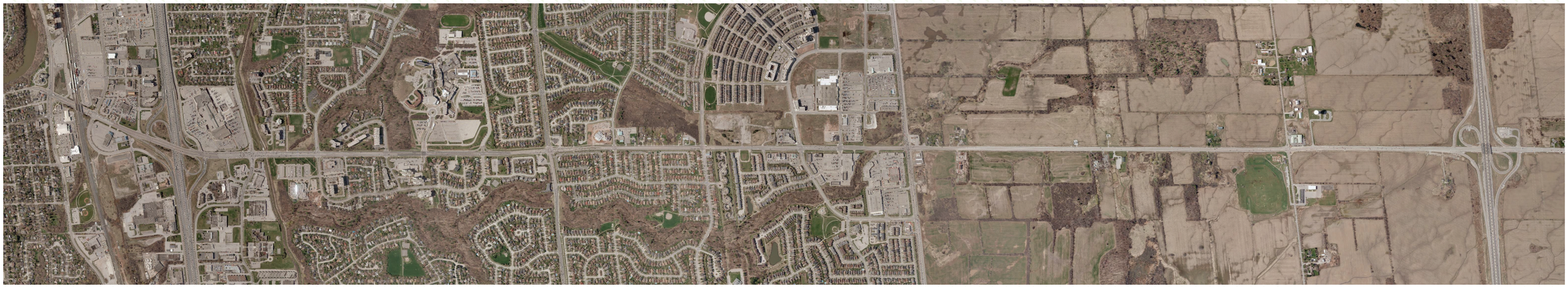
ENVIRONMENTAL STUDY REPORT

TRAFALGAR ROAD (REGIONAL ROAD 3) IMPROVEMENTS CLASS ENVIRONMENTAL ASSESSMENT STUDY
FROM CORNWALL ROAD TO HIGHWAY 407, TOWN OF OAKVILLE



Main Report and Appendix A - Volume I

Submitted by:

AECOM
300 Water Street, Whitby,
Ontario L1N 9J2

T: 905.668.9363
F: 905.668.0221
www.aecom.com

Project Number: 60119993

APRIL 2015

ENVIRONMENTAL STUDY REPORT

TRAFALGAR ROAD (REGIONAL ROAD 3) IMPROVEMENTS CLASS ENVIRONMENTAL ASSESSMENT STUDY
FROM CORNWALL ROAD TO HIGHWAY 407, TOWN OF OAKVILLE

Volume I -

Main Report and Appendix A - Consultation

Volume II -

Appendix B - Natural Environment Report
Appendix C - Noise Assessment Report
Appendix D - Air Quality Assessment
Appendix E - Cultural Land and Built Heritage Report
Appendix F - Stage 1 Archaeological Assessment Report
Appendix G - Stormwater Management Report
Appendix H - Fluvial Geomorphology Report
Appendix I - Utilities
Appendix J - Geotechnical Investigation Report

Submitted by:

AECOM
300 Water Street, Whitby,
Ontario L1N 9J2

T: 905.668.9363
F: 905.668.0221
www.aecom.com

Project Number: 60119993

APRIL 2015

Regional Municipality of Halton

Trafalgar Road (Regional Road 3) Improvements Class Environmental Assessment Study From Cornwall Road to Highway 407

Environmental Study Report

Prepared by:
AECOM
300 Water Street 905 668 9363 tel
Whitby, ON, Canada L1N 9J2 905 668 0221 fax
www.aecom.com

Report Number:
60119993

Date:
April, 2015

AECOM Signatures

Report Prepared By:

Diana Addley
Environmental Planner, Transportation

Report Reviewed By:

Sheri Harmsworth, P. Eng.
Project Manager

Executive Summary

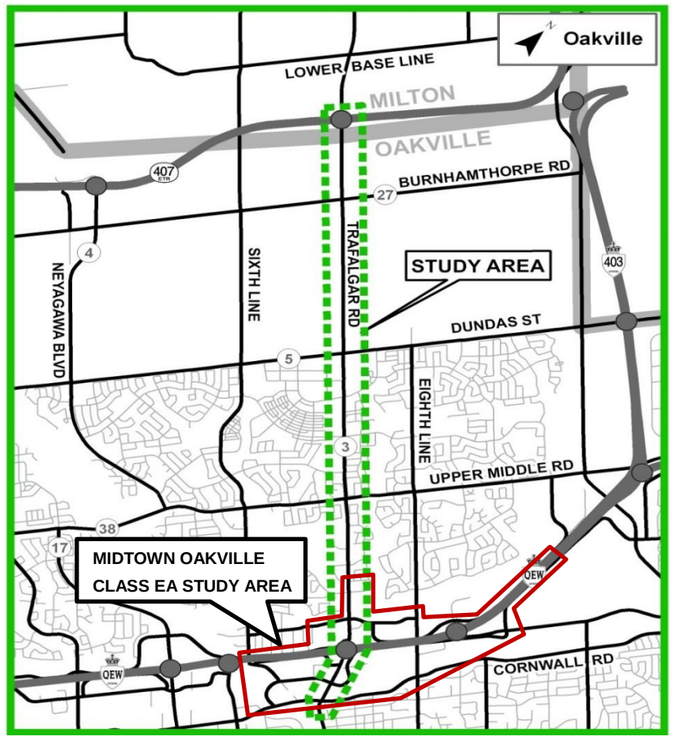
Introduction

This Environmental Study Report (ESR) documents the planning, preliminary design and Class Environmental Assessment (EA) Study completed by the Regional Municipality of Halton for improvements to Trafalgar Road (Regional Road 3) from Cornwall Road to Highway 407. The Study Area limits are shown in **Exhibit ES-1** below.

