.g. nuisance noise, increase receptor overall noise exposure, release of dust, decrease in local air quality, increased creation and release of air pollutants.	NS	Not required	NS
Navigability: Site specific construction effects associated with works over a navigable waterway – navigable clearance maintained.	**Navigability:** Site specific construction effects associated with works over a navigable waterway, changes to navigable clearance and/or navigability during any phase of the project. from past, existing and future urban development (roads, residential and commercial development).	Effects to navigability – e.g. alteration of navigable clearance, alteration of access to navigable waterways.	NS	Not required	NS
Pipelines: Site specific works and activities over or near pipelines during construction and operation.	**Pipelines:** Site specific works over or near pipelines and potential pipeline relocations from past, existing and future urban development (roads, residential and commercial development).	Effects associated with pipelines – e.g. pipeline spills or leaks.	NS	Not required	NS

[1] Only the adverse effects of the project remaining after the application of mitigation measures (i.e. the adverse residual effects identified in Table 5.6-1 and/or Table 5.6-2) are the focus of the cumulative effects assessment.
[2] Only those projects that have a potential to contribute or may affect the same environmental components as this project.
[3] It is anticipated that all projects have or will implement best management practices and necessary site-specific mitigation measures, as warranted, towards preventing any significant residual effects.

NS: Not significant adverse effect

5.6 SIGNIFICANCE

Tables 5.6-1 and **5.6-2** provide a summary of the potential environmental effects during the construction and operational/maintenance phases and their significance associated with the project on the various environmental components examined. Please refer to **Section 5.1** for further analysis of the significance determinations.

The following criteria were considered when determining the significance of the potential effects:

- **Direction** – measure of relative effect, i.e. positive or negative;
- **Geographic extent / location** – spatial area affected by a project – local, regional, national, global
- **Frequency** – measure of repetitions -one time, recurring
- **Duration** – measure of the length of time a potential effect could last, i.e. short-term, long-term;
- **Magnitude** – potential severity of the effect; based on relationship to a regulation or guidelines or accepted industry standards;
- **Occurrence** – measure of likelihood of the effect;
- **Reversibility/Mitigation** – the potential for recovery and ability to avoid effect or reduce time to recover;
- **Ecological** – measure of the ecological impact of the effect with consideration of the relative ecological importance of the environmental component;
- **Confidence** – level of confidence in prediction of effect;
- **Residual Effects** – measure of overall effect with consideration of reversibility/mitigation;
- **Cumulative Effects** – measure of the net environmental effects associated with the project in combination of the environmental effects of other past, present or future projects or activities; and
- **Significance** – overall impact significance of the potential environmental effects. A potential effect would be considered significant if, after considering the above criteria, there was a fairly high certainty that the project would result in a potential adverse effect that could not be reversed or mitigated and the magnitude of the residual effect was deemed to be high.

Table 5.6-1 The Significance of Predicted Effects for the Construction of the Mississauga BRT

Environmental Component	Predicted Effect	Direction	Geographic Extent / Location	Frequency	Duration	Magnitude	Occurrence	Reversibility / Mitigation	Ecological	Confidence	Residual Effects	Cumulative Effects	Significance
Fish and Fish Habitat	Site specific effects – e.g., removal of riparian vegetation, localized alternation of channel bed, temporary flow diversion, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Note: TRCA has determined that none of the proposed works within their jurisdiction are anticipated to result in Harmful Alteration, Disruption or Destruction of fish habitat.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Low	Negligible	Not significant
Vegetation, Wetlands, Wildlife and Migratory Birds	Site specific effects – removal of common vegetation communities, edge effects, removal of riparian vegetation, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Low	Negligible	Not significant
Species of Conservation Concern and Species at Risk	Site specific habitat effects – No SAR were identified in the study area. The project will result in the removal of common vegetation communities, edge effects, removal of riparian vegetation, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Note: the habitat within the project limits is not suitable for most species at risk/species of conservation concern.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	Medium	Low	Negligible	Not significant

Environmental Component	Predicted Effect	Direction	Geographic Extent / Location	Frequency	Duration	Magnitude	Occurrence	Reversibility / Mitigation	Ecological	Confidence	Residual Effects	Cumulative Effects	Significance
Air Quality	Minor increase in dust during construction. Increased vehicle emissions from construction equipment.	Negative	Isolated	Occasional	Short-Term	Low	Possible	Yes	Low	High	Negligible	Negligible	Not significant
Contaminated Sites, Waste Management and Storage of Excess Materials	Contamination resulting from excavation, storage and/or disposal of materials.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Low	Negligible	Not significant
Groundwater	Groundwater interference and/or interception, changes to quantity and/or quality, water well impacts.	Negative	Isolated	Occasional	Short-Term	Low	Certain	Yes	Low	High	Low	Negligible	Not significant
Stormwater Management	Water quality or quantity changes, erosion, sedimentation, contaminants carried in run-off, spills.	Negative	Isolated	Occasional	Short-Term	Low	Certain	Yes	Low	High	Low	Negligible	Not significant
Noise	Site-specific construction noise.	Negative	Isolated	Occasional	Short-Term	Low	Certain	Yes	Low	High	Low	Low	Not significant
Health and Wellbeing	Air quality and noise effects.	Negative	Isolated	Occasional	Short-Term	Low	Possible	Yes	Low	High	Negligible	Negligible	Not significant
Archaeology	Effects to archaeological resources (e.g., damage, disruption).	Negative	Isolated	Continuous	Long-Term	Low	Possible	Yes	Low	High	Low	Negligible	Not significant
Heritage	No anticipated effects.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Navigability	Site-specific construction effects associated with works over the Etobicoke Creek (the only navigable waterway within the project limits). Note: navigable clearance will be maintained throughout construction.	Negative	Isolated	Occasional	Short-Term	Low	Possible	Yes	Low	High	Negligible	Negligible	Not significant
Pipelines	Site specific works and activities over or near pipelines.	Negative	Isolated	Occasional	Short-Term	Low	Certain	Yes	Low	High	None	Negligible	Not significant

Table 5.6-2 The Significance of Predicted Effects for the Operation and Maintenance of the Mississauga BRT

Environmental Component	Predicted Effect	Direction	Geographic Extent / Location	Frequency	Duration	Magnitude	Occurrence	Reversibility / Mitigation	Ecological	Confidence	Residual Effects	Cumulative Effects	Significance
Fish and Fish Habitat	Site specific effects – e.g., erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Negligible	Negligible	Not significant
Vegetation, Wetlands, Wildlife and Migratory Birds	Site specific effects – temporary habitat/vegetation disturbance, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills, right-of-way management (fertilizer, herbicides, pesticides).	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Negligible	Negligible	Not significant
Species of Conservation Concern and Species at Risk	Site-specific habitat effects – temporary habitat/vegetation disturbance, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills, right-of-way management (fertilizer, herbicides, pesticides). Note: the habitat within the project limits is not suitable for most species at risks/species of conservation concern.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Negligible	Negligible	Not significant
Air Quality	Improved air quality due to reduced number of vehicles travelling within the study area.	Positive	Isolated	Continuous	Long-Term	Low	Probable	N.A.	Low	Medium	Benefit	Negligible	N.A.
Contaminated Sites, Waste Management and Storage of Excess Materials	Contamination resulting from equipment, chemicals and other materials.	Negative	Isolated	Occasional	Short/ Long-Term	Low	Possible	Yes	Low	Medium	Negligible	Negligible	Not significant

Environmental Component	Predicted Effect	Direction	Geographic Extent / Location	Frequency	Duration	Magnitude	Occurrence	Reversibility / Mitigation	Ecological	Confidence	Residual Effects	Cumulative Effects	Significance
Groundwater	Effects associated with spills and potential changes to local water quality and quantity.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Stormwater Management	Water quality or quantity changes, erosion, sedimentation, contaminants carried in run-off, spills.	Negative	Isolated	Continuous	Long-Term	Low	Certain	Yes	Low	High	Negligible	Negligible	Not significant
Noise	Noise associated with the operation and maintenance of the Mississauga BRT.	Negative	Isolated	Continuous	Long-Term	Low	Certain	No	Low	High	Low	Low	Not significant
Health and Wellbeing	Achievement of Official Plan objectives; improvements to transit system. Air quality and noise effects.	Generally Positive	City Wide	Continuous	Long-Term	Low	Probable	Yes	Low	Medium	Low/Benefit	Negligible	Not significant
Archaeology	No anticipated effects.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Heritage	No anticipated effects.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Navigability	No anticipated effects. Note: the Etobicoke Creek crossing has been designed to maintain navigable clearance.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Pipelines	Site specific works and activities over or near pipelines.	Negative	Isolated	Occasional	Short-Term	Low	Certain	Yes	Low	High	None	Negligible	Not significant

5.7 POTENTIAL ENVIRONMENTAL EFFECTS ANALYSIS AND SUMMARY OF MITIGATION AND COMMITMENTS TO FUTURE WORK

Table 5.7-1 summarizes the potential environmental effects analysis and includes all of the identified mitigation measures and commitments to future work both during construction and the operation/maintenance phases of the project. It should be noted that the table should be read in conjunction with the main text of this chapter.

Table 5.7-1 Potential Environmental Effects Analysis and Summary of Mitigation and Commitments to Future Work

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
Fish and Fish Habitat	Construction	Site specific effects – e.g., removal of riparian vegetation, localized alternation of channel bed, temporary flow diversion, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Note: TRCA has determined that none of the proposed works within their jurisdiction are anticipated to result in Harmful Alteration, Disruption or Destruction of fish habitat. Please refer to **Section 5.1.1.1** for further discussion regarding the potential environmental effects.	ME	*Design-Related Measures* Design measures have been implemented to minimize potential adverse effects at the Cooksville Creek, Little Etobicoke Creek and Etobicoke Creek crossings. The design of the Cooksville Creek twin box cell culvert is such that it allows work to be done on one cell at a time without any effect on the creek flow in the other cell. There will be no temporary or permanent alteration to the Cooksville Creek channel or flow characteristics as a result of the lowering of a segment of culvert obvert at the busway crossing. At the Etobicoke Creek crossing, the BRT alignment was shifted to utilize the existing Eglinton Avenue structure, thereby avoiding the adverse effects of a new crossing on the watercourse and surrounding valley system. Specifically, the alignment avoids footprint effects on the normal flow channel, avoids encroachment on the 'natural banks' and avoids adverse effects on local fluvial geomorphologic conditions that new piers upstream of the existing piers would have otherwise created. At the Little Etobicoke Creek, a shift was incorporated into the original alignment to bring it closer to the adjacent roadway in order to reduce the overall extent of culvert enclosure and enable removal of the seasonal fish barrier at the existing crossing. This shift also avoids (with the possible exception of edge disturbance) the wetland pocket located east of Little Etobicoke Creek that supports Digger Crayfish. In addition, the following design measures will be implemented at the Little Etobicoke Creek: • The extension of the existing Little Etobicoke Creek crossing structure will be designed and installed to enhance flow conveyance/fluvial processes, channel stability and fish movement opportunities. • The existing low concrete weir/seasonal barrier to fish movement and the Jersey barrier will be removed, and the portions of channel disturbed to install these features and the culvert footing extensions will be re-instated using naturalized approaches that will enhance channel stability and fluvial processes. • A stable low flow channel through the east cell extension will be created. The invert of the east cell will be 'set' at the existing channel invert to convey the low flow, however the inverts of the central and west cells will be 'set' above the low flow cell so that they function only to convey overbank and 'flood' flows. This will require re-grading and transitioning of the floodplain into the inlet ends of these cells, with stable 'ramping down' into the existing culverts (to avoid loss of hydraulic capacity but prevent flow from entering these cells until desired elevation).	The greatest potential for adverse effects in relation to fish habitat and watercourses occur during the construction phase. With the application of the identified mitigation measures, which should also result in a net improvement in fish movement and habitat opportunities in Little Etobicoke Creek, potential for adverse effects have been minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up

				• The new low flow and bankfull channel sections will be installed to transition smoothly with the upstream channel section. Riffle/flat habitat and substrate will be maintained or created/re-instated along the low flow channel through the east cell.
				• The grade change at the weir will be addressed through design of a stable riffle or riffle ramp, or series of riffles through the channel section (depending on the specific gradient change required).
				• All disturbed bank and valley areas will be re-vegetated, with consideration of enhancement of the existing woody riparian cover.
				
				Construction-Related Mitigation Measures
				
				Based on the character of the habitat conditions and resident fish communities, the following commitments to future work and standard mitigation measures will be implemented to mitigate potential adverse effects during construction:
				• A warmwater construction-timing window restriction (between March 15 and July 1) will be used for all required instream works.
				• All works will be completed as per the Greater Golden Horseshoe Area Conservation Authorities' (2006) *Erosion and Sediment Control for Urban Construction* document will be implemented to prevent erosion and migration of sediment-laden runoff from the construction zone to the watercourses. A copy of that document can be provided upon request. The general approach is to prepare a detailed sediment and erosion control plan that implemented prior to and adapted during construction. The plan generally includes common measures such as:
				  • inspection and maintenance of sediment control measures until final cover is established; and
				  • vegetation management to preserve, protect and restore riparian vegetation including: minimizing the removal of riparian vegetation, particularly woody vegetation, replacing removed woody riparian vegetation with appropriate native species, and encouraging the planting to enhance riparian cover. Additional measures pertaining to vegetation replacement and valley slope stability (at Etobicoke Creek) are outlined in **Section 5.1.1.2**.
				All works will be completed in accordance with the City of Mississauga's Sediment and Erosion Control Bylaw. A copy of the bylaw can be provided upon request.
				• Appropriate temporary flow diversion/bypass measures will be employed during construction of the Little Etobicoke Creek extension and at the Cooksville Creek culvert, to isolate the construction zone and maintain clean flow downstream flow at all times. The appropriate means of flow management will be developed during Detail Design by the project hydrologist based on the flow regime, in consultation with the project biologist. If temporary cofferdams or flow barriers are used, they will be constructed of non-sediment generating materials (i.e. gravel bags, clean stone with no fines). If temporary disturbance along the channel edges is required to install the footings, appropriate containment measures (e.g., coffer dam systems) will be used to isolate the temporary work areas.
				• In accordance with a commitment made during the Provincial Environmental Assessment, sample monitoring for water quality and siltation will be undertaken at Cooksville Creek and Etobicoke Creek for a period of one year following completion of construction. The monitoring plan will be developed during Detail Design.				