The Study was undertaken in accordance with Schedule "C" of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (Municipal Class EA) (October 2000, amended in 2007 and 2011).

Details on the study background and the Municipal Class EA Process are provided in **Section 1** of the ESR.

Exhibit ES–1: Study Area



Problem Being Addressed

Trafalgar Road extends from Lakeshore Road in the Town of Oakville to the Town of Halton Hills, and has interchanges at the QEW, Highway 407 and Highway 401 crossings. Trafalgar Road is classified as a major arterial north of Cornwall Road.

The Trafalgar Road corridor serves the intensification areas of Midtown Oakville and the Uptown Core, as well as the future North Oakville East Secondary Plan area.

A review of existing and projected future conditions, including planning and policy documentation, has demonstrated a need and opportunity for improvements to Trafalgar Road between Cornwall Road and Highway 407 to address the following:

- Several sections of Trafalgar Road operate near, at or above capacity;
- Under existing conditions, nine of the 19 assessed intersections are operating at or over capacity (i.e., volume to capacity (v/c) ratio >1.0, LOS F), including intersections at Dundas Street, Upper Middle Road, White Oaks Boulevard, Iroquois Shore Road, Cross Avenue and Cornwall Road;
- Travel demand in the Trafalgar Road corridor will exceed existing capacity by the 2031 horizon year due to forecasted traffic growth; with the projected increase in traffic volumes, 12 of the 19 assessed existing intersections will operate at or over capacity by the year 2031;
- Promote pedestrian and cyclist travel and enhance safety at intersections through the introduction of pedestrian facilities, and by filling in gaps in the existing system adjacent to Trafalgar Road;
- Preserve and enhance the role of Trafalgar Road as a major north-south corridor in the Town of Oakville.

Further information regarding the project needs and opportunities are provided in **Section 2** of this ESR.

Exhibit ES-1 identifies the Midtown Oakville Class EA Study Area, which overlaps with the Trafalgar Road Study Area. There was significant coordination between the two studies as discussed within this ESR. Of greatest significance to the Trafalgar Road Study is that north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations. The recommendations of the Midtown Oakville Class EA Study are provided in **Section 2.4.3.5**. The Midtown Oakville Class EA Environmental Study Report is available online at www.oakville.ca.

Existing and Future Conditions

In general, the Trafalgar Road corridor has an urban cross-section south of Dundas Street, and a rural cross-section for most of its length north of Dundas Street; similarly, most development adjacent to the corridor exists south of Dundas Street. There is a mix of land uses from residential, to business/commercial, as well as agricultural, educational, and religious. Within the study area, Trafalgar Road is adjacent to several natural features such as woodlots, creeks, and a provincially significant wetland complex that shelter numerous aquatic and other species. Future land uses adjacent to the corridor will be primarily residential and business/commercial north of Dundas Street. As outlined in the North Oakville East Secondary Plan, the lands adjacent to Trafalgar Road will be within the area designated as Urban Core Area. Trafalgar Road serves three intensification areas, including Midtown Oakville, the Uptown Core, and the future North Oakville East Secondary Plan area.

To support the development and assessment of alternatives, existing conditions and constraints in the Study Area were inventoried from secondary sources augmented by field reconnaissance/investigations. The following aspects of the environment were considered:

- Physical Environment (**Section 3.2**)
- Natural Environment (Atlas of Breeding Birds of Ontario, Terrestrial Habitat, Aquatic Species and Habitat, Species at Risk) (**Section 3.3**)
- Socio-Economic Environment (Land Use, Proposed Development, Aboriginal Interests, Noise, Air Quality, Sources of Potential Contamination) (**Section 3.4**)
- Cultural Environment (Cultural Landscapes and Built Heritage Resources, Archaeology) (**Section 3.5**)
- Stormwater Management and Structural (**Section 3.6**)
- Fluvial Geomorphology (**Section 3.7**)
- Utilities (**Section 3.8**)

Further details regarding the existing and future conditions within the Study Area are provided in **Section 3**.

Alternative Solutions

Alternative solutions were identified which could address the transportation needs and opportunities for the Study Area. The following alternative solutions, presented at PIC#1, were identified as having potential to address the problems and opportunities within the Study Area:

- Alternative 1: Implement Transportation System Management (TSM) and Transportation Demand Management (TDM) Measures
- Alternative 2: Upgrade other area roadways
- Alternative 3: Adding Two General Purpose Lanes
- Alternative 4: Adding Two High Occupancy Vehicle (HOV) Lanes
- Alternative 5: Adding Two Bus Rapid Transit (BRT) Lanes
- Alternative 6: Adding Two General Purpose Lanes plus Two High Occupancy Vehicle Lanes
- Alternative 7: Adding Two General Purpose Lanes plus Two Bus Rapid Transit Lanes

The assessment of the alternative solutions resulted in the following recommendations:

- Widen the Trafalgar Road corridor to a six-lane cross-section, including four general purpose lanes with the provision for two HOV / BRT lanes on the existing alignment.
- Implement TDM and TSM on a Region-wide basis as components of the overall transportation strategy in Halton Region's TMP.

Further details regarding the development, assessment and evaluation of the alternative solutions is provided in **Section 4**.

Alternative Design Concepts

Alternative design concepts were developed and assessed for the preferred alternative solution for the Trafalgar Road corridor, including curbside versus median BRT operation, BRT versus High Occupancy Vehicle (HOV) operation and network improvement strategies.

The assessment of the alternative design concepts resulted in the following recommendations:

- A six lane cross-section with four general purpose lanes with provisions for two curbside HOV / BRT lanes;
- Other network improvement strategies including:
    - Provision of transit priority measures
    - Transit priority for transit vehicles travelling southbound on Trafalgar Road south of Leighland Avenue to the Oakville GO Station
    - Intersection improvements at Trafalgar Road/Cornwall Road including removal of the channelization island in the southwest corner, addition of raised painted strips in the westbound to northbound channelized right-turn lane, and addition of audible pedestrian signals

Further details regarding the development, assessment and evaluation of the alternative design concepts is provided in **Section 5**.

Project Consultation Process

Public and external agency participation was an integral part of this Class EA Study. Consultation efforts had the following objectives:

- Generate awareness of the project and provide opportunities for involvement throughout the planning process; and
- Facilitate constructive input from public and agency stakeholders at key points in the EA process, prior to decision-making.

Key opportunities for participation in the study included:

- Notice of Study Commencement;
- Public Information Centres;
- Technical Agency Meetings.

Section 6 of the ESR documents the Consultation program undertaken through the course of this study, including public involvement, external agency involvement and Aboriginal consultation.

Project Description

The Preferred Design for Trafalgar Road between Cornwall Road and Highway 407 includes the following major improvements (refer to **Exhibit ES-2 and ES-3** at the end of the Executive Summary**)**:

- Widen the Trafalgar Road corridor to a six-lane cross-section. This six-lane cross section begins north of Leighland Avenue and continues to south of Highway 407, with an urban cross-section planned throughout. A 6-lane cross-section currently exists south of White Oaks Boulevard.
- 50m right-of-way from north of Dundas Street; the ROW varies south of Dundas Street where constrained by existing development and locally near intersections, and is 55m at intersections where transit station/stop facilities are located.
- Posted speed limit on Trafalgar Road of 60km/h throughout the corridor.
- As a major arterial road, Trafalgar Road will include left and right-turn lanes at most signalized intersections. It should be noted that during detailed design, the Region will be considering implementation of an adaptive "real-time" traffic control system to further improve traffic operations within the corridor as traffic volumes fluctuate throughout the course of the day.
- Raised median which varies in width, narrowing near intersections to accommodate left-turn lanes and in areas where property is constrained. With raised medians through the corridor, left turns are only permitted at intersections. While existing accesses will be maintained, several accesses/driveways to properties will become right-in/right-out only.
- Upgrades at the Cornwall Road / Trafalgar Road intersection, including removal of the island on the southwest corner, and addition of audible pedestrian signals and painted raised strips to encourage lower vehicle speeds on the approach to the channelized right turn in the northeast quadrant.
- Provision for enhanced bus stops at signalized intersections. Bus stops will be located curbside on the far-side of most signalized intersections. Bus bays (5 m wide x 50m long) are provided where there are no constraints, and for near-side stops only where a right-turn lane won't be present to allow the curb lane to remain clear and for express buses to bypass a stopped bus.

- Potential to implement transit priority measures at Dundas Street, Sheridan College, and Leighland Avenue, and other key intersections as required.
- Active transportation facilities through the corridor. North of Glenashton Drive to south of Highway 407, multi-use pathways are located on both sides of the corridor, except in constrained areas adjacent to heritage properties immediately north of Dundas Street. South of Glenashton Drive to Leighland Avenue/Iroquois Shore Road, sidewalks are provided on the east side of the roadway and multi-use pathways are located on the west side of the roadway with sidewalks in the remaining constrained areas.
- Full illumination north of Dundas Street.

The widening of Trafalgar Road through the Town of Oakville will take a number of years to complete. The improvements will be implemented through a phased approach. Phase 1 is anticipated to occur in 2017, followed by Phase 2 in 2018, and Phase 3 in 2019. The limits for each phase are as follows:

- Phase 1: Leighland Avenue to Upper Middle Road;
- Phase 2: Upper Middle Road to Dundas Street;
- Phase 3: Dundas Street to Highway 407.

Each of the three phases will initially be built as a 6 lane urban cross-section with multi-use trails and/or sidewalks, transit facilities and transit priority measures where required. Upon completion of the widening of Trafalgar Road to 6 lanes throughout the project limits (i.e. all three segments), there is future opportunity to consider the introduction of High Occupancy Vehicle (HOV) curb lanes allowing a mix of transit and private vehicles with two or more occupants. As transit ridership builds, there is also the opportunity to convert the HOV lanes into dedicated bus lanes in the future. The limits or extent of operations for HOV/transit would need to be confirmed in consultation with the Town of Oakville and Oakville Transit. Conversion from curbside HOV/ Transit lanes to curbside BRT lanes would not require reconstruction of the roadway. Much of the transition would be related to changes in signage and pavement markings.