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				• Any required temporary water intake hoses used for temporary dewatering / flow transfer (i.e., at Little Etobicoke Creek) will be screened. • Any fish stranded in the isolated work zone (i.e., at Little Etobicoke Creek) will be captured and transferred up or downstream of the work zone. • Appropriate settling and energy dissipation measures will be used for discharge of water for all temporary flow transfer and/or dewatering activities. • No fording of the watercourses will occur without authorization by TRCA or CVC (as appropriate). • All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response. All debris and potential contaminants (e.g. concrete and structural materials, paint and solvents, sand-blasting) generated the construction works will be properly contained to prevent debris from entering the watercourses, and all debris will be properly disposed of off-site. This will include use of appropriate isolation measures (e.g., contained platforms) during construction of the extended bridge deck platform at Etobicoke Creek.				
	Operation/ Maintenance	Site specific effects – e.g., erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off. Please refer to **Section 5.1.1.1** for further discussion regarding the potential environmental effects.	ME	Commitments to future work and standard mitigation measures associated with operation and maintenance of the BRT will include: • Surface runoff will be directed to storm water management facilities to provide Enhanced (Level 1) quality control. Details are included in **Section 5.1.1.7**. These measures were designed with input from the project biologists to protect potentially sensitive functions of the natural features. • Pesticide applications will be avoided unless essential (low maintenance right-of-way strategy). The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. • All precautions will be taken to avoid spills during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response. • The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be	Potential effects during the operational and maintenance phases relate primarily to increased stormwater runoff. Additional stormwater runoff is not anticipated to result in a significant adverse environmental effect as it will be addressed by the implementation of the stormwater management measures identified in **Section 5.1.1.7**. With the implementation of mitigation measures potential for adverse effects to fish and fish habitat can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management. Similar construction-related mitigation measures and commitments to future work as those outlined above will be employed for any rehabilitation activities associated with future watercourse culvert or structure replacement or repair, or any other general transitway-rehabilitation works that affect areas draining to watercourses. Specifically: • All relevant construction-related measures outlined above will be identified and applied to address potential effects specific to the rehabilitation works and potentially affected watercourse. • Standard measures will include sediment and erosion control and restoration of disturbed surfaces draining to the watercourse, temporary timing, fish protection and flow management measures for any instream works, and standard management practices for handling of equipment, potential contaminants and construction related debris. • CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.				
Vegetation, Wetlands, Wildlife and Migratory Birds	Construction	Site specific effects – removal of common vegetation communities, edge effects, removal of riparian vegetation, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Please refer to **Section 5.1.1.2** for further discussion regarding the potential environmental effects.	ME	*Design-related Measures* As noted previously, design measures were implemented to minimize potential adverse effects at the Etobicoke Creek crossing. The BRT alignment was shifted at the Etobicoke Creek crossing to utilize the existing Eglinton Avenue structure, thereby avoiding the adverse effects of a new crossing on the watercourse, as well as the valley slopes and associated vegetation. The alignment was also shifted at the Little Etobicoke Creek crossing to protect Unit E18, a Cattail Mineral Shallow Marsh (MAS 2-1) on the east side of the creek that supports Digger Crayfish habitat along its north edge. The location of the alignment of the BRT was also shifted, during the design process, in order to avoid direct effects to a small (~0.3 ha) pocket Cattail Mineral Shallow Marsh (MAS 2-1) located along the south side of Eglinton Avenue West, just west of Renforth Drive. The marsh is dominated almost entirely by Narrow-leaved Cattail. This marsh would have been removed with the original BRT alignment and location of a previously proposed parking area. *Construction-Related Mitigation Measures and Commitments to Future Work* • Implement protection measures and proper clearing techniques during construction to protect retained vegetation and local habitat including: • Minimize the removal of vegetation, particularly woody vegetation, to that required for the BRT project.	No significant adverse effects to vegetation are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The vegetation and habitat associates are common, tolerant and cultural in character, and the spatial extent of the project and associated vegetation and habitat removals is limited. The implementation of identified mitigation measures will manage potential for effects to an appropriate level. Nonetheless, the incremental removal of the local vegetation and associated habitat, and particularly the small wetland and woody patches, is recognized on a local scale in the context of the highly urbanized landscape, as reflected in the general recommendations for replacement and enhancement plantings.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				• Clearly delineate vegetation areas adjacent to the BRT corridor to be protected (e.g., on Contract drawings and in the field), including erection of temporary tree protection where appropriate (e.g., RW1, Etobicoke Creek east valley slope, Little Etobicoke valley) to preclude construction equipment access, temporary storage and other construction activities. Maintain fencing throughout construction. • Fell trees away from retained vegetation and watercourses to avoid damage and disturbance. • Restrict grubbing of trees to the required footprint zone; in adjacent areas of the right-of-way within the natural areas, tree stumps will be cut flush to the ground and grubbing avoided in order to minimize soil disturbance, particularly in erosion prone areas on the Etobicoke Creek valley slope. • 'Repair' or remove trees damaged during clearing. • Employ appropriate sedimentation and erosion control measures as per the Erosion and Sediment Control for Urban Construction (Greater Golden Horseshoe Conservation Authority 2006) and the City of Mississauga's Erosion and Sediment Control Bylaw. A copy of both documents can be provided upon request. • Maintain the general local drainage areas to the wetland pockets (e.g., avoid extensive diversion of surface flows into or away from these features), and manage any stormwater management outfalls to avoid large changes to the frequent storm runoff regime. • Prevent disposal of wetland material containing Phragmites or Purple Loosestrife (or other invasive species) in or near retained wetland pockets. • Site temporary storage areas away from the remnant woody vegetation areas and away from the valley slopes. • Appropriately dispose of all construction-related debris following construction. • Ensure an environmental inspector is on site during construction to ensure compliance with mitigation measures. • Implement the City's typical vegetation replacement and enhancement protocols for both woody vegetation and the wetland pockets removed by the project, based on CVC and/or TRCA's guidelines, with consideration of landownership and usage, including utilities. Specific vegetation replacement is anticipated to be required for RW1, as well as the larger regulated wetland pockets. Candidate areas that exhibit the best potential for vegetation and habitat enhancement are the Etobicoke Creek floodplain, the NE4SMA area east of Cawthra Road, and the Little Etobicoke riparian corridor. Other opportunities such as acquisition of existing forest areas will also be explored. Related consultation with TRCA and CVC will continue during Detail Design (see **Appendix E** for related correspondence and meeting notes). • Supplement/enhance existing vegetation cover with planting of native species, including the restoration of disturbed areas, and within those areas highlighted above. Enhancement of woody cover along the City's identified 'Natural Linkage' area to improve the quality of the local wildlife habitat and linkage functions will also be considered in consultation with the landowners and utility operators.	Similarly, no significant adverse effects to wildlife are anticipated during construction with proper implementation and inspection of the identified mitigation measures. The wildlife in the area will be tolerant of development and transportation infrastructure generally given the decades of exposure, the amount of habitat removal is relatively small and no significant or unique habitat features are removed and no new habitat fragmentation will result. With the implementation of the identified mitigation measures, potential for adverse effects can be minimized and no significant residual effects will occur.			

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up

				• Re-stabilize and re-vegetate disturbed valley slopes and creek banks following construction.
				• Prevent harm to any wildlife encountered incidentally during construction. Consider contractor-awareness training to emphasize avoidance of disturbing or harassing wildlife.
				• All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response.
				• In order to avoid potential adverse environmental effects on migratory bird species that may breed in the project area the following measures will be implemented:
				  ◦ Any construction, maintenance, operation and decommissioning activities with the potential to destroy or disturb migratory birds shall not take place in migratory bird habitat during the breeding season that, in this location, is generally defined to be from May 1 – July 31.
				  ◦ If the proponent must conduct works that could potentially destroy migratory birds or their nests within breeding bird habitat during the identified breeding season for migratory birds, a nest survey will be conducted by a qualified avian biologist prior to commencement of the works to identify and locate active nests of species covered by the *Migratory Birds Convention Act*. A mitigation plan (which may include establishing appropriate buffers around active nests) would then be developed to address any potential effects on migratory birds or their active nests, and would be reviewed by Environment Canada prior to implementation.
				• Review design opportunities further during Detail Design, in consultation with City staff, to minimize encroachment and maintain wildlife movement opportunities along the City's Linkage Area in relation to design of slopes, location of fencing, plantings, etc. This may include identification of opportunities to improve the linage function where feasible and practical. Objectives related to wildlife movement must ultimately recognize the nature of the project limits and the adjacent land uses.				

	Operation/ Maintenance	Site specific effects – temporary habitat/vegetation disturbance, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills, right-of-way management (fertilizer, herbicides, pesticides).	ME	• Employ a low maintenance right-of-way management approach to reduce or avoid the need for fertilizer and pesticide applications, other than what may be needed for the initial establishment of planted trees. The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. • Incorporate native vegetation plantings in the landscape design	No significant adverse effects to vegetation, wetlands, wildlife or migratory birds are anticipated during operation and maintenance, with proper implementation of the identified mitigation measures as well as the implementation and maintenance of standard stormwater management measures outlined in **Section 5.1.1.7**.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
		Please refer to **Section 5.1.1.2** for further discussion regarding the potential environmental effects.		• Implement the stormwater management measures outlined in **Section 5.1.1.7**. • Use the mitigation measures outlined previously to minimize the extent of temporary disturbance required during maintenance and future rehabilitation activities, and implement restoration measures as required. • The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts (*2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management. • Implement mitigation measures to protect nesting migratory birds during maintenance activities (e.g., bridge / culvert repair). • CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.	With the implementation of the identified mitigation measures potential for adverse effects to can be minimized and no significant residual effects will occur.			
Species of Conservation Concern and Species at Risk	Construction	Site specific habitat effects – No SAR were identified in the study area. The project will result in the removal of common vegetation communities, edge effects, removal of riparian vegetation, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills. Note: the habitat within the project limits is not suitable for most species at risk/species of conservation concern. Please refer to **Section 5.1.1.3** for further discussion regarding the potential environmental effects.	ME	Commitments to future work during during Detail Design include: • Completion of additional in-season botanical surveys for Squirrel Corn, Bellwort and Sharp-leaved Hepatica in RW1 (Unit E5). • Completion of additional in-season botanical surveys for locally rare (L rank: L1, L2 and L3) species in the wetland pocket in NE4SMA may be warranted should the footprint of the BRT alignment change (with final grading limits developed during Detail Design or any other shifts to the alignment). • Preparation of appropriate salvage and re-instatement measures (e.g. transplant, seed bank salvage, sod mats, seed harvest) for any relevant species that may be identified. The survey results will be provided to Transport Canada and Infrastructure Canada who will determine whether or there is a warrant for review by any Federal Authorities. It is noteworthy that none of these species are listed under the *Species at Risk Act*. The following mitigation measure, in combination with the standard mitigation measures for protection of wildlife generally as outlined above (see Vegetation, Wetlands, Wildlife and Migratory Birds), will minimize negative effects and may provide a net benefit to the potential Monarch habitat: • Native seed mixes containing Common Milkweed will be used when re-establishing vegetation within disturbed areas of the right-of-way.	With the implementation of the identified mitigation measures potential for adverse effects to species of conservation concern can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
	Operation/ Maintenance	Site-specific habitat effects – temporary habitat/vegetation disturbance, disturbance or accidental harm to wildlife or nesting birds, erosion, sedimentation, water quality or quantity changes, contaminants carried in run-off, spills, right-of-way management (fertilizer, herbicides, pesticides). Note: the habitat within the project limits is not suitable for most species at risks/species of conservation concern. Please refer to **Section 5.1.1.3** for further discussion regarding the potential environmental effects.	ME	• Stormwater run-off will be controlled as outlined in **Section 5.1.1.7**. • Spill prevention and response will be addressed as outlined in **Section 5.2**. • Employ a low maintenance right-of-way management approach to reduce or avoid the need for fertilizer and pesticide applications, other than what may be needed for the initial establishment of planted trees. The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. • Implementation of construction related mitigation measures identified for protecting terrestrial and aquatic habitat (please refer to **Section 5.1.1.3**) will also protect wildlife generally, including TRCA L- 3 and 4 rank species identified as present generally within the vicinity of project limits and any species of conservation concern.	With the implementation of the identified mitigation measures potential for adverse effects to species of conservation concern can be minimized and no significant residual effects will occur.	NS	M	NA
Air Quality	Construction	Minor increase in dust during construction. Increased vehicle emissions from construction equipment. Please refer to **Section 5.1.1.4** for further discussion regarding the potential environmental effects.	ME	• Dust impacts will be mitigated by ensuring that proper watering and/or other dust suppressant techniques, as identified in Ontario Provincial Standard Specification (OPSS) 506, are used during the construction phase. OPSS 506 outlines the requirements for dust suppressants and their application including application. • Following construction, any open, unpaved areas will be seeded. • To mitigate emissions from construction equipment, the Contractor will be required to keep equipment in good operating conditions and efforts will be made to minimize the idling of equipment, especially during smog alerts. When smog advisories are issued, the City of Mississauga will discuss the scheduled activities with the Contractor to determine what steps can be taken to further limit air emissions without unduly affecting the Contractor's schedule.	Adverse effects will be relatively short-term and with the implementation of the identified mitigation measures adverse effects during construction can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
	Operation/ Maintenance	Improved air quality due to reduced number of vehicles travelling within the study area. Please refer to **Section 5.1.1.4** for further discussion regarding the potential environmental effects.	NS	• Operational and maintenance effects will be managed through the use of best management practices such as those identified for construction works (e.g. dust control, operation of equipment in good operating order, minimize idling). • In accordance with a requirement made during the Provincial Environmental Assessment, air pollution levels in adjacent areas will be measured prior to and following the commencement of operations along the busway at potentially affected residential sites. Details regarding the measurement requirements and locations will be determined during Detail Design. • The forecast vehicle fleet that will be operating on the busway consists of a mix of current Mississauga Transit and GO Transit vehicles, with potential use in part by the Toronto Transit Commission. The vehicles currently being employed by these agencies include: ➢ Standard Bus: New Flyer Industries D40LF (with rear mount A/C) ➢ Intercity Bus: Motor Coach Industries D4500CT ➢ Double-Deck Bus: Alexander Dennis Enviro 500 12.8m LH Body ➢ Articulated Bus: New Flyer Industries D60LF (with rear mount A/C) ➢ Representative BRT Bus: New Flyer Industries DE60LF-BRT The current bus fleets are entirely diesel-fuelled. As the City of Mississauga and GO Transit decommission vehicles and update their fleet, consideration will be given to employing alternative fuel technologies (Compressed Natural Gas [CNG], diesel-electric, low sulphur diesel, biodiesel, etc). It should be noted that the funding agreement for the Mississauga BRT Project included an allowance for the purchase of new BRT-specific vehicles (indicated above as “Representative BRT Bus”); however, the propulsion system to be employed will be identified as part of a separate study.	The project is not expected to result in any adverse or residual local or regional air quality effects during operations and maintenance. In fact, air quality will likely be improved when compared to a future situation that does not include the Mississauga BRT as part of the transportation network.	NS	NA	NA
Contaminated Sites, Waste Management and Storage of Access Materials	Construction	Contamination resulting from excavation, storage and/or disposal of materials. Please refer to **Section 5.1.1.5** for further discussion regarding the potential environmental effects.	ME	• A contaminant investigation including subsurface investigation (i.e. boreholes) will be carried out in the areas of high and moderate potential for contamination identified in **Section 4.1.6** with the exception of Area 10 (Etobicoke Creek). The purpose of the subsurface investigations is to ascertain the presence or absence of soil and/or groundwater contamination in order to develop appropriate measures to manage excess materials during the construction. Discussions are ongoing with property owners regarding permissions to enter property to complete the work. The exact schedule for completion of the contaminant investigation work is unknown as it is subject to field conditions and property access; however, the site investigations will be completed as soon as possible during Detail Design. A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada for their review. That investigation will characterize the chemical quality of the soil, in light of the potential impacts identified in the Contamination Overview Study. This will facilitate appropriate soil management options per O. Reg. 153/04 and O. Reg. 347 during construction; and will provide timely data required to maintain and improve excavation progress and, thereby, minimize work delays.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up

				• Soil and rock management principles have been developed to aid in appropriately identifying how excess materials will be segregated, staged, transported and reused within the corridor or disposed of off-site.
				• On-site aesthetic field screening of soils and other materials excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works.
				• During excavation activities, any soil that exhibits visual or olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options.
				• Additional details regarding segregation are included in **Section 5.1.1.5**.
				• Where practical, attempts will be made to reuse excess non-contaminated soil on-site and on or near to the locations where it was generated. Examples of how excess soil can be used on-site include berming, landscaping and grading.
				• Suitable projects or other opportunities for reuse of non-contaminated soil off-site will be identified as the Detail Design progresses. Examples of other project uses include:
				  • Use as aggregate supply by a soil or gardening centre.
				  • Use as fill or landscaping material on other construction projects.
				  • Incorporation of excess soil for public or recreational uses.
				• If no suitable use for excess non-contaminated soils generated during construction can be found, the material would need to be disposed of at a landfill facility willing to accept it as cover material.
				• Excess contaminated soil (hazardous and non-hazardous) will be disposed of at a MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.
				• On-site aesthetic field screening of shale bedrock excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works.
				• During excavation activities, any shale bedrock that exhibits visual or olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options.
				• Where practical, attempts will be made to reuse excess bedrock material on-site and on or near to the locations where it was generated. Similar to excess soil, non-contaminated bedrock could be used on-site for berming, landscaping and grading.
				• Suitable projects or other opportunities for reuse of non-contaminated rock (i.e. similar uses referred to under “Soil Management”) will be identified during Detail Design. If no suitable use for excess non-contaminated rock generated during construction can be found, the material would will be disposed of at a landfill facility willing to accept it as cover material.
				• Excess contaminated rock (hazardous and non-hazardous) rock will be disposed of at a				

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site. • TRCA and CVC will be consulted with as necessary during Detail Design regarding the placement of fill and any associated requirements for permits. • All non-soil/rock material (e.g. concrete, masonry, asphalt, wood, metals etc.) will be separated from excess soil and bedrock generated during construction, as each of these materials follow a different waste stream. During the course of excavation activities, temporary stockpiling of non-soil/rock material will likely occur. All stockpiled material will be located away from active work areas and either disposed of at an off-site recycling facility or licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.				
	Operation/ Maintenance	Contamination resulting from equipment, chemicals and other materials. Please refer to **Section 5.1.1.5** for further discussion regarding the potential environmental effects.	ME	• Equipment, chemicals, and other materials may need to be used to facilitate inspection and maintenance activities. The BRT operator will assume all maintenance and inspection activities associated with the operation of the BRT facility. Please refer to **Section 5.2** for details regarding spills prevention and management.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
Groundwater	Construction	Groundwater interference and/or interception, changes to quantity and/or quality, water well impacts. Please refer to **Section 5.1.1.6** for further discussion regarding the potential environmental effects.	ME	• During Detail Design, the locations of the three water wells noted in **Section 5.1.1.6** will be verified in the field to determine their presence or absence and exact location, as the geographic coordinates supplied by the MOE may not be accurate or may contain a substantial degree of error (e.g. accurate to within 200 m). If these wells are confirmed to be located within construction zones they will be decommissioned in accordance with Ontario Regulation 903 under the *Ontario Water Resources Act* (*OWRA*). If they are still in use (by businesses or private owners) an alternate source of water will be provided to those owners. Consideration will also be given to potential indirect effects to any water wells and appropriate mitigation will be developed as warranted. During Detail Design Transport Canada and Infrastructure Canada will be provided with an update regarding the existence and use of water wells and any additional mitigation measures that are identified towards ensuring that water wells and water well use are not adversely affected by the project.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
	Operation/ Maintenance	Effects associated with spills and potential changes to local water quality and quantity. Please refer to **Section 5.1.1.6** for further discussion regarding the potential environmental effects.	ME	• Potential effects to groundwater during operation and maintenance of the BRT facility are anticipated to be limited to potential effects associated with spills and potential changes to local water quality and quantity. Please refer to **Section 5.2** for additional details regarding spills prevention and management. Please refer to **Section 5.1.1.7** for details regarding stormwater management. • Construction activities associated with the project such as culvert works, road improvements and in-or-near stream modifications/diversions have the potential to affect shallow groundwater and surface water resources within the study area. As a result, it is possible that a PTTW will be required for one or more components of the construction	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				works. During Detail Design the PTTW requirements for the construction works will be identified in consultation with the MOE. All PTTW applications and supporting documents will be prepared and signed by a Qualified Person in accordance with MOE requirements. Additional details regarding PTTW are provided in **Section 5.1.1.6**. • In addition to any mitigation developed as part of the PTTW process, construction mitigation measures will be implemented to control the release of debris from construction activities, and fabrication and landscaping activities from potentially adversely effecting the environment. These measures are outlined in **Section 5.2**.				
Stormwater Management	Construction	Water quality or quantity changes, erosion, sedimentation, contaminants carried in run-off, spills. Please refer to **Section 5.1.1.7** for further discussion regarding the potential environmental effects.	ME	• **Section 5.1.1.7** provides an overview of the hydraulic criteria and stormwater management criteria for this project. • The management of the construction process and the addition of new or revised system elements will focus on avoiding disruption to the existing system, again using experienced contractors and close oversight by the proponent, working closely with the appropriate Conservation Authority (i.e. CVC or TRCA) and local property owners (e.g. MTO).	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
	Operation/ Maintenance	Water quality or quantity changes, erosion, sedimentation, contaminants carried in run-off, spills. Please refer to **Section 5.1.1.7** for further discussion regarding the potential environmental effects.	ME	• Once the BRT facility is operational, there will be no special ongoing operational or maintenance effects on the stormwater management / drainage system. The new culverts, pipes, and expanded ponds / ditches will be added to the inventory of such structures in Mississauga and will follow conventional inspection, maintenance and rehabilitation schedules.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
Noise	Construction	Site-specific construction noise. Please refer to **Section 5.1.1.8** for further discussion regarding the potential environmental effects.	ME	• In addition to the mitigation measures outlined below, the City of Mississauga is committed to completing an updated noise assessment prior to the completion of Preliminary Design. The updated noise assessment will reflect current design plans, land use, and will assess noise associated with the vehicles proposed to be used along the busway. The updated noise assessment will be provided to Transport Canada, Infrastructure Canada and the Ontario Ministry of the Environment for review. The Responsible Authorities will determine if further Federal Authority review is required. • It is possible that the updated noise assessment will identify potential noise effects that will warrant a review of the application of noise mitigation measures. Should mitigation be warranted the updated noise assessment will include a review of appropriate noise control measures with consideration given to the technical, administrative and economic feasibility of the various alternatives. • General construction will be limited to the time periods outlined in the City of Mississauga's Noise Control By-law which limits the times during which construction equipment can be operated. If construction activities are required outside of these hours,	Noise effects resulting from construction are anticipated to be relatively short-term in duration and with the implementation of the mitigation measures and best management practices disturbances can be minimized. As a result, no significant adverse environmental effects or significant residual effects are anticipated during construction.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up

				exemptions will be sought in advance by the Contractor, directly from the City of Mississauga. Exemption will only be sought for works that will not produce substantial noise. For example, exemptions will not be sought for noisy activities such as blasting or pile driving.
				• There will be explicit indication that contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws will be the responsibility of the City of Mississauga for all work done by contractors.
				• All equipment will be properly maintained to limit noise emissions in compliance with MOE NPC-115 guidelines. As such, all construction equipment will be operated with effective muffling devices that are in good working order.
				• The contract documents will contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect.
				• In the presence of persistent noise complaints, all construction equipment will be verified to comply with MOE NPC-115 guidelines.
				• In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.
				• Construction mitigation alternatives include but are not limited to:
				  • Re-scheduling of noisy operations to daytime hours, where possible;
				  • Use of alternate, quieter equipment or methods, where available; and
				  • The use of portable, localized noise barriers for critical areas.
				• A monitoring program will be implemented to monitor for potential effects due to construction noise. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design and MOE will be consulted as necessary in the development of the program.
				• Noise monitoring reports will be submitted to Transport Canada and Infrastructure Canada at appropriate intervals during construction.				

	Operation/ Maintenance	Noise associated with the operation and maintenance of the Mississauga BRT. Please refer to **Section 5.1.1.8** for further discussion regarding the potential environmental effects.	ME	• Opportunities to reduce operational noise effects through design will be identified and reviewed Detail Design. • In accordance with the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992) the City of Mississauga is committed to ensuring that noise levels are monitored prior to and during the operation of the busway. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design and MOE will be consulted as necessary in the development of the program. It is possible that the monitoring may identify noise effects that will warrant a review of the application of new or modified noise mitigation measures. Should additional mitigation be warranted a review of appropriate noise control measures will be completed with consideration given to the technical, administrative and economic feasibility of the various mitigation alternatives. • Restricting noisy activities to daytime hours where possible.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				• Adhering to the City of Mississauga's Noise Control By-law and seeking and obtaining exemptions as warranted. Exemption will only be sought for works that will not produce substantial noise.				
Health and Wellbeing	Construction	Air quality and noise effects. Please refer to **Section 5.1.2.1** for further discussion regarding the potential environmental effects.	ME	• Implement the air quality mitigation measures outlined in **Section 5.1.1.4**. • Implement the noise mitigation measures outlined in **Section 5.1.1.8**.	As discussed in **Section 5.1.2.1**, no adverse environmental effects are anticipated from a health and wellbeing perspective and in general the effects, including any residual effects, are anticipated to positively influence health and wellbeing.	NS	M	NA
	Operation/ Maintenance	Air quality and noise effects. Please refer to **Section 5.1.2.1** for further discussion regarding the potential environmental effects.	ME	• Implement the air quality mitigation measures outlined in **Section 5.1.1.4**. • Implement the noise mitigation measures outlined in **Section 5.1.1.8**.	As discussed in **Section 5.1.2.1**, no adverse environmental effects are anticipated from a health and wellbeing perspective and in general the effects, including any residual effects, are anticipated to positively influence health and wellbeing.	NS	M	NA
Archaeology	Construction	Effects to archaeological resources (e.g., damage, disruption). Please refer to **Section 5.1.2.2.1** for further discussion regarding the potential environmental effects.	ME	• Undertake a Stage 2 Archaeological Assessment for works in the identified undisturbed areas. Discussions are ongoing with property owners regarding permissions to enter property to complete the Stage 2 Archaeological Assessment. The exact schedule for completion of the Stage 2 Archaeological Assessment work is unknown as it is subject to field conditions and property access; however, the assessment will be completed as soon as possible during Detail Design. • If archaeological finds are discovered, Stage 3-4 mitigation will be undertaken as required in accordance with the guidelines and policies of the Ministry of Culture. Consultation will occur with the Ontario Ministry of Culture and, if applicable, potentially interested First Nations to discussion mitigation strategies if sites are found as part of the Stage 2 Assessments. Copies of the Stage 2 Archaeological Assessments will be provided to Transport Canada and Infrastructure Canada for their review. • Submit any additional Archaeological Assessments a minimum of 90 days prior to construction to the Ministry of Culture. • Should buried archaeological deposits be found along any section of the corridor during construction activities, the Ministry of Culture and any relevant First Nations will be notified immediately. • In the event that human remains are encountered during construction activities the Ministry of Culture, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations, the Peel Regional Police and any relevant First Nations will be notified immediately. As noted above, the commitment has been made to complete all necessary archaeological assessments towards ensuring that the proposed works do not result in any significant adverse effects. Please refer to **Section 5.1.2.2.1** for a description of Stage 2, 3 and 4	The potential for archaeological finds in areas of construction exists at some relatively undisturbed sites. With the implementation of the above noted mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				Archaeological Assessments.				
	Operation/ Maintenance	No anticipated effects. Please refer to **Section 5.1.2.2.1** for further discussion regarding the potential environmental effects.		• Not applicable	The project is not expected to result in any adverse or residual effects to archaeological resources during operations and maintenance.	NS	NA	NA
Heritage	Construction	No anticipated effects. Please refer to **Section 5.1.2.2.2** for further discussion regarding the potential environmental effects.	NS	• Not applicable	As noted in **Section 4.2.4.2**, there are no known built heritage features within the Mississauga BRT corridor. As a result, no mitigation is proposed, no significant adverse effects are anticipated and no significant residual effects will occur.	NS	NA	NA
	Operation/ Maintenance	No anticipated effects. Please refer to **Section 5.1.2.2.2** for further discussion regarding the potential environmental effects.	NS	• Not applicable	As noted in **Section 4.2.4.2**, there are no known built heritage features within the Mississauga BRT corridor. As a result, no mitigation is proposed, no significant adverse effects are anticipated and no significant residual effects will occur.	NS	NA	NA
Navigability	Construction	Site-specific construction effects associated with works over the Etobicoke Creek (the only navigable waterway within the project limits). Note: navigable clearance will be maintained throughout construction. Please refer to **Section 5.1.2.3** for further discussion regarding the potential environmental effects.	ME	• The widening of the Etobicoke Creek structure has been designed so as to maintain navigability. The widening of the Etobicoke Creek structure will be constructed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and people using the valley pathway below. As a result, potential adverse effects during and after construction are considered to be mitigated (approval under the *NWPA* will be required). The crossing of the Etobicoke Creek will require the following mitigation and commitment to future work: • Apply to Transport Canada for approval under the *NWPA;* • Consult with Transport Canada and the TRCA to finalize design, methodology and timing; • Abide by all Conditions of Approval that may be identified in the approval under the *NWPA*; and • Ensure debris does not fall into the water during construction.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
	Operation/ Maintenance	Not applicable. Note: the Etobicoke Creek crossing has been designed to maintain navigable clearance.	NS	• Not applicable	By maintaining navigable clearance at the Etobicoke Creek crossing potential for adverse effects can be minimized and no significant residual effects will occur.	NS	NA	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
		Please refer to **Section 5.1.2.3** for further discussion regarding the potential environmental effects.						
Pipelines	Construction	Utility relocation and replacement. Note: As noted in **Section 4.2.8**, although the study area includes pipelines regulated by the National Energy Board (NEB) none of the works will result in the need for a permit from the NEB. Please refer to **Section 5.1.2.4** for further discussion regarding the potential environmental effects.	ME	• Ongoing liaison with the pipeline owners will occur through the Detail Design stage. • Prior to construction, obtain agreements from pipeline owners for the pipeline crossings.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
	Operation/ Maintenance	Utility maintenance and disruptions associated with access to utilities. Please refer to **Section 5.1.2.4** for further discussion regarding the potential environmental effects.	ME	• The presence of the BRT facility is not expected to represent a significant adverse effect on the ability of pipeline owners in the corridor to carry out their regular operations and maintenance programs. Pipeline owners will be consulted as warranted.	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA
Accidents/ Malfunctions	Construction	Accidents, spills and workplace safety. Please refer to **Section 5.2** for further discussion regarding the potential environmental effects.	ME	• Accidents that may occur during construction of the facility are addressed by provincial legislation, policies, and procedures. • All precautions will be taken to avoid spills during construction and during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection A*ct and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. In accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008), incidents that may result in possible contraventions of the City's Storm Sewer Bylaw will be referred to staff from the City's Transportation and Infrastructure Planning Division for investigation. • Within the City of Mississauga, Fire and Emergency Services and the Transportation and Works Department are able to provide and carry out a coordinated operational response to spills on a 24 hour basis. Both Fire and Emergency Services and Transportation and Works have available the necessary in-house and contracted material, equipment and	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				personnel resources to provide a spill response. In particular, Fire and Emergency Services have a HAZMAT Team available to assist in spill incidents, while Transportation and Works have available an Emergency Response Vehicle that is stocked with supplies to handle minor spills. In addition, Transportation and Works have available on-call emergency spill response contractors. • During construction, measures will be implemented to control the release of debris from construction activities, fabrication and landscaping activities from entering watercourses. All fuels, oils, lubricants, paints, solvents, chemicals, etc. will be stored in clearly marked areas that have spill contingency plans in place. Any vehicle maintenance and fuelling will be carried out at the maintenance areas in the works facility or at commercial garages wherever possible. If refuelling of vehicles must occur on site, it will be carried out at a designated refuelling site where conditions will allow for the containment of any accidentally spilled fuel. Refuelling will not be permitted within 30 metres of any watercourse, 100 metres of any private wells or adjacent to sensitive areas. Refuelling will only be carried out by trained personnel. Furthermore vehicles will be maintained to minimize leaks and when detected, leaks will be repaired immediately. Care will be taken to prevent the release of fuel to the environment when refuelling small equipment in the field. The Contractor will be required to completed all works and spill response in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001) and have all necessary emergency equipment on site. • If a spill does occur, the owner of the material or in control of the material is responsible for the spill. This person will take reasonable action to stop the spread of the spilled materials by blocking catch basins, digging trenches, creating dikes, and / or spreading absorbent materials. If this person is unknown or unable to respond, and it is safe to do so, the Contractor shall follow the steps noted above. In all cases the MOE Spill Action Centre (1-800-268-6060), and the City of Mississauga and/or GO Transit (as appropriate) will be notified. If the spill occurs during construction the Contract Administrator will also be notified. Depending upon the nature of the accident or spill, different agencies and stakeholders will also need to be contacted. It is recognized that any spill response depends on the cooperation of various participating agencies. Both local and regional municipalities, in conjunction with the Ministry of Environment and other agencies, may operate as a team in determining an appropriate level of response to a spill incident. • Clean-up and disposal of the spilled material is the responsibility of the owner or person having control of the material. If during construction another person does not take responsibility for clean-up, the Contract Administrator will be notified. Until determined otherwise, the Contractor will assume the overall responsibility for coordinating the clean-up of spilled material. • Workplace health and safety is addressed through provincial legislative requirements such as the *Occupational Health and Safety Act* and associated regulations.				