The preliminary plan is presented on **Plates 1** to **22** at the end of **Section 7**. Further details regarding the major features for the proposed roadway improvements on Trafalgar Road between Cornwall Road and Highway 407 are provided in **Section 7**.

While refinements may occur during detailed design, any changes should not alter the intent of the recommended undertaking or its components. During detailed design, there will be further consultation with technical agencies, including, but not limited to, Conservation Halton, the Ministry of Natural Resources and Forestry, the Ministry of the Environment and Climate Change, the Town of Oakville, Oakville Transit, Metrolinx / GO Transit, the Ministry of Transportation, utilities and affected property owners.

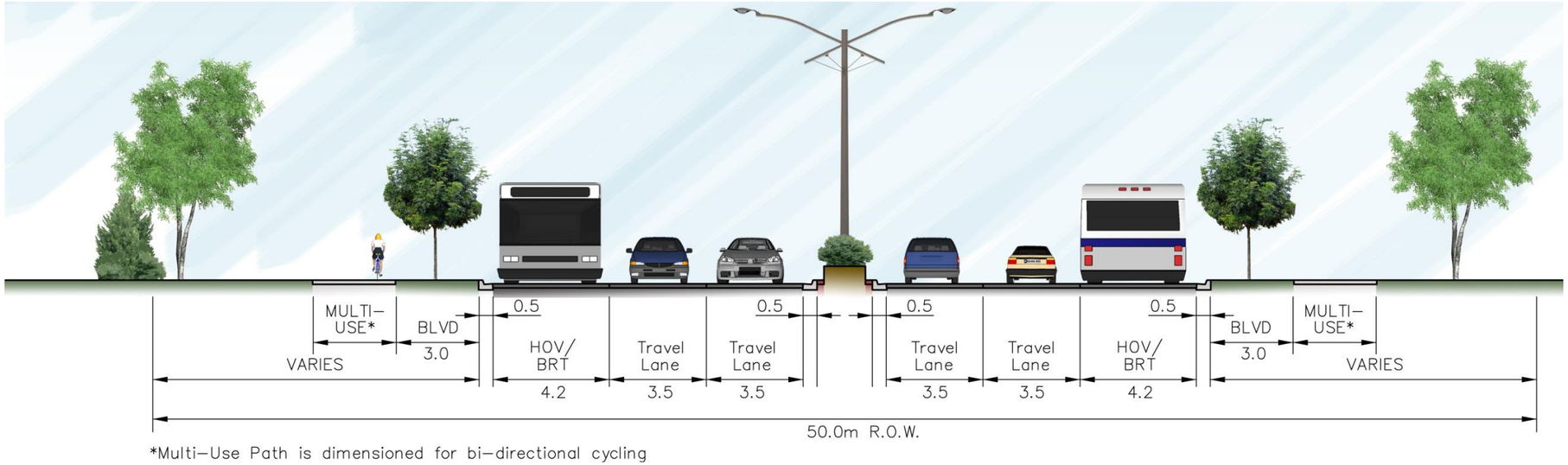
In addition to the proposed improvements documented in this Environmental Study Report, improvements are planned along the Trafalgar Road corridor in the section north of Cornwall Road and south of White Oaks Boulevard South, as documented in the Midtown Oakville Class EA Environmental Study Report and described in **Section 2.4.3.5**.

Potential Environmental Effects, Mitigation Measures and Commitments to Future Work

Preliminary mitigation measures and detailed design commitments have been developed to address potential impacts associated with the preferred plan and are discussed in **Section 8**, with additional details provided in the Appendices to this document.

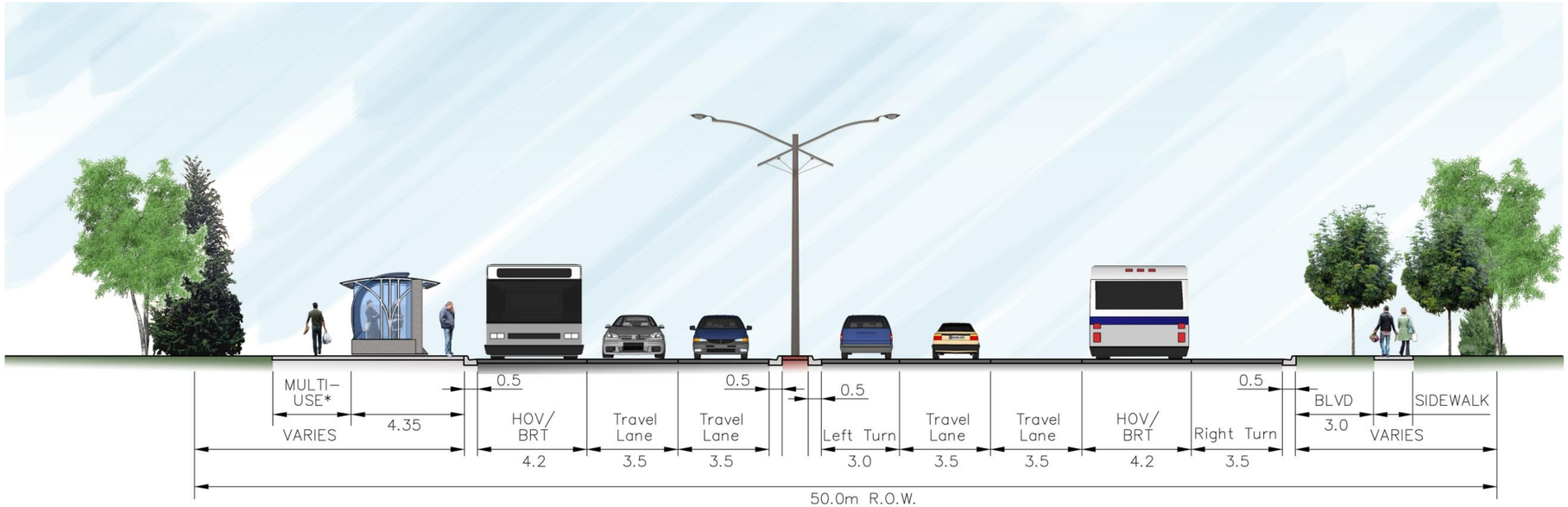
Many of the environmental impacts and concerns related to the project have been minimized or mitigated through the process by which the recommended preliminary design was refined. The remaining anticipated impacts to the natural, social and cultural environments and the proposed mitigation measures for the recommended alternative design are described in **Section 8** of this ESR.