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
	Operation/ Maintenance	Accidents, spills and workplace safety. Please refer to **Section 5.2** for further discussion regarding the potential environmental effects.	ME	• Accidents that may occur during operation and maintenance of the facility are addressed by provincial legislation, policies, and procedures. One way to minimize the risk of accidents and the associated effects to the environment including, but not limited to, human health and wellbeing is to ensure that the BRT facility is used only by authorized, trained persons in a controlled and visible manner. Signage will be in place at all potential entry points to the busway and stations that clearly limits access to authorized vehicles and people only. Constant visual surveillance and camera monitoring will identify unauthorized users and staff will be sent to remove them. All maintenance staff / activities or any other use of the busway will need to be pre-authorized by the BRT operator. • Any BRT/motor vehicle or BRT/pedestrian/passenger accidents that occur will be immediately reported by the bus operator to the Peel Regional Police. The Peel Regional Police will be responsible for investigating the incident and for producing a formal accident report. The bus operators also have internal disciplinary procedures related to involvement in accidents or any other unsafe operational practice. • Vehicular accidents present the possibility of fuel spills to the environment and fire. Potential adverse effects associated with fuel spills will be address in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Potential adverse effects associated with fire will be address through the availability of fire suppressants, building sprinkler systems and rapid notification of, and response by, emergency services. • All precautions will be taken to avoid spills during construction and during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. In accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008), incidents that may result in possible contraventions of the City's Storm Sewer Bylaw will be referred to staff from the City's Transportation and Infrastructure Planning Division for investigation. • Within the City of Mississauga, Fire and Emergency Services and the Transportation and Works Department are able to provide and carry out a coordinated operational response to spills on a 24 hour basis. Both Fire and Emergency Services and Transportation and Works have available the necessary in-house and contracted material, equipment and personnel resources to provide a spill response. In particular, Fire and Emergency Services have a HAZMAT Team available to assist in spill incidents, while Transportation and Works have available an Emergency Response Vehicle that is stocked with supplies to handle minor spills. In addition, Transportation and Works have available on-call	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up

				emergency spill response contractors.
				• The following mitigation measures will be implemented to minimize impacts of potential spills:
				  • Employee "Best Practices" for drainage design;
				  • Control areas of used for refuelling;
				  • Mandatory and immediate contact with the appropriate regulatory authorities (e.g. MOE Spills Action Centre, DFO);
				  • Immediate contact with spill clean-up contractors; and
				  • Monitor and record spill clean up and submit required reports.
				• Workplace health and safety is addressed through provincial legislative requirements such as the *Occupational Health and Safety Act* and associated regulations.				

Effects of the Environment on the Project	Construction, Operation and Maintenance	Flooding (major rainfall), severe snowstorms, tornado, severe ice, watercourse flooding, heat waves, smog alerts, fog and fire. Please refer to **Section 5.3** for further discussion regarding the potential environmental effects.	ME	• Flooding has been addressed in the design of the facilities in accordance with Ministry of Transportation of Ontario Highway Drainage Design standards, and reflecting the 1992 Provincial Environmental Assessment (EA) and the 2004 Provincial EA Addendum, the current policies of the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation Authority (CVC), the City of Mississauga, Go Transit and MTO. The major drainage system components will be designed to manage a 100 year storm event (event statistically occurring once every 100 years). All minor system components (culverts) will be designed for the 10 year storm event. Given the rarity of a 100 year storm event, it is anticipated that the drainage and stormwater management system will effectively manage potential changes in rainfall patterns and quantity as a result of climate change. Additional details regarding stormwater management are provided in **Section 5.1.1.7**. • A snow removal program that maintains safe and efficient busway operation for vehicles and passengers will be developed and implemented by the facility operator. The snow removal plan will be developed with due consideration for potential effects to the surrounding environment (e.g. appropriate snow storage locations). • Regular maintenance will address many potential effects of the environment on the project. • Operating procedures, including proper facility maintenance and consideration of weather conditions warranting service suspension, will be developed during the implementation phase to address any potential operational impacts resulting from severe weather conditions. • The busway has several entry / exit ramps and sits within a grid of parallel and crossing roads that will allow stations or segments of the busway to be closed or restricted if necessary due to severe weather, with bus services rerouted to operate on roadways in general traffic or in temporary bus priority lanes. Similarly, parking facilities can be closed temporarily if necessary. The facility will be monitored at all times and decisions regarding operating procedures during periods of severe weather will follow protocols established by the City in consultation with GO Transit, the Ministry of Transportation, and emergency services. • In all cases, the safe operation of the BRT facility and implementation of appropriate	With the implementation of the identified mitigation measures potential for adverse effects can be minimized and no significant residual effects will occur.	NS	M	NA

Environmental Components	Project Phase/ or Component	Description of Potential Environmental Effects	Significance of the Effect	Recommended Mitigation Measures / or Best Management Practices (BMPs) and Commitments to Future Work	Residual Effect	Significance of Residual Effect	Monitoring	Follow-up
				measures to minimize/mitigate any adverse effects will be priorities. Necessary remedial actions (e.g. infrastructure repairs, re-vegetation of a disturbed slopes, etc.) will be undertaken in a timely manner and in accordance with all relevant legislation.				

S: Significant adverse environmental effect
ME: Minor adverse effect / mitigable effect (not significant)
NS: Not a significant adverse environmental effect
UN: Uncertain / Unknown effect
M: Monitoring required
F: Follow-up required
NA: Not required or not applicable

6.0 PUBLIC PARTICIPATION

6.1 PUBLIC PARTICIPATION UNDER SUBSECTION 18(3)

Although public participation is not mandatory for screenings under the *CEAA*, the RAs must determine whether public participation is appropriate in the circumstances.

- Is the RA of the opinion that public participation in the screening of the project is appropriate? Yes ☐ No ☒
- Scope of the project and factors to be assessed posted on the CEAR? Yes ☐ N/A ☒
- Public Notice to request public input posted on the CEAR? Yes ☐ N/A ☒

Public participation was not considered necessary as public consultation has been undertaken as part of the provincial environmental assessment process. As a result, it was not deemed necessary to duplicate public consultation efforts for this CEAA Screening. The following sections provide information regarding the public consultation completed to date.

6.2 OTHER PUBLIC PARTICIPATION

The Mississauga BRT project has been the subject of an extensive consultation process, stretching back to the late 1980s with the development of the Mississauga Transportation Study which established the preferred corridor. An in-depth public and agency consultation process was included in the 1990 – 1993 Provincial Environmental Assessment process (documented in the Provincial EA Report). It included surveys, cable television presentations, opinion polls, newspaper advertising, individual meetings, open public meetings, and agency liaison.

The Provincial EA Addendum process in 2003 – 2004 also had a full public and agency consultation process, covering the whole project but with a focus on aspects of the project that had changed since the 1993 plan. The Preliminary Design stage again incorporates liaison with all technical agencies and stakeholders, and features Public Information Centres along with an ongoing project updates and information on the City of Mississauga's website. Finally, a second Provincial EA Addendum process is underway to deal with further design changes, and this includes public consultation among residents in the specific affected areas. Newspaper and television coverage, combined with public notices and advertisements, have extended knowledge of the project among the general populace.

6.2.1 General Consultation Program

As noted in **Section 6.2**, the Mississauga BRT project has had a high public profile through the Provincial EA and EA Addendum processes, both of which featured full public consultation processes in accordance with the requirements of the Ontario EA Act.

At the current Preliminary Design stage, the City of Mississauga and GO Transit followed up on those earlier steps with a new public information program. This is to be carried out during the design, construction, and operation stages of the project. The program employs a number of means of informing the public of study developments and opportunities for interested members of the public to provide their input on the project, including:

- Project website (www.mississauga.ca/brt);
- Project newsletters;
- Public Information Centres;
- BRT Project Director appearing on cable television to discuss the project;
- Information displays and booths at related City events, including the *Building a City for the 21st Century* symposium; and
- Information brochures available on Mississauga Transit buses and in the City Centre Transit Terminal.

The project has a web page within the City of Mississauga internet site (http://www.mississauga.ca/portal/residents/brt); project material was available throughout the study for review and comment by the public.

6.2.2 First Set of Public Information Centres – April 2008

A first set of Public Information Centres (PICs) was held in April 2008, one in the east and one in the west segments of the study area.

The PICs used an "open house" format where members of the public could circulate through a series of display panels to familiarize themselves with the project, its history, and current state of development. Following that, the Project Director made a presentation of the overall project. The Project Team then carried out a series of group workshops with attendees focusing on key issues, and presented back to the attendees a summary of the workshop results. The first round of PICs attracted over 100 attendees.

The workshops were aimed at bringing out public ideas and input to the design, rather than providing a forum for criticism. This was done through asking a set of questions; the compiled responses are provided in **Appendix H**.

6.2.3 Ontario EA Addendum Consultation – June 2008

Residents adjacent to locations where the Preliminary Design study identified a need to change the alignment significantly, resulting in effects that may be different from those identified in the Provincial EA Addendum (2004), were invited to additional public information "drop-in" centres at City Hall on June 24 and 26, 2008 to review and comment on the changes. Residents, landowners and businesses living adjacent to areas of proposed alignment changes were notified of the drop-in centres by hand-delivered notices two weeks prior to the sessions.

The focus of the Drop-In Centres was to present to the public proposed changes to the Provincial EA-approved BRT alignment in five locations:

- Highway 403 S-W and E-N/S Ramps at Winston Churchill Boulevard;
- Hurontario Street / Sherwoodtowne Boulevard;
- Tomken Road;
- Dixie Station; and
- Eastgate Parkway / Fieldgate Drive

The Public Drop-In Centres were staffed and attracted a total of 43 registered attendees. In advance of the meetings, BRT Project Office staff met with a small community group (including Councilor Prentice) representing the Copseholm Trail residents to discuss the proposed modifications to the BRT alignment in the Eastgate / Fieldgate area on Monday, June 23rd, 2008. The community group expressed concern over the noise and visual effects of the proposal for the BRT to cross over Eastgate Parkway.

A total of five comment sheets were submitted at the sessions by the public. There were no attendees / comments at the sessions related to the Hurontario site, only one attendee commenting on the Tomken site, and one couple was interested in the Winston Churchill area. Most attendees were interested in the Fieldgate / Tomken location. BRT Project Office staff met individually with the most effected landowner at Hurontario Street.

While most attendees were supportive of the BRT concept, and recognized the need to introduce more environmentally-friendly and efficient travel options for Mississauga residents, there were some concerns related primarily to the potential for noise and visual effects associated with the proposed modifications.

In addition, on Monday June 23, 2008, BRT Project Office staff met with a small community group (Councillor Prentice was unable to attend) representing the Copseholm Trail residents to discuss the proposed modifications to the BRT alignment in the Eastgate / Fieldgate area. The community group expressed concern over the noise and visual effects of the proposed modifications (BRT to cross over Eastgate Parkway). The noise analysis conducted concluded that the noise effects were not significantly different. The Project Team will explore mitigation measures such as berming and landscaping to address the visual concerns.

6.2.4 Second Set of Public Information Centres – October 2008

A second set of Public Information Centres (PICs) was held in October 2008, one in the east and one in the west segments of the study area. The PICs were aimed at presenting interested members of the public with the proposed Preliminary Design plan, and soliciting their views on whether all the concerns expressed at earlier sessions had been adequately and appropriately responded to.

The PICs used an "open house" format where members of the public could circulate through a series of display panels to familiarize themselves with the project, its history, and current state of development. Project staff were available to answer questions or explain displays.

Fewer than forty people attended the second set of Information Centres. Some comment sheets were submitted, for review by the Project Team. No significant changes or concerns were raised by the public.

6.3 CONSULTATION WITH EXTERNAL DEPARTMENTS AND AGENCIES

As noted above, the Mississauga BRT project has featured intense and ongoing consultation with all technical agencies, government departments, utilities, and stakeholders through the provincial 1990 – 1993 EA and 2003 – 2004 EA Addendum process. The preparation of a Preliminary Design Report by the Ministry of Transportation of Ontario for the BRT West Park & Ride lots in 2006-07 also involved consultation with many of the same stakeholder agencies. Consultation has followed the City of Mississauga's and GO Transit's well-established protocols for involving and consulting with all interested and affected agencies in transportation projects, particularly those falling under the Ontario Environmental Assessment process.

City of Mississauga and GO Transit staff, departments, senior management, elected officials, and technical committees have been involved in the project on an as-needed basis, by written correspondence, telephone discussions, electronic mail, one-on-one meetings, group meetings, and presentations. This day-to-day liaison work within the proponent agencies is not documented here.

In the current Preliminary Design stage, the City of Mississauga and GO Transit have continued to liaise with agencies and stakeholders. The following agencies have received notification regarding this project:

- Transport Canada
- Indian and Northern Affairs Canada
- Toronto Region Conservation Authority (TRCA)
- Credit Valley Conservation (CVC)
- Ministry of Transportation (MTO)
- Ministry of the Environment (MOE)
- Ministry of Natural Resources (MNR)
- Ministry of Municipal Affairs
- Ministry of Public Infrastructure and Renewal
- Ministry of Aboriginal Affairs
- Region of Peel
- Regional Municipality of Halton
- City of Toronto
- City of Brampton

- Town of Oakville
- Oakville Transit
- Toronto Transit Commission
- Metrolinx (previously the Greater Toronto Transportation Authority)
- Greater Toronto Airports Authority
- Ontario Realty Corporation
- Ontario Provincial Police – Port Credit
- Mississauga Fire and Emergency Services
- Peel Regional Police
- Peel Paramedic Services
- Hydro One
- Bell Canada
- Enersource
- Rogers Cable
- Enbridge Distribution Inc.
- Sun-Canadian Pipe Line Company
- Trans-Northern Pipelines Inc.
- Enbridge Pipelines Inc.
- Imperial Oil (Sarnia Products Pipeline)
- Canadian Pacific Railway

Ongoing consultation has included one-on-one correspondence and/or meetings aimed at obtaining as up-to-date information on external interests, identifying potential issues, and providing input to appropriate management solutions. Please refer to **Appendix E** for related correspondence and meeting notes. Agencies involved in focused consultation include:

- Transport Canada
- Toronto Region Conservation Authority (TRCA)
- Credit Valley Conservation (CVC)
- Ministry of Transportation (MTO)
- Ministry of the Environment (MOE)
- Region of Peel
- City of Toronto
- Metrolinx (previously the Greater Toronto Transportation Authority)
- Greater Toronto Airports Authority
- Ontario Realty Corporation
- All utilities (aerial and buried) within or crossing the BRT corridor

Liaison scope and timing is determined on an issue-by-issue basis, and varies from agency to agency. The BRT proponents will continue to liaise with these agencies and any other stakeholders that may emerge through the Detail Design and construction process. Furthermore, there is a full range of staff and departments within the City and GO Transit with

an interest in the project, and the City's BRT Project Team continue to lead discussions with those on an as-needed basis. The City's senior staff and elected officials are briefed on the project on a regular basis.

6.4 COMMUNITY AND ABORIGINAL KNOWLEDGE

Indian and Northern Affairs Canada and the Ontario Ministry of Aboriginal Affairs were contacted to identify First Nations groups that should be consulted regarding this project. In consultation with those agencies it has been determined that no First Nation groups are located directly within the study area and there is no known active litigation related to First Nations in the vicinity of the study area. However, the Mississauga BRT Project is located within 50 km of two specific claims. There are no known specific claims directly within the study area. As such notification letters were sent to the Mississaugas of the New Credit First Nation and the Six Nations of the Grand River project information and to encourage their involvement should they hold any particular interest in the study area. The Six Nations of the Grand River have advised that they do not have any interest in the BRT Project. They did note that if the archaeological review reveals any remains, they need to be contacted and advised of the findings.

To date no response has been received from the Mississaugas of the New Credit First Nation. Please refer to **Appendix E** for copies of related correspondence. Please refer to **Section 5.1.2.2.1** for commitments to notifying and involving relevant First Nations upon the discovery of any archaeological resources of potential interest to one or more First Nation groups.

Potential effects on lands and resources used for traditional purposes by aboriginal persons have been examined by taking into account the knowledge of the study area and identifying potential effects on specific resources. The City of Mississauga is not aware of any current use of lands and resources for traditional purposes by aboriginal persons within the study boundaries. The urban and suburban nature of the study area limits many traditional land uses, including hunting, fishing and the gathering or harvesting of plants for traditional use. In addition, the sections specified below provide the information from which it has been concluded that this project will not likely result in significant adverse environmental effects to fish or fish habitat (**Section 5.1.1.1**), wildlife habitat (**Section 5.1.1.2**), vegetation (**Section 5.1.1.2**), or archaeological resources (**Section 5.1.2.2.1**).

6.5 CONSULTATION WITH PROPERTY OWNERS AND DEVELOPERS

The BRT corridor is flanked by some commercial properties where development is ongoing or is planned (primarily between Fieldgate Road and Renforth Drive). The BRT Project Office is involved on an ongoing basis in support of the City's other departments (primarily the Planning Department) regarding active development applications. The intent is to coordinate the design and timing of private works with that of the BRT project, to optimize the outcome for both parties. These discussions range from development concept review to property protection to architectural / site plan review to field meetings regarding utility relocation coordination.

This process will continue through the busway design and construction period, in response to developer initiatives and owner enquiries. Resolution of any issues that arise is through the processes set out in the *Planning Act*.

7.0 MONITORING PLAN

As per section 20(2) of the *CEAA*, Transport Canada and Infrastructure Canada are responsible for ensuring that mitigation measures will be implemented.

- Monitoring Plan to be developed for this project? Yes ☒ No ☐
- Other RAs / FAs will assist in monitoring? Yes ☐ No ☒
- The Proponent will be reporting on implementation of mitigation measures? Yes ☒ No ☐

8.0 FOLLOW-UP PROGRAM

- Is a *CEAA* Section 38 follow-up program considered appropriate for this project? Yes ☐ No ☒

The proponents will implement a construction administration and monitoring program to ensure compliance with the terms and conditions of the CEAA Screening and the associated mitigation measures and commitments to future work. The administration and monitoring operations will be documented and can be made available for review. Environmental specialists will conduct monitoring to ensure mitigation measures are carried out. Monitoring reports will be provided to the Responsible Authorities at regular intervals (please see **Section 12.0** for details), negating the need for a formal follow-up program under *CEAA*.

9.0 REFERENCES

Bakowsky, W.D. 1996. Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario. Ontario Ministry of Natural Resources, Peterborough, Ontario.

Barr, D. Summer 1994. Not Your Common Crayfish. *Seasons.* Vol. 33, No. 2. Federation of Ontario Naturalists.

Bird Studies Canada. 2001. Ontario Breeding Bird Atlas: Guide for Participants. Environment Canada: Canadian Wildlife Service.

Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario (Third Edition). Ontario Geological Survey. Special Volume 2.

City of Mississauga. 1991. Mississauga Transitway Planning Study - Mavis Road to Ridgeway Drive Existing Natural Features, Potential Impacts and Recommended Mitigation.

City of Mississauga. 1992. Mississauga Transitway Environmental Assessment Report.

City of Mississauga. 1992. Mississauga Busway Functional Planning Study.

City of Mississauga. 2004. Salt Management Plan.

City of Mississauga. 2004. Mississauga Transitway Environmental Assessment Addendum.

City of Mississauga. 2005. Mississauga Plan (Official Plan). <http://www.mississauga.ca/file/COM/CP_Section6_2.pdf>

City of Mississauga. 2006. Natural Areas Survey – Maps and Fact Sheets. City of Mississauga. <http://www.mississauga.ca/file/COM/NAS2005Update.pdf>

City of Mississauga. 2007. E.Kliwer: Personal Communication via email October 15th, 19th and December 20, 2007*;* Natural Areas Survey Information.

City of Mississauga. 2008. Backgrounder on Mississauga's BRT. <http://www.mississauga.ca/portal/residents/brtbasics?paf_gear_id=9700018&itemId=102600571n#_ftnref1> Viewed June 30, 2008.

City of Mississauga. 2008. City of Mississauga Spill Response Plan January 2008.

City of Toronto. 2007. Official Plan; Map #9. <http://www.toronto.ca/planning/official_plan/introduction.htm>

Clayon, John. 2007. Personal Communication. Credit Valley Conservation Authority.

COSEWIC. 2002. Assessment and Status Report on the Eastern Milksnake *Lampropeltis tirangulum* in Canada. Ottawa. May 2002. Vi + 29 pp.

COSEWIC. 2008. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada. April 2007. 84 pp.

Crocker, D.W., and D.W. Barr. 1968. Handbook of the Crayfishes of Ontario. Life Sciences Miscellaneous Publications, Royal Ontario Museum. Toronto: University of Toronto Press.

Davies, S. and Holysh, S. 2007. Groundwater Resources of the Credit River Watershed; Ontario Geological Survey, Groundwater Resources Study 6, 132p.

Department of Fisheries and Oceans Canada. 2008. Doherty, Andrea: Personal Communication.

Department of Fisheries and Oceans Canada. 2007a. Toronto and Region Conservation Authority: Species-at-Risk Distribution Mapping.

Department Fisheries and Oceans Canada. 2007b. Credit Valley Conservation Authority: Species-at-Risk Distribution Mapping.

Dunn, E.H., J.Bart, B. Collins, B. Craig, B. Dale, C. Downes, C. Francis, S. Woodley, and P. Zorn. 2006. Monitoring Bird Populations in Small Geographic Areas: Special Publication Canadian Wildlife Service March 2006. Environment Canada: Canadian Wildlife Service.

Environment Canada. 2008. Species-at-Risk map-based Search Tool. <http://www.sis.ec.gc.ca/ec_species/ec_species_e.phtml>

Environment Canada. 2007. Area-sensitive Forest Birds in Urban Areas. Canadian Wildlife Service.

Environment Canada. 2004. Code of Practice for the Environmental Management of Road Salts. <http://www.ec.gc.ca/nopp/roadsalt/cop/pdf/1774_EngBook_00.pdf>

Experimental Farms Services. 1955. Soil Survey of York County. Department of Agriculture.

Geomatics International. 1996. Cawthra Bush Natural Areas Survey, City of Mississauga. <http://cawthra-bush.org/BIOLOGICAL/BIOLOGICAL_DOCUMENTATION/fs1996.htm>

Greater Golden Horseshoe Conservation Authority. 2006. Erosion and Sediment Control for Urban Construction. <http://www.sustainabletechnologies.ca/>

GO Transit. 2001. Bus Services Division – Fluid Spills.

GO Transit. 2006. Station Operations Maintenance Procedures – Response to Environmental Emergencies.

Jones, R. 1982. Zinc and cadmium in lettuce and radish grown in soils collected near electrical transmission towers. Water, Air & Soil Pollution; Springer Netherlands. Volume 19, no. 4, pp. 389-395.

Lee, H.T, W.D. Bakowsky, J.L. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Region, Science Development and Transfer Branch. Technical Manual ELC-005.

Ministry of Agriculture and Foods. 1953. Soil Survey of Peel County. Ministry of Agriculture and Foods.

Ministry of the Environment. 2001. A Groundwater Monitoring Network and Partnership for Ontario. Environmental Monitoring and Reporting Branch, Toronto, Ontario.

Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual, March 2003.

Ministry of Municipal Affairs and Housing. 2005. Greenbelt Plan-Schedules 1 and 4. Government of Ontario.

Ministry of Municipal Affairs and Housing. 2002. Oak Ridges Moraine Conservation Plan. Government of Ontario.

Ministry of Natural Resources. 2007. Robinson, Suzanne: Personal Communication. Ministry of Natural Resources, Aurora District.

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

Ministry of Natural Resources. 1999. Natural Heritage Reference Manual: For Policy 2.3 of the Provincial Policy Statement. June 1999.

Ministry of Transportation. 2007. Southern Highways Program 2007 to 2011. <http://www.mto.gov.on.ca/english/pubs/shp2007/shp.html> Viewed June 30, 2008.

Ministry of Transportation. 2008. Highway Drainage Design Standards, January 2008.

Natural Heritage Information Centre (NHIC). 2008. NHIC website. Ontario Ministry of Natural Resources. <http://nhic.mnr.gov.on.ca/MNR/nhic/data.cfm>

Newmaster, S.G., A. Lehela, P.W.C. Uhlig, S. McMurray, and M.J. Oldham. 1998. Ontario Plant List. Ontario Ministry of Natural Resources. Ontario Forest Research Institute, Sault Ste. Marie, Ontario, Forest Research Information Paper No. 123.

Ontario Geological Survey. 1991. Map 2544 - Bedrock Geology of Southern Ontario.

Ontario Ministry of Natural Resources. 1972. Map 2224 - Physiography of the South Central Portion of Southern Ontario.

Redside Dace Recovery Team. 2005. Recovery Strategy for Redside Dace in Ontario 2005-2009.

Region of Peel. 2005. Official Plan. Region of Peel.

Royal Ontario Museum. 2008. Species-at-Risk. <http://www.rom.on.ca/ontario/risk.php?region=5>

Toronto and Region Conservation Authority. 2007a. S. Lingertat: Personal Communication November 30, 2007. McCormick Rankin Corporation.

Toronto and Region Conservation Authority. 2007b. B. Williston: Personal Communication at Meeting October 24, 2007. McCormick Rankin Corporation.

Toronto and Region Conservation Authority. 2007c. L. James: Personal Communication via e-mail October 5, 2007. McCormick Rankin Corporation.

Toronto and Region Conservation Authority. 2007d. *S.Smith*: *Personal Communication via e-mail December 11, 2007*. McCormick Rankin Corporation.

Toronto and Region Conservation Authority. 2006a. Etobicoke and Mimico Creeks Watershed Report Cards. <http://www.trca.on.ca/website/TRCA/Website.nsf/WebPage/EtobicokeMimicoCreekWatersheds?OpenDocument&ppos=3&spos=1&tpos=2&rsn=#turning>

Toronto and Region Conservation Authority. 2006b. GTAA Living City Project-Etobicoke Creek-The Terrestrial System. Toronto and Region Conservation Authority.

Toronto and Region Conservation Authority. 2004. *Draft Terrestrial Natural Heritage Report*. Toronto and Region Conservation Authority.

Toronto and Region Conservation Authority. 2008. Site Meeting-June 18, 2008. Toronto and Region Conservation Authority; Ecoplans Limited, McCormick Rankin Corporation.

Transport Canada. 2007. Scoping Document for the Mississauga BRT Project.

Szuba, K. and B. Naylor. 1998. Forest Raptors and their Nests on Central Ontario. Southcentral Sciences Section Field Guide FG-03. <http://www.lrconline.com/productioncentre/pagelayout/images/Hawk_Guide.pdf>

Varga, S., et al. 1999. The Vascular Plant Flora of the Greater Toronto Area (Rough Draft). Ontario Ministry of Natural Resources, Aurora.