Exhibit ES–2: Typical Mid-Block Cross-Section



*Multi–Use Path is dimensioned for bi–directional cycling

Exhibit ES–3: Typical Intersection Cross-Section with Right-Turn and Left-Turn Lanes



*Multi–Use Path is dimensioned for bi–directional cycling

Table of Contents

Executive Summary

page

VOLUME 1

List of Exhibits

VOLUME I

Appendices

Appendix A. Consultation

VOLUME II

Appendices

Appendix B. Natural Environment Report
Appendix C. Noise Assessment Report
Appendix D. Air Quality Report
Appendix E. Cultural Land and Built Heritage Report
Appendix F. Stage 1 Archaeological Assessment Report
Appendix G. SWM Report
Appendix H. Fluvial Geomorphology Report
Appendix I. Utilities
Appendix J. Geotechnical Investigation Report

This page is intentionally blank.

1. Introduction

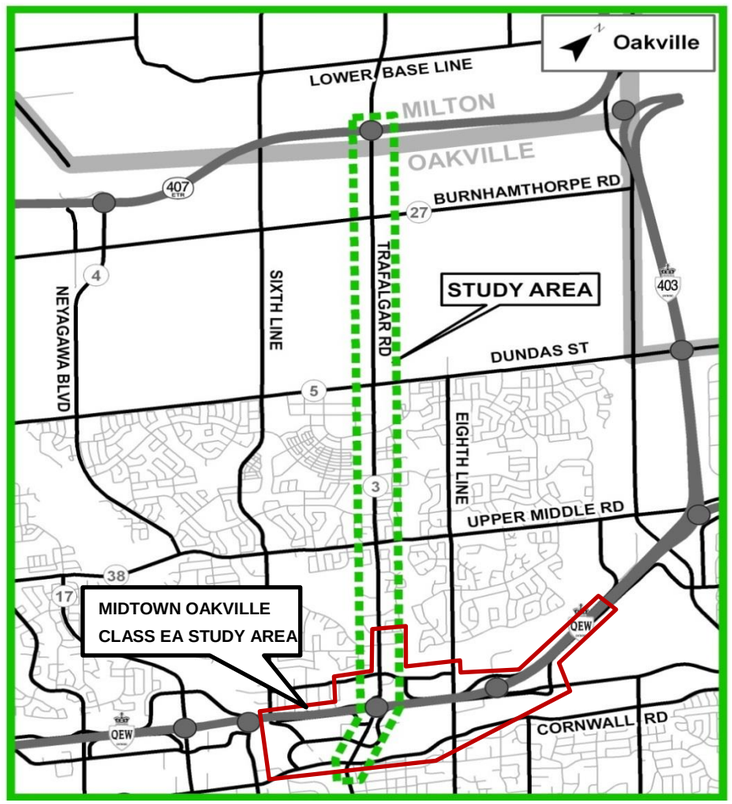
1.1 Introduction and Study Background

This Environmental Study Report (ESR) documents the planning and preliminary design components for the Trafalgar Road (Regional Road 3) Improvements Class Environmental Assessment (EA) Study. The study was undertaken in accordance with Schedule 'C' of the Municipal Engineers Association (MEA) *Municipal Class Environmental Assessment* (Municipal Class EA) (October 2000, amended 2007 and 2011).

In 2002, the Regional Municipality of Halton (Halton Region) initiated a Class EA for improvements to Trafalgar Road from Leighland Avenue/Iroquois Shore Road to Upper Middle Road (Regional Road 38). Following the initiation of the study, a number of other studies were initiated or completed which resulted in the need to expand the Study Area. These studies included the *North Oakville East Secondary Plan*, the Metrolinx *Regional Transportation Plan* and the *Midtown Oakville Class EA Study*. To this end, in 2009, the Study Area was expanded and the Class EA study was re-initiated to include the eight kilometre section of Trafalgar Road from Cornwall Road south of the QEW, northerly to Highway 407 as shown in **Exhibit 1.1**.