10.0 *CEAA* DETERMINATION

On the basis on this Screening and in accordance with subsection 20(1) of the *CEAA*, Transport Canada and Infrastructure Canada have determined that:

☐ The project is not likely to cause significant adverse environmental effects with the application of the mitigation measures specified in this report. **The project can proceed upon receipt of <u>all</u> required approvals.**

☐ The project is likely to cause significant adverse environmental effects that cannot be justified. The project does not proceed.

☐ The project must be referred to the Minister of the Environment for a Mediation or a Review Panel because:

- ☐ of uncertainty as to whether the project is likely to cause significant adverse environmental effects;
- ☐ the project is likely to cause significant adverse environmental effects;
- ☐ of public concern.

Decision Date:

11.0 SIGN-OFF

Project Title:	Mississauga Bus Rapid Transit Project		
NWPP File No.:	8200-08-6145		
***CEAA* Decision:**			
Posted on CEAR:	Yes ☒ No ☐	CEAR No.:	07-01-31000

1. Environmental Screening PREPARED by:

_____ Date _____

Title: **Mr. Mike Bricks, MCIP, RPP**
Senior Environmental Planner
Ecoplans Limited

The above has prepared this environmental screening report to the best of her/his ability or knowledge.

2. Environmental Screening RECOMMENDED by:

_____ Date _____

Title: **Ms. Kathryn Cooper-MacDonald**
Environmental Assessment Officer
Surface Infrastructure Programs, Highways and Borders
Transport Canada

The above has reviewed the environmental screening report and agrees that it meets the requirements of the *CEAA*.

3. Environmental Screening APPROVED by:

_____ Date _____

Title: **Mr. Keith Grady**
Senior Advisor, Environmental Review and Approvals
Issues Management Directorate
Program Operations Branch
Infrastructure Canada

The above has reviewed the environmental screening report and approves the *CEAA* Decision.

4. Environmental Screening APPROVED by:

_____ Date _____

Title: **Mr. John Hnatyshyn**
Acting Director - Transit Projects
Surface Infrastructure Programs, Transit
Transport Canada

The above has reviewed the environmental screening report and approves the *CEAA* Decision.

5. Mitigation Measures ACCEPTED by:

_____ Date _____

Title: **Mr. Geoff Wright P.Eng., MBA**
Project Director, Mississauga BRT Office
City of Mississauga

The proponent has read and understood this environmental screening report and accepts responsibility for the implementation of the mitigation measures.

6. Mitigation Measures ACCEPTED by:

_____ Date _____

Title: **Ms. Judy Knight**
Vice-President, Corporate Infrastructure
GO Transit

The proponent has read and understood this environmental screening report and accepts responsibility for the implementation of the mitigation measures.

12.0 MONITORING PLAN

Pursuant to the *CEAA* Section 20 (2.1), the signatory Federal Departments/Agencies and/or Provincial/Territorial Departments/Agencies accept responsibility for providing Transport Canada and Infrastructure Canada with assurance that mitigation measures identified under their Department/Agency within this monitoring plan are implemented.

It is expected that the Proponent will be responsible for implementing the measures unless otherwise noted. Upon implementation of the mitigation measures, a written confirmation must be provided to Transport Canada and Infrastructure Canada according to frequencies prescribed below. It is intended that **Table 12-1** (Mitigation Measures [Site-Specific Measures and non-BMPs]) and **Table 12-2** (BMPs) will form the reporting template and must be submitted with each round of monitoring reporting. It is proposed that a monitoring report will be submitted to the Responsible Authorities once at the end of Detail Design (to monitor the transfer to mitigation measures to the final design and contract package(s)) and at least once every three months during construction. In addition, monitoring reporting will be submitted once during the winter and once during the summer in the first year of operations. The approach to monitoring reporting can be further discussed with Transport Canada and Infrastructure Canada during Detail Design to ensure that the monitoring reporting will meet the needs of Transport Canada, Infrastructure Canada and the proponents.

It is important to note that, although the CEAA Screening Report refers to “mitigation measures”, many of the measures identified in the report are Best Management Practices (BMPs). For the purposes of **Table 12-1** “mitigation measures” are those measures that address unique site-specific effects or are otherwise not considered to be BMPs. Commitments to future work are also documented in **Table 12-1**.

Monitoring Plan

Project Name:	Mississauga Bus Rapid Transit Project
Transport Canada File No.:	
NWPP File No.:	8200-08-6145
Decision Date:	
Proponent/Contractor:	
Project Start Date:	
Project End Date:	
Name of Field Supervisor:	
Email:	
Telephone No.:	
Monitoring Plan Schedule:	Construction Monitoring: Once at the end of Detail Design and at least once every three months during construction (*to be confirmed during Detail Design*) Operation/Maintenance: Once during the winter and once during the summer in the first year of operations.
Photos required:	**Yes** ☐ **No** ☐
PLEASE SEND COMPLETED FORM TO TRANSPORT CANADA SURFACE INFRASTRUCTURE PROGRAMS –AT FAX# 613-990-9639 OR BY EMAIL AT mo.tayyaran@tc.gc.ca UPON MONITORING PLAN SCHEDULE.	

Table 12-1 Mitigation Measures [Site-Specific Measures and non-BMPs] and Commitments to Future Work

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
Construction	**Fish and Fish Habitat**	The following design measures will be implemented at the Little Etobicoke Creek: 1. The extension of the existing Little Etobicoke Creek crossing structure will be designed and installed to enhance flow conveyance/fluvial processes, channel stability and fish movement opportunities. 2. The existing low concrete weir/seasonal barrier to fish movement and the Jersey barrier will be removed, and the portions of channel disturbed to install these features and the culvert footing extensions will be re-instated using naturalized approaches that will enhance channel stability and fluvial processes. 3. A stable low flow channel through the east cell extension will be created. The invert of the east cell will be 'set' at the existing channel invert to convey the low flow, however the inverts of the central and west cells will be 'set' above the low flow cell so that they function only to convey overbank and 'flood' flows. This will require re-grading and transitioning of the floodplain into the inlet ends of these cells, with stable 'ramping down' into the existing culverts (to avoid loss of hydraulic capacity but prevent flow from entering these cells until desired elevation).	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure (*Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column*)**	**Measure Implemented**		**Photos or document No.**	**Date**
		4. The new low flow and bankfull channel sections will be installed to transition smoothly with the upstream channel section. Riffle/flat habitat and substrate will be maintained or created/re-instated along the low flow channel through the east cell. 5. The grade change at the weir will be addressed through design of a stable riffle or riffle ramp, or series of riffles through the channel section (depending on the specific gradient change required). 6. All disturbed bank and valley areas will be re-vegetated, with consideration of enhancement of the existing woody riparian cover.				
	Vegetation, Wetlands, Wildlife and Migratory Birds	7. Implement the City's typical vegetation replacement and enhancement protocols for both woody vegetation and the wetland pockets removed by the project, based on CVC and/or TRCA's guidelines, with consideration of landownership and usage, including utilities. Specific vegetation replacement is anticipated to be required for RW1, as well as the larger regulated wetland pockets. Candidate areas that exhibit the best potential for vegetation and habitat enhancement are the Etobicoke Creek floodplain, the NE4SMA area east of Cawthra Road, and the Little Etobicoke riparian corridor. Other opportunities such as acquisition of existing forest areas will also be explored. Related consultation with TRCA and CVC will continue during Detail Design (see	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		Appendix E for related correspondence and meeting notes). 8. Supplement/enhance existing vegetation cover with planting of native species, including the restoration of disturbed areas, and within those areas highlighted above. Enhancement of woody cover along the City's identified 'Natural Linkage' area to improve the quality of the local wildlife habitat and linkage functions will also be considered in consultation with the landowners and utility operators. 9. Review design opportunities further during Detail Design, in consultation with City staff, to minimize encroachment and maintain wildlife movement opportunities along the City's Linkage Area in relation to design of slopes, location of fencing, plantings, etc. This may include identification of opportunities to improve the linage function where feasible and practical. Objectives related to wildlife movement must ultimately recognize the nature of the project limits and the adjacent land uses.				
	Species of Conservation Concern and Species at Risk	Additional mitigation measures that will be completed during Detail Design include: 10. Completion of additional in-season botanical surveys for Squirrel Corn, Bellwort and Sharp-leaved Hepatica in RW1. 11. Completion of additional in-season botanical surveys for	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		locally rare (L rank: L1, L2 and L3) species in the wetland pocket in NE4SMA may be warranted should the footprint of the BRT alignment change (with final grading limits developed during Detail Design or any other shifts to the alignment). 12. Preparation of appropriate salvage and re-instatement measures (e.g. transplant, seed bank salvage, sod mats, seed harvest) for any relevant species that may be identified. The following mitigation measure, in combination with the standard mitigation measures for protection of wildlife generally as outlined above (see Vegetation, Wetlands, Wildlife and Migratory Birds), will minimize negative effects and may provide a net benefit to the potential Monarch habitat: 13. Native seed mixes containing Common Milkweed will be used when re-establishing vegetation within disturbed areas of the right-of-way.				
	Air Quality	14. To mitigate emissions from construction equipment, the Contractor will be required to keep equipment in good operating conditions and efforts will be made to minimize the idling of equipment, especially during smog alerts. When smog advisories are issued, the City of Mississauga will discuss the scheduled activities with the Contractor to determine what steps can be taken to further limit air emissions without unduly affecting the	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		Contractor's schedule.				
	Contaminated Sites, Waste Management and Storage of Access Materials	15. A contaminant investigation including subsurface investigation (i.e. boreholes) will be carried out in the areas of high and moderate potential for contamination identified in Section 4.1.6 with the exception of Area 10 (Etobicoke Creek). The purpose of the subsurface investigations is to ascertain the presence or absence of soil and/or groundwater contamination in order to develop appropriate measures to manage excess materials during the construction. Discussions are ongoing with property owners regarding permissions to enter property to complete the work. The exact schedule for completion of the contaminant investigation work is unknown as it is subject to field conditions and property access; however, the site investigations will be completed as soon as possible during Detail Design. A copy of the contaminant investigation report will be provided to Transport Canada and Infrastructure Canada for their review. That investigation will characterize the chemical quality of the soil, in light of the potential impacts identified in the Contamination Overview Study. This will facilitate appropriate soil management options per O. Reg. 153/04 and O. Reg. 347 during construction; and will provide timely data required to maintain and improve excavation progress and, thereby, minimize work delays.	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		16. Soil and rock management principles have been developed to aid in appropriately identifying how excess materials will be segregated, staged, transported and reused within the corridor or disposed of off-site. 17. On-site aesthetic field screening of soils and other materials excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works. 18. During excavation activities, any soil that exhibits visual or olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options. 19. Additional details regarding segregation are included in **Section 5.1.1.5**. 20. On-site aesthetic field screening of shale bedrock excavated during construction activities will be performed using visual, olfactory and Total Organic Vapor (TOV) measurements on a case-by-case basis. This will form an integral part of the source segregation during excavation works. 21. During excavation activities, any shale bedrock that exhibits visual or olfactory evidence of environmental impacts will be chemically tested to confirm environmental quality to determine disposal options. 22. TRCA and CVC will be consulted with as necessary				

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		during Detail Design regarding the placement of fill and any associated requirements for permits. 23. All non-soil/rock material (e.g. concrete, masonry, asphalt, wood, metals etc.) will be separated from excess soil and bedrock generated during construction, as each of these materials follow a different waste stream. During the course of excavation activities, temporary stockpiling of non-soil/rock material will likely occur. All stockpiled material will be located away from active work areas and either disposed of at an off-site recycling facility or licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.				
	Groundwater	24. During Detail Design, the locations of the three water wells noted in **Section 5.1.1.6** will be verified in the field to determine their presence or absence and exact location, as the geographic coordinates supplied by the MOE may not be accurate or may contain a substantial degree of error (e.g. accurate to within 200 m). If these wells are confirmed to be located within construction zones they will be decommissioned in accordance with Ontario Regulation 903 under the *Ontario Water Resources Act* (*OWRA*). If they are still in use (by businesses or private owners) an alternate source of water will be provided to those owners. Consideration will also be given to potential indirect effects to any	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		water wells and appropriate mitigation will be developed as warranted. During Detail Design Transport Canada and Infrastructure Canada will be provided with an update regarding the existence and use of water wells and any additional mitigation measures that are identified towards ensuring that water wells and water well use are not adversely affected by the project.				
	Stormwater Management	25. The management of the construction process and the addition of new or revised system elements will focus on avoiding disruption to the existing system, again using experienced contractors and close oversight by the proponent, working closely with the appropriate Conservation Authority (i.e. CVC or TRCA) and local property owners (e.g. MTO).	Yes ☐	No ☐		
	Noise	26. In accordance with the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992) the City of Mississauga is committed to completing an updated noise assessment prior to the completion of Preliminary Design. The updated noise assessment will reflect current design plans, land use, and will assess noise associated with the vehicles proposed to be used along the busway. The updated noise assessment will be provided to Transport Canada, Infrastructure Canada and the Ontario Ministry of the Environment for review. The Responsible Authorities will determine if further Federal Authority review is required.	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		27. It is possible that the updated noise assessment will identify potential noise effects that will warrant a review of the application of noise mitigation measures. Should mitigation be warranted the updated noise assessment will include a review of appropriate noise control measures with consideration given to the technical, administrative and economic feasibility of the various alternatives. 28. A monitoring program will be implemented to monitor for potential effects due to construction noise. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design and MOE will be consulted as necessary in the development of the program.				
	Archaeology	29. Undertake a Stage 2 Archaeological Assessment for works in the identified undisturbed areas. Discussions are ongoing with property owners regarding permissions to enter property to complete the Stage 2 Archaeological Assessment. The exact schedule for completion of the Stage 2 Archaeological Assessment work is unknown as it is subject to field conditions and property access; however, the assessment will be completed as soon as possible during Detail Design. 30. If archaeological finds are discovered, Stage 3-4 mitigation will be undertaken as required in accordance with the guidelines and policies of the Ministry of	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		Culture. Consultation will occur with the Ontario Ministry of Culture and, if applicable, potentially interested First Nations to discussion mitigation strategies if sites are found as part of the Stage 2 Assessments. Copies of the Stage 2 Archaeological Assessments will be provided to Transport Canada and Infrastructure Canada for their review. 31. Submit any additional Archaeological Assessments a minimum of 90 days prior to construction to the Ministry of Culture. 32. As noted above, the commitment has been made to complete all necessary archaeological assessments towards ensuring that the proposed works do not result in any significant adverse effects. Please refer to **Section 5.1.2.2.1** for a description of Stage 2, 3 and 4 Archaeological Assessments.				