Exhibit 1.1 also identifies the Midtown Oakville Class EA Study Area, which overlaps with the Trafalgar Road Study Area. There was significant coordination between the two studies as discussed within this ESR. Of greatest significance to the Trafalgar Road Study is that north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations. The recommendations of the Midtown Oakville Class EA Study are identified in **Section 2.4.3.5**.

Exhibit 1-1. Study Area



1.2 Municipal Class EA Process and Selection of Schedule

To address the need for improvements to Trafalgar Road, Halton Region must comply with the requirements of the MEA *Municipal Class EA* document (2000, as amended in 2007 and 2011). Approved under the Ontario *Environmental Assessment Act (EAA)*, the Municipal Class EA process incorporates the following key principles of EA planning:

- consultation with affected parties early in and throughout the process, such that the planning process is a co-operative venture
- consideration of a reasonable range of alternatives, both the functionally different 'alternatives to' and the 'alternative methods' of implementing the solution
- identification and consideration of the effects of each alternative on the environment
- systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects
- provision of clear and complete documentation of the planning process followed, to allow 'traceability' of decision-making with respect to the project.

As illustrated in **Exhibit 1.2**, the Municipal Class EA document outlines a five-phase planning and design process. Each phase is summarized below:

Phase 1 ..... Identify the problem and/or opportunity to be addressed.

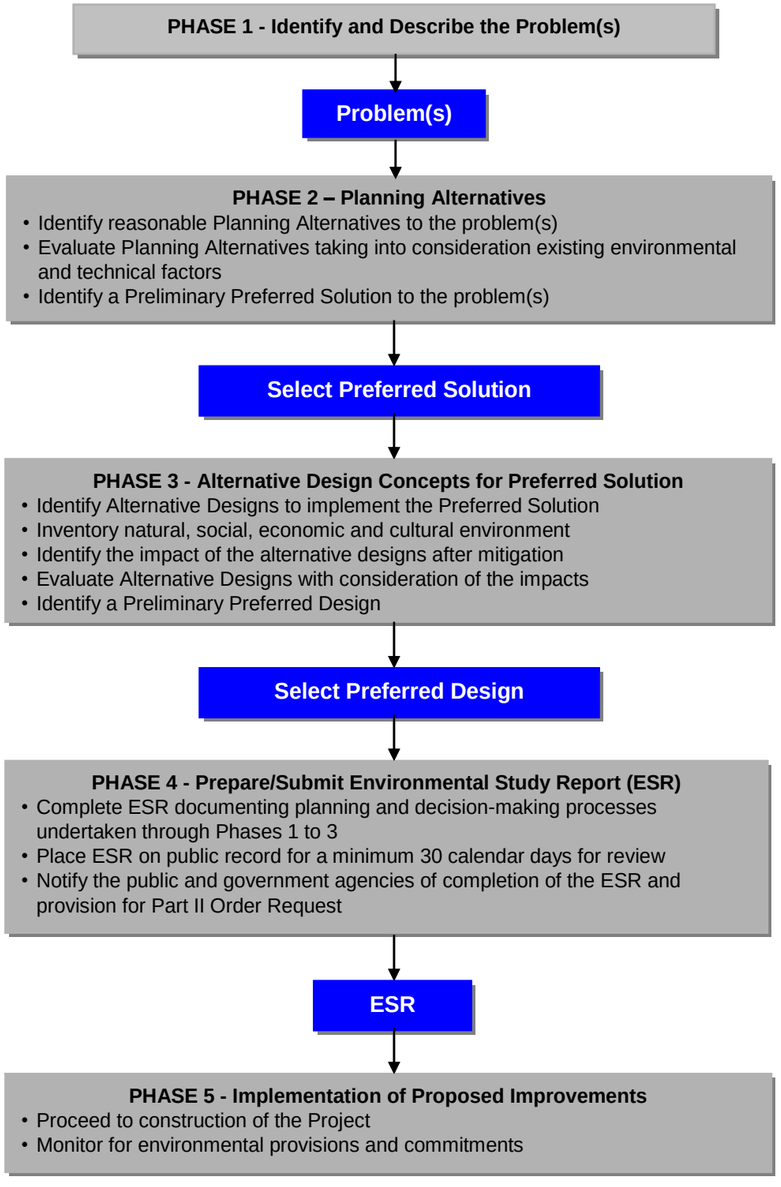
Phase 2 ..... Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and determine the preferred solution taking into account public and regulatory agency input.

Phase 3 ..... Examine alternative methods of implementing the preferred solution taking into account the existing environment, public and regulatory agency input, anticipated environmental impacts, and methods of minimizing negative impacts and maximizing positive impacts.

Phase 4 ..... Document, in an Environmental Study Report (ESR), a summary of the rationale and the planning, design and consultation process undertaken through Phases 1 to 3. The ESR is made available for public and agency review and comment.

Phase 5 ..... Complete contract drawings and documents and proceed to construction and operation. Monitor construction and operation where necessary for adherence to environmental provisions and mitigation. Phase 5 is not part of this study. This phase will be undertaken prior to construction.

Exhibit 1-2. Municipal Class EA Process



In addition, the Municipal Class EA document classifies transportation improvements as either Schedule A, A+, B or C projects based on the anticipated level of impact. Each schedule is described as follows:

Schedule A ..... Projects are limited in scale, have minimal adverse environmental impacts, and require no public notification or documentation.

Schedule A+ .... Projects are limited in scale, have minimal adverse environmental impacts, and require no documentation. However, the public is to be advised of the project prior to implementation.

Schedule B ..... Projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process, involving mandatory contact with the directly affected public and regulatory agencies, to ensure that they are aware of the project and that their concerns are addressed. 'Schedule B' projects require that a Project File be prepared and made available for public review.

Schedule C ..... Projects have the potential for significant environmental impacts and must proceed under the full planning and documentation procedures of the Municipal Class EA document. 'Schedule C' projects require that an ESR be prepared and filed on the public record for review by the public and regulatory agencies.

This Study is classified as a 'Schedule C' project which involves completion of Phases 1 through 4 of the planning and design process (Phase 5 will be completed prior to construction). This ESR has been prepared and will be made available for a minimum 30-day public review period. During this review period, any person or party with an outstanding issue may bring the issue forward to Halton Region for resolution. If the issue cannot be resolved, the person or party with the concern may request the Minister of the Environment to order Halton Region to comply with 'Part II' of the Ontario *EAA*. 'Part II' of the Ontario *EAA* requires the completion of an individual EA study with formal government review and approval. This request is called a 'Part II Order Request' (formerly 'Bump-up Request') and must be submitted to the Minister in writing within the minimum 30-day public review period. If no requests for a 'Part II Order' are received during the public review period, the project will proceed to Phase 5 (Design and Construction).

1.2.1 Canadian Environmental Assessment Act (CEAA)

The Canadian Environmental Assessment Act (CEAA) was recently repealed and replaced with CEAA 2012 which received Royal Assent on July 6, 2012. Recent changes to CEAA include replacing "triggers" with the CEAA 2012 Regulation Designating Physical Activities list. A proponent is not required to complete the Federal EA Process if a project is not on this list. A review of this list has determined that the Trafalgar Road Improvements Class EA Study does not include physical activities identified on the list and is therefore not a Designated Project. Hence, this study is not subject to the new federal EA process.

1.3 Consultation

The MEA Municipal Class EA document outlines specific mandatory public and agency consultation contact points and methods. As part of the Municipal Class EA 'Schedule C' planning process, several steps have been undertaken to inform government agencies, affected landowners, the local community and the general public of the project and to solicit comments. In order to properly communicate the project and solicit feedback throughout the planning process, the following activities were undertaken:

- Posting project milestones on Halton Region's website, including Notices of Study Commencement, Public Information Centres (PICs) and Study Completion (http://www.halton.ca/cms/one.aspx?portalId=8310&pageId=22703);
- Holding meetings with Halton Region, Town of Oakville, Oakville Transit, Conservation Halton, Metrolinx and the Ministry of Transportation at key phases during the study;
- Publication of newspaper notices in the *Oakville Beaver* for project milestones;
- Direct mailing of notices to stakeholders, affected land owners, general public and review agencies regarding project milestones;
- Holding three PICs to engage and obtain input from the public, review agencies and stakeholders;
- Holding meetings following PIC #3 with affected property owners; and,
- Issuing a Notice of Study Completion that was published in the *Oakville Beaver.* The Notice was also mailed to adjacent property owners and the general public who requested to be included on the contact list as well as agencies for notification of the 30-day public review period.

The above communications and consultation program outputs are further described in **Section 6**. Consultation materials are included in **Appendix A**.

1.3.1 Filing of Environmental Study Report

The filing of this ESR completes the planning and preliminary design stage of the project. The ESR is placed on the public record and made available for review for a 30 calendar day period starting April 16, 2015 and ending on May 19, 2015. A public notice (Notice of Study Completion) was published at the time of filing. Copies of the report are available for review and comment during normal business hours at the following locations:

- Clerk's Office
  Halton Region
  1151 Bronte Road
  Oakville, ON L6M 3L1
  Tel. (905) 825-6000
- Clerk's Office
  Town of Oakville
  1225 Trafalgar Road
  Oakville, ON L6H 0H3
  Tel. (905) 845-6601
- Oakville Public Library
  Iroquois Ridge Branch
  1051 Glenashton Drive
  Oakville, ON L6H 6Z4
  Tel. (905) 338-4247
- Oakville Public Library
  White Oaks Branch
  1070 McCraney Street East
  Oakville, ON L6H 2R6
  Tel. (905) 815-2038
- Oakville Public Library
  Central Branch
  120 Navy Street
  Oakville, ON L6J 2Z4
  Tel. (905) 815-2042

1.3.2 Part II Order

The Class EA process contains a provision that allows for changing the status of a project from a Class EA to an Individual Environmental Assessment (IEA). This is called a 'Part II Order'. Members of the public, interest groups, government agencies and others may request that an IEA be prepared for a specific project if they feel their concerns have not been addressed through the Class EA planning process. The Ministry of the Environment and Climate Change determines whether or not this is necessary and the decision in this regard is final. If the 'Part II Order' is granted, the project cannot proceed unless an IEA is prepared. The IEA is subject to a formal government review and approval process and may result in a formal public hearing. Anyone wishing to request a 'Part II Order' of the Trafalgar Road (Regional Road 3) Corridor Improvements Class EA Study must submit a written request by the end of the 30 calendar day review period to the Minister of the Environment and Climate Change at the following address, with a copy sent to Halton Region:

Ministry of the Environment address:	Halton Region address:
Honorable Glen R. Murray Minister of the Environment and Climate Change Ferguson Block 11th Floor 77 Wellesley Street West Toronto ON M7A 2T5	Regional Municipality of Halton Attn: Matt Krusto Project Manager, Halton Region 1151 Bronte Road Oakville, ON L6M 3L1

1.3.3 Project Team

Halton Region retained AECOM Canada Ltd. (AECOM) and their sub-consultants to undertake the Class EA for this study. General direction was provided by Regional representatives with project team meetings held at key points in the process and prior to presenting the study findings to public and agency stakeholders.