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
	Navigability	33. The widening of the Etobicoke Creek structure has been designed so as to maintain navigability. The widening of the Etobicoke Creek structure will be constructed so as not to allow debris to fall, thereby preventing a potential health and safety hazard for boaters and people using the valley pathway below. As a result, potential adverse effects during and after construction are considered to be mitigated (approval under the *NWPA* will be required). The crossing of the Etobicoke Creek will require the following mitigation and commitment to future work: • Apply to Transport Canada for approval under the *NWPA;* • Consult with Transport Canada and the TRCA to finalize design, methodology and timing; • Abide by all Conditions of Approval that may be identified in the approval under the *NWPA*; and • Ensure debris does not fall into the water during construction.	Yes ☐	No ☐		
	Pipelines	34. Ongoing liaison with the pipeline owners will occur through the Detail Design stage. 35. Prior to construction, obtain agreements from pipeline owners for the pipeline crossings	Yes ☐	No ☐		
Operation/ Maintenance	**Fish and Fish Habitat**	36. Surface runoff will be directed to storm water management facilities to provide Enhanced (Level 1)	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		quality control. Details are included in **Section 5.1.1.7**. These measures were designed with input from the project biologists to protect potentially sensitive functions of the natural features. 37. CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.				
	Vegetation, Wetlands, Wildlife and Migratory Birds	38. CVC and TRCA will be consulted, as appropriate, towards ensuring that potential adverse effects to the natural environment are mitigated using appropriate mitigation measures.	Yes ☐	No ☐		
	Air Quality	39. In accordance with a requirement made during the Provincial Environmental Assessment, air pollution levels in adjacent areas will be measured prior to and following the commencement of operations along the busway at potentially affected residential sites. Details regarding the measurement requirements and locations will be determined during Detail Design. 40. The forecast vehicle fleet that will be operating on the busway consists of a mix of current Mississauga Transit and GO Transit vehicles, with potential use in part by the Toronto Transit Commission. The vehicles currently being employed by these agencies include:	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		➢ Standard Bus: New Flyer Industries D40LF (with rear mount A/C) ➢ Intercity Bus: Motor Coach Industries D4500CT ➢ Double-Deck Bus: Alexander Dennis Enviro 500 12.8m LH Body ➢ Articulated Bus: New Flyer Industries D60LF (with rear mount A/C) ➢ Representative BRT Bus: New Flyer Industries DE60LF-BRT The current bus fleets are entirely diesel-fuelled. As the City of Mississauga and GO Transit decommission vehicles and update their fleet, consideration will be given to employing alternative fuel technologies (Compressed Natural Gas [CNG], diesel-electric, low sulphur diesel, biodiesel, etc). It should be noted that the funding agreement for the Mississauga BRT Project included an allowance for the purchase of new BRT-specific vehicles (indicated above as "Representative BRT Bus"); however, the propulsion system to be employed will be identified as part of a separate study.				
	Groundwater	41. Construction activities associated with the project such as culvert works, road improvements and in-or-near stream modifications/diversions have the potential to affect shallow groundwater and surface water resources within the study area. As a result, it is possible that a	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure** (***Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column***)	**Measure Implemented**		**Photos or document No.**	**Date**
		PTTW will be required for one or more components of the construction works. During Detail Design the PTTW requirements for the construction works will be identified in consultation with the MOE. All PTTW applications and supporting documents will be prepared and signed by a Qualified Person in accordance with MOE requirements. Additional details regarding PTTW are provided in **Section 5.1.1.6**. 42. In addition to any mitigation developed as part of the PTTW process, construction mitigation measures will be implemented to control the release of debris from construction activities, and fabrication and landscaping activities from potentially adversely effecting the environment. These measures are outlined in **Section 5.2**.				
	Noise	43. Opportunities to reduce operational noise effects through design will be identified and reviewed Detail Design. 44. In accordance with the Mississauga Transitway Environmental Assessment Report (City of Mississauga 1992) the City of Mississauga is committed to ensuring that noise levels are monitored prior to and during the operation of the busway. The noise monitoring program requirements will be identified in the updated noise assessment and confirmed during Detail Design and MOE will be consulted as necessary in the development	Yes ☐	No ☐		

MITIGATION MEASURES AND COMMITMENTS TO FUTURE WORK TO BE ADHERED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.						
Project Phases/ Activities	**Environmental Components**	**Department / Mitigation Measure (*Note: Transport Canada and Infrastructure Canada will be the Departments for all measures listed in this column*)**	**Measure Implemented**		**Photos or document No.**	**Date**
		of the program. It is possible that the monitoring may identify noise effects that will warrant a review of the application of new or modified noise mitigation measures. Should additional mitigation be warranted a review of appropriate noise control measures will be completed with consideration given to the technical, administrative and economic feasibility of the various mitigation alternatives.				

Completed by:

Signature: _____ **Date:** _____

Name: _____

Title: _____

Table 12-2 Best Management Practices

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
Construction	**Fish and Fish Habitat**	1. Based on the character of the habitat conditions and resident fish communities, the following commitments to future work and standard mitigation measures will be implemented to mitigate potential adverse effects during construction: • A warmwater construction-timing window restriction (between March 15 and July 1) will be used for all required instream works. • All works will be completed as per the Greater Golden Horseshoe Area Conservation Authorities' (2006) *Erosion and Sediment Control for Urban Construction* document will be implemented to prevent erosion and migration of sediment-laden runoff from the construction zone to the watercourses. A copy of that document can be provided upon request. The general approach is to prepare a detailed sediment and erosion control plan that implemented prior to and adapted during construction. The plan generally includes common measures such as: • inspection and maintenance of sediment control measures until final cover is established; and • vegetation management to preserve, protect and restore riparian vegetation including: minimizing the removal of riparian vegetation, particularly woody vegetation, replacing removed woody riparian vegetation with appropriate native species, and encouraging the planting to enhance riparian cover. Additional measures pertaining to vegetation replacement and valley slope stability (at Etobicoke Creek) are outlined in **Section 5.1.1.2**. • All works will be completed in accordance with the City of Mississauga's Sediment and Erosion Control Bylaw. A copy of the bylaw can be provided upon request. • Appropriate temporary flow diversion/bypass measures will be employed during construction of the Little Etobicoke Creek extension and at the Cooksville Creek culvert, to isolate the construction zone and maintain clean flow downstream flow at all times. The appropriate means of flow management will be developed during Detail Design by the project hydrologist based on the flow regime, in consultation with the project biologist. If temporary cofferdams

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		or flow barriers are used, they will be constructed of non-sediment generating materials (i.e. gravel bags, clean stone with no fines). If temporary disturbance along the channel edges is required to install the footings, appropriate containment measures (e.g., coffer dam systems) will be used to isolate the temporary work areas. • In accordance with a commitment made during the Provincial Environmental Assessment, sample monitoring for water quality and siltation will be undertaken at Cooksville Creek and Etobicoke Creek for a period of one year following completion of construction. The monitoring plan will be developed during Detail Design. • Any required temporary water intake hoses used for temporary dewatering / flow transfer (i.e., at Little Etobicoke Creek) will be screened. • Any fish stranded in the isolated work zone (i.e., at Little Etobicoke Creek) will be captured and transferred up or downstream of the work zone. • Appropriate settling and energy dissipation measures will be used for discharge of water for all temporary flow transfer and/or dewatering activities. • No fording of the watercourses will occur without authorization by TRCA or CVC (as appropriate). • All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response. 2. All debris and potential contaminants (e.g. concrete and structural materials, paint and solvents, sand-blasting) generated the construction works will be properly contained to prevent debris from entering the watercourses, and all debris will be properly disposed of off-site. This will include use of appropriate isolation measures (e.g., contained platforms) during construction of the extended

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		bridge deck platform at Etobicoke Creek.
	Vegetation, Wetlands, Wildlife and Migratory Birds	3. Implement protection measures and proper clearing techniques during construction to protect retained vegetation and local habitat including: • Minimize the removal of vegetation, particularly woody vegetation, to that required for the BRT project. • Clearly delineate vegetation areas adjacent to the BRT corridor to be protected (e.g., on Contract drawings and in the field), including erection of temporary tree protection where appropriate (e.g., RW1, Etobicoke Creek east valley slope, Little Etobicoke valley) to preclude construction equipment access, temporary storage and other construction activities. Maintain fencing throughout construction. • Fell trees away from retained vegetation and watercourses to avoid damage and disturbance. • Restrict grubbing of trees to the required footprint zone; in adjacent areas of the right-of-way within the natural areas, tree stumps will be cut flush to the ground and grubbing avoided in order to minimize soil disturbance, particularly in erosion prone areas on the Etobicoke Creek valley slope. • 'Repair' or remove trees damaged during clearing. 4. Employ appropriate sedimentation and erosion control measures as per the Erosion and Sediment Control for Urban Construction (Greater Golden Horseshoe Conservation Authority 2006). 5. Implement protection measures and proper clearing techniques during construction to protect retained vegetation and local habitat including: • Minimize the removal of vegetation, particularly woody vegetation, to that required for the BRT project. • Clearly delineate vegetation areas adjacent to the BRT corridor to be protected (e.g., on Contract drawings and in the field), including erection of temporary tree protection where appropriate (e.g., RW1, Etobicoke Creek east valley slope, Little Etobicoke valley) to preclude

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		construction equipment access, temporary storage and other construction activities. Maintain fencing throughout construction. • Fell trees away from retained vegetation and watercourses to avoid damage and disturbance. • Restrict grubbing of trees to the required footprint zone; in adjacent areas of the right-of-way within the natural areas, tree stumps will be cut flush to the ground and grubbing avoided in order to minimize soil disturbance, particularly in erosion prone areas on the Etobicoke Creek valley slope. • 'Repair' or remove trees damaged during clearing. 6. Employ appropriate sedimentation and erosion control measures as per the Erosion and Sediment Control for Urban Construction (Greater Golden Horseshoe Conservation Authority 2006) and the City of Mississauga's Erosion and Sediment Control Bylaw. A copy of both documents can be provided upon request. 7. Maintain the general local drainage areas to the wetland pockets (e.g., avoid extensive diversion of surface flows into or away from these features), and manage any stormwater management outfalls to avoid large changes to the frequent storm runoff regime. 8. Prevent disposal of wetland material containing Phragmites or Purple Loosestrife (or other invasive species) in or near retained wetland pockets. 9. Site temporary storage areas away from the remnant woody vegetation areas and away from the valley slopes. 10. Appropriately dispose of all construction-related debris following construction. 11. Ensure an environmental inspector is on site during construction to ensure compliance with mitigation measures. 12. Re-stabilize and re-vegetate disturbed valley slopes and creek banks following construction. 13. Prevent harm to any wildlife encountered incidentally during construction. Consider contractor-awareness training to emphasize avoidance of disturbing or harassing wildlife. 14. All precautions will be taken to avoid spills during construction. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other applicable

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response. 15. In order to avoid potential adverse environmental effects on migratory bird species that may breed in the project area the following measures will be implemented: 16. Any construction, maintenance, operation and decommissioning activities with the potential to destroy or disturb migratory birds shall not take place in migratory bird habitat during the breeding season that, in this location, is generally defined to be from May 1 – July 31. 17. If the proponent must conduct works that could potentially destroy migratory birds or their nests within breeding bird habitat during the identified breeding season for migratory birds, a nest survey will be conducted by a qualified avian biologist prior to commencement of the works to identify and locate active nests of species covered by the *Migratory Birds Convention Act*. A mitigation plan (which may include establishing appropriate buffers around active nests) would then be developed to address any potential effects on migratory birds or their active nests, and would be reviewed by Environment Canada prior to implementation.
	Air Quality	18. Dust impacts will be mitigated by ensuring that proper watering and/or other dust suppressant techniques, as identified in Ontario Provincial Standard Specification (OPSS) 506, are used during the construction phase. OPSS 506 outlines the requirements for dust suppressants and their application including application. 19. Following construction, any open, unpaved areas will be seeded. 20. To mitigate emissions from construction equipment, the Contractor will be required to keep equipment in good operating conditions and efforts will be made to minimize the idling of equipment, especially during smog alerts. When smog advisories are issued, the City of Mississauga will discuss the scheduled activities with the Contractor to determine what steps can be taken to further limit air emissions without unduly affecting the Contractor's schedule.

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
	Contaminated Sites, Waste Management and Storage of Access Materials	21. Where practical, attempts will be made to reuse excess non-contaminated soil on-site and on or near to the locations where it was generated. Examples of how excess soil can be used on-site include berming, landscaping and grading. 22. Suitable projects or other opportunities for reuse of non-contaminated soil off-site will be identified as the Detail Design progresses. Examples of other project uses include: • Use as aggregate supply by a soil or gardening centre. • Use as fill or landscaping material on other construction projects. • Incorporation of excess soil for public or recreational uses. 23. If no suitable use for excess non-contaminated soils generated during construction can be found, the material would need to be disposed of at a landfill facility willing to accept it as cover material. 24. Excess contaminated soil (hazardous and non-hazardous) will be disposed of at a MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site. 25. Where practical, attempts will be made to reuse excess bedrock material on-site and on or near to the locations where it was generated. Similar to excess soil, non-contaminated bedrock could be used on-site for berming, landscaping and grading. 26. Suitable projects or other opportunities for reuse of non-contaminated rock (i.e. similar uses referred to under “Soil Management”) will be identified during Detail Design. If no suitable use for excess non-contaminated rock generated during construction can be found, the material would will be disposed of at a landfill facility willing to accept it as cover material. 27. Excess contaminated rock (hazardous and non-hazardous) rock will be disposed of at a MOE licensed landfill or treatment facility with a valid MOE Certificate of Approval for a waste disposal site.

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
	Stormwater Management	28. **Section 5.1.1.7** provides an overview of the hydraulic criteria and stormwater management criteria for this project. 29. The management of the construction process and the addition of new or revised system elements will focus on avoiding disruption to the existing system, again using experienced contractors and close oversight by the proponent, working closely with the appropriate Conservation Authority (i.e. CVC or TRCA) and local property owners (e.g. MTO).
	Noise	30. General construction will be limited to the time periods outlined in the City of Mississauga's Noise Control By-law which limits the times during which construction equipment can be operated. If construction activities are required outside of these hours, exemptions will be sought in advance by the Contractor, directly from the City of Mississauga. Exemption will only be sought for works that will not produce substantial noise. For example, exemptions will not be sought for noisy activities such as blasting or pile driving. 31. There will be explicit indication that contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws will be the responsibility of the City of Mississauga for all work done by contractors. 32. All equipment will be properly maintained to limit noise emissions in compliance with MOE NPC-115 guidelines. As such, all construction equipment will be operated with effective muffling devices that are in good working order. 33. The contract documents will contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect. 34. In the presence of persistent noise complaints, all construction equipment will be verified to comply with MOE NPC-115 guidelines. 35. In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical,

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		administrative and economic feasibility of the various alternatives. 36. Construction mitigation alternatives include but are not limited to: • Re-scheduling of noisy operations to daytime hours, where possible; • Use of alternate, quieter equipment or methods, where available; and • The use of portable, localized noise barriers for critical areas.
	Health and Wellbeing	37. Implement the air quality mitigation measures outlined in **Section 5.1.1.4**. 38. Implement the noise mitigation measures outlined in **Section 5.1.1.8**.
	Archaeology	39. Should buried archaeological deposits be found along any section of the corridor during construction activities, the Ministry of Culture and any relevant First Nations will be notified immediately. 40. In the event that human remains are encountered during construction activities the Ministry of Culture, the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Consumer and Commercial Relations, the Peel Regional Police and any relevant First Nations will be notified immediately.
	Accidents/ Malfunctions	41. Accidents that may occur during construction of the facility are addressed by provincial legislation, policies, and procedures. 42. All precautions will be taken to avoid spills during construction and during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. In accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008), incidents that may result in possible contraventions of the City's Storm Sewer Bylaw will be referred to staff from the City's Transportation and Infrastructure Planning Division for investigation.

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		43. Within the City of Mississauga, Fire and Emergency Services and the Transportation and Works Department are able to provide and carry out a coordinated operational response to spills on a 24 hour basis. Both Fire and Emergency Services and Transportation and Works have available the necessary in-house and contracted material, equipment and personnel resources to provide a spill response. In particular, Fire and Emergency Services have a HAZMAT Team available to assist in spill incidents, while Transportation and Works have available an Emergency Response Vehicle that is stocked with supplies to handle minor spills. In addition, Transportation and Works have available on-call emergency spill response contractors. 44. During construction, measures will be implemented to control the release of debris from construction activities, fabrication and landscaping activities from entering watercourses. All fuels, oils, lubricants, paints, solvents, chemicals, etc. will be stored in clearly marked areas that have spill contingency plans in place. Any vehicle maintenance and fuelling will be carried out at the maintenance areas in the works facility or at commercial garages wherever possible. If refuelling of vehicles must occur on site, it will be carried out at a designated refuelling site where conditions will allow for the containment of any accidentally spilled fuel. Refuelling will not be permitted within 30 metres of any watercourse, 100 metres of any private wells or adjacent to sensitive areas. Refuelling will only be carried out by trained personnel. Furthermore vehicles will be maintained to minimize leaks and when detected, leaks will be repaired immediately. Care will be taken to prevent the release of fuel to the environment when refuelling small equipment in the field. The Contractor will be required to completed all works and spill response in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001) and have all necessary emergency equipment on site. 45. If a spill does occur, the owner of the material or in control of the material is responsible for the spill. This person will take reasonable action to stop the spread of the spilled materials by blocking catch basins, digging trenches, creating dikes, and / or spreading absorbent materials. If this person is unknown or unable to respond, and it is safe to do so, the Contractor shall follow the

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		steps noted above. In all cases the MOE Spill Action Centre (1-800-268-6060), and the City of Mississauga and/or GO Transit (as appropriate) will be notified. If the spill occurs during construction the Contract Administrator will also be notified. Depending upon the nature of the accident or spill, different agencies and stakeholders will also need to be contacted. It is recognized that any spill response depends on the cooperation of various participating agencies. Both local and regional municipalities, in conjunction with the Ministry of Environment and other agencies, may operate as a team in determining an appropriate level of response to a spill incident. 46. Clean-up and disposal of the spilled material is the responsibility of the owner or person having control of the material. If during construction another person does not take responsibility for clean-up, the Contract Administrator will be notified. Until determined otherwise, the Contractor will assume the overall responsibility for coordinating the clean-up of spilled material. 47. Workplace health and safety is addressed through provincial legislative requirements such as the *Occupational Health and Safety Act* and associated regulations.
	Effects of the Environment on the Project	48. Flooding has been addressed in the design of the facilities in accordance with Ministry of Transportation of Ontario Highway Drainage Design standards, and reflecting the 1992 Provincial Environmental Assessment (EA) and the 2004 EA Addendum, the current policies of the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation Authority (CVC), the City of Mississauga, Go Transit and MTO. The major drainage system components will be designed to manage a 100 year storm event (event statistically occurring once every 100 years). All minor system components (culverts) will be designed for the 10 year storm event. Given the rarity of a 100 year storm event, it is anticipated that the drainage and stormwater management system will effectively manage potential changes in rainfall patterns and quantity as a result of climate change. Additional details regarding stormwater management are provided in **Section 5.1.1.7**. 49. A snow removal program that maintains safe and efficient busway operation for vehicles and passengers will be developed and implemented by the facility operator. The snow removal plan

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		will be developed with due consideration for potential effects to the surrounding environment (e.g. appropriate snow storage locations). 50. Regular maintenance will address many potential effects of the environment on the project. 51. Operating procedures, including proper facility maintenance and consideration of weather conditions warranting service suspension, will be developed during the implementation phase to address any potential operational impacts resulting from severe weather conditions. 52. The busway has several entry / exit ramps and sits within a grid of parallel and crossing roads that will allow stations or segments of the busway to be closed or restricted if necessary due to severe weather, with bus services rerouted to operate on roadways in general traffic or in temporary bus priority lanes. Similarly, parking facilities can be closed temporarily if necessary. The facility will be monitored at all times and decisions regarding operating procedures during periods of severe weather will follow protocols established by the City in consultation with GO Transit, the Ministry of Transportation, and emergency services. 53. In all cases, the safe operation of the BRT facility and implementation of appropriate measures to minimize/mitigate any adverse effects will be priorities. Necessary remedial actions (e.g. infrastructure repairs, re-vegetation of a disturbed slopes, etc.) will be undertaken in a timely manner and in accordance with all relevant legislation.
Operation/ Maintenance	**Fish and Fish Habitat**	54. Pesticide applications will be avoided unless essential (low maintenance right-of-way strategy). The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. 55. All precautions will be taken to avoid spills during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Act* and any other

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Please refer to **Section 5.2** for additional information regarding spill prevention and response. 56. The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management. 57. Similar construction-related mitigation measures and commitments to future work as those outlined above will be employed for any rehabilitation activities associated with future watercourse culvert or structure replacement or repair, or any other general transitway-rehabilitation works that affect areas draining to watercourses. Specifically: • All relevant construction-related measures outlined above will be identified and applied to address potential effects specific to the rehabilitation works and potentially affected watercourse. • Standard measures will include sediment and erosion control and restoration of disturbed surfaces draining to the watercourse, temporary timing, fish protection and flow management measures for any instream works, and standard management practices for handling of equipment, potential contaminants and construction related debris.

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
	Vegetation, Wetlands, Wildlife and Migratory Birds	58. Employ a low maintenance right-of-way management approach to reduce or avoid the need for fertilizer and pesticide applications, other than what may be needed for the initial establishment of planted trees. The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. 59. Incorporate native vegetation plantings in the landscape design 60. Implement the stormwater management measures outlined in **Section 5.1.1.7**. 61. Use the mitigation measures outlined previously to minimize the extent of temporary disturbance required during maintenance and future rehabilitation activities, and implement restoration measures as required. 62. The City of Mississauga is striving to reduce the use of salt. Implementation of salt management techniques will result in more efficient use of road salt and less release of wasted salt to the aquatic system. With the Environment Canada's *Code of Practice for the Environmental Management of Road Salts (*2004), transportation agencies are encouraged to improve their use and management of road salt. All works will be completed in accordance with the City of Mississauga's Salt Management Plan (City of Mississauga July 2004) which was developed in accordance with Environment Canada's *Code of Practice for the Environmental Management of Road Salts* (2004). A copy of the City's Salt Management Plan can be provided upon request. Salt runoff will be dispersed along the transitway to the aquatic system when dilution is highest (spring). See **Section 5.1.1.7** of the report for greater details regarding stormwater management. 63. Implement mitigation measures to protect nesting migratory birds during maintenance activities (e.g., bridge / culvert repair).

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
	Species of Conservation Concern and Species at Risk	64. Stormwater run-off will be controlled as outlined in **Section 5.1.1.7**. 65. Spill prevention and response will be addressed as outlined in **Section 5.2**. 66. Employ a low maintenance right-of-way management approach to reduce or avoid the need for fertilizer and pesticide applications, other than what may be needed for the initial establishment of planted trees. The City of Mississauga has been proactive when it comes to the use of pesticides including monitoring use, and selected and controlled use of pesticides. The use of pesticides will be limited to treating vegetation that is a risk to public health and safety (e.g. poison ivy, giant hogweed). In addition, an amendment to the provincial *Pesticides Act* (Bill 64) prohibits the use of pesticides for cosmetic uses. It is anticipated that the amendment will take force prior to the commencement of construction. 67. Implementation of construction related mitigation measures identified for protecting terrestrial and aquatic habitat (please refer to **Section 5.1.1.3**) will also protect wildlife generally, including TRCA L- 3 and 4 rank species identified as present generally within the vicinity of project limits and any species of conservation concern.
	Air Quality	68. Operational and maintenance effects will be managed through the use of best management practices such as those identified for construction works (e.g. dust control, operation of equipment in good operating order, minimize idling).
	Contaminated Sites, Waste Management and Storage of Access Materials	69. Equipment, chemicals, and other materials may need to be used to facilitate inspection and maintenance activities. The BRT operator will assume all maintenance and inspection activities associated with the operation of the BRT facility. Please refer to **Section 5.2** for details regarding spills prevention and management.
	Groundwater	70. Potential effects to groundwater during operation and maintenance of the BRT facility are anticipated to be limited to potential effects associated with spills and potential changes to local water quality and quantity. Please refer to **Section 5.2** for additional details regarding spills prevention and management. Please refer to **Section 5.1.1.7** for details regarding stormwater management.

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
	Stormwater Management	71. Once the BRT facility is operational, there will be no special ongoing operational or maintenance effects on the stormwater management / drainage system. The new culverts, pipes, and expanded ponds / ditches will be added to the inventory of such structures in Mississauga and will follow conventional inspection, maintenance and rehabilitation schedules.
	Noise	72. Restricting noisy activities to daytime hours where possible. 73. Adhering to the City of Mississauga's Noise Control By-law and seeking and obtaining exemptions as warranted.
	Health and Wellbeing	74. Implement the air quality mitigation measures outlined in **Section 5.1.1.4**. 75. Implement the noise mitigation measures outlined in **Section 5.1.1.8**.
	Pipelines	76. The presence of the BRT facility is not expected to represent a significant adverse effect on the ability of pipeline owners in the corridor to carry out their regular operations and maintenance programs. Pipeline owners will be consulted as warranted.
	Accidents/ Malfunctions	77. Accidents that may occur during operation and maintenance of the facility are addressed by provincial legislation, policies, and procedures. One way to minimize the risk of accidents and the associated effects to the environment including, but not limited to, human health and wellbeing is to ensure that the BRT facility is used only by authorized, trained persons in a controlled and visible manner. Signage will be in place at all potential entry points to the busway and stations that clearly limits access to authorized vehicles and people only. Constant visual surveillance and camera monitoring will identify unauthorized users and staff will be sent to remove them. All maintenance staff / activities or any other use of the busway will need to be pre-authorized by the BRT operator. 78. Any BRT/motor vehicle or BRT/pedestrian/passenger accidents that occur will be immediately reported by the bus operator to the Peel Regional Police. The Peel Regional Police will be responsible for investigating the incident and for producing a formal accident report. The bus operators also have internal disciplinary procedures related to involvement in accidents or any

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		other unsafe operational practice. 79. Vehicular accidents present the possibility of fuel spills to the environment and fire. Potential adverse effects associated with fuel spills will be address in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. Potential adverse effects associated with fire will be address through the availability of fire suppressants, building sprinkler systems and rapid notification of, and response by, emergency services. 80. All precautions will be taken to avoid spills during construction and during operation and maintenance. All spill responses will be completed in accordance with the Ontario *Environmental Protection Ac*t and any other applicable legislation. Spill response will also be completed in accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008) and/or GO Transit's Spill Response Procedures (GO Transit November 2006; GO Transit August 2001). Copies of these documents can be made available upon request. In accordance with the City of Mississauga's Spill Response Plan (City of Mississauga January 2008), incidents that may result in possible contraventions of the City's Storm Sewer Bylaw will be referred to staff from the City's Transportation and Infrastructure Planning Division for investigation. 81. Within the City of Mississauga, Fire and Emergency Services and the Transportation and Works Department are able to provide and carry out a coordinated operational response to spills on a 24 hour basis. Both Fire and Emergency Services and Transportation and Works have available the necessary in-house and contracted material, equipment and personnel resources to provide a spill response. In particular, Fire and Emergency Services have a HAZMAT Team available to assist in spill incidents, while Transportation and Works have available an Emergency Response Vehicle that is stocked with supplies to handle minor spills. In addition, Transportation and Works have available on-call emergency spill response contractors. 82. The following mitigation measures will be implemented to minimize impacts of potential spills:

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		83. Employee "Best Practices" for drainage design; • Control areas of used for refuelling; • Mandatory and immediate contact with the appropriate regulatory authorities (e.g. MOE Spills Action Centre, DFO); • Immediate contact with spill clean-up contractors; and • Monitor and record spill clean up and submit required reports. 84. Workplace health and safety is addressed through provincial legislative requirements such as the *Occupational Health and Safety Act* and associated regulations.
	Effects of the Environment on the Project	85. Flooding has been addressed in the design of the facilities in accordance with Ministry of Transportation of Ontario Highway Drainage Design standards, and reflecting the 1992 Provincial Environmental Assessment (EA) and the 2004 EA Addendum, the current policies of the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation Authority (CVC), the City of Mississauga, Go Transit and MTO. The major drainage system components will be designed to manage a 100 year storm event (event statistically occurring once every 100 years). All minor system components (culverts) will be designed for the 10 year storm event. Given the rarity of a 100 year storm event, it is anticipated that the drainage and stormwater management system will effectively manage potential changes in rainfall patterns and quantity as a result of climate change. Additional details regarding stormwater management are provided in **Section 5.1.1.7**. 86. A snow removal program that maintains safe and efficient busway operation for vehicles and passengers will be developed and implemented by the facility operator. The snow removal plan will be developed with due consideration for potential effects to the surrounding environment (e.g. appropriate snow storage locations). 87. Regular maintenance will address many potential effects of the environment on the project. 88. Operating procedures, including proper facility maintenance and consideration of weather

BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED TO BY THE PROPONENT AND THE CONTRACTOR DURING PROJECT CONSTRUCTION, OPERATION, MAINTENANCE, OR DECOMMISSIONING ACTIVITIES.		
Project Phases/ Activities	**Environmental Components**	**Departments / Best Management Practices**
		conditions warranting service suspension, will be developed during the implementation phase to address any potential operational impacts resulting from severe weather conditions. 89. The busway has several entry / exit ramps and sits within a grid of parallel and crossing roads that will allow stations or segments of the busway to be closed or restricted if necessary due to severe weather, with bus services rerouted to operate on roadways in general traffic or in temporary bus priority lanes. Similarly, parking facilities can be closed temporarily if necessary. The facility will be monitored at all times and decisions regarding operating procedures during periods of severe weather will follow protocols established by the City in consultation with GO Transit, the Ministry of Transportation, and emergency services. 90. In all cases, the safe operation of the BRT facility and implementation of appropriate measures to minimize/mitigate any adverse effects will be priorities. Necessary remedial actions (e.g. infrastructure repairs, re-vegetation of a disturbed slopes, etc.) will be undertaken in a timely manner and in accordance with all relevant legislation.