The project team was comprised of representatives from the following organizations covering the broad range of noted specialties:

Halton Region
- Public Works
- Legislative and Planning Services

Sub –Consultants
- Archeoworks – Stage One Archaeological Assessment
- Unterman McPhail Associates – Cultural Heritage
- Terraprobe – Geotechnical and Foundation Engineering

AECOM
- Project Management
- Roadway Engineering
- Transportation Planning
- Traffic Engineering
- Safety Advice
- Bridge Engineering
- Noise Analysis
- Air Quality Analysis
- Land Use & Social Impact
- Drainage & Hydrology
- Natural Environment (Terrestrial, Fisheries and Wildlife)
- Fluvial Geomorphology

This page is intentionally blank.

2. Problem Being Addressed

2.1 Introduction

Halton Region is situated within the western edge of the Greater Toronto and Hamilton Area (GTHA), comprised of a land area of approximately 967 km², which includes a 25 kilometre frontage along Lake Ontario (ENTRA, 2007). The Study Area corridor is located entirely within the Town of Oakville. This eight kilometre section of Trafalgar Road is under the jurisdiction of Halton Region.

2.2 Provincial Planning Context

2.2.1 Provincial Policy Statement (2014)

The *Provincial Policy Statement* (PPS) is the complimentary policy document to the *Planning Act*. Issued under the authority of Section 3 of the *Planning Act*, the PPS provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial 'policy-led' planning system that recognizes and addresses the complex inter-relationship among environmental, economic and social factors in land use planning.

The 2014 PPS builds upon the policy direction of the 2005 PPS, and requires the promotion of active transportation and transit-supportive development and providing for connectivity among transportation modes. General principles are established in the PPS that are further elaborated on in a detailed set of policies that generally address the following matters:

1. *Building Strong Communities;*
2. *Wise Use and Management of Resources; and*
3. *Protecting Public Health and Safety.*

2.2.2 Growth Plan for the Greater Golden Horseshoe (2006)

The Greater Golden Horseshoe (GGH) includes the cities of Toronto, Hamilton and Kawartha Lakes, the regional municipalities of Halton, Peel, York, Durham, Waterloo and Niagara and the counties of Haldimand, Brant, Wellington, Dufferin, Simcoe, Northumberland and Peterborough (Ministry of Infrastructure (MOI), 2006). In recognition of the GGH's distinction as one of the fastest growing regions in North America, Bill 136, the *Places to Grow Act*, received Royal Assent on June 13, 2005 (MOI, 2006). The Act provides the legal framework necessary to implement the Government of Ontario's vision for building stronger, prosperous communities by better managing growth in the GGH to the year 2031. The Act enables the government to plan for population growth, economic expansion and the protection of the environment, agricultural lands and other valuable resources in a co-ordinated and strategic way (MOI, 2006).

On June 16, 2006, the Province of Ontario released its Growth Plan for the GGH (MOI, 2006); the Growth Plan has been amended twice since the 2006 release, once in January 2012 (Simcoe Sub-area), and a second time in June 2013 to update population and employment forecasts. The purpose of the 25-year Plan is to:

- "Revitalize downtowns to become vibrant and convenient centres.
- Create complete communities that offer more options for living, working, learning, shopping and playing.
- Provide housing options to meet the needs of people at any age.
- Curb sprawl and protect farmland and green space.
- Reduce traffic gridlock by improving access to a greater range of transportation options." (MOI Website, 2014).

By 2031, the GGH's population will grow by 4.15 million people from the area's existing (2001) population of 7,790,000. During this same period, the GGH employment will continue to grow from 3,810,000 to 5,560,000 (MOI 2013).

The Growth Plan sets the stage for Halton Region to absorb a portion of the growth projected for the western half of the Greater Toronto and Hamilton Area (GTHA). An estimated 780,000 people are expected to reside in Halton Region by the year 2031, which represents an increase of 324,000 people when compared to Halton Region's 2006 population of 456,000 (ROPA 38, 2009). Employment projections for Halton Region are expected to increase from 218,000 in 2006, to 390,000 by 2031 (ROPA 38, 2009). The population forecasts assumed in the Halton Region EMME Demand Model in this study are consistent with the Region's Best Planning Estimates (2011) and the Places To Grow growth projections.

The Growth Plan designates Midtown Oakville, Downtown Burlington, and Downtown Milton to the north as 'Urban Growth Centres' within the GTHA (MOI, 2013). The North Oakville area is not identified as an 'Urban Growth Centre'. Nevertheless, the Town of Oakville is expected to absorb some of the growth forecasted for Halton Region (by 2031). By 2031, Oakville's 2006 population of 172,000 is projected to reach 255,000 which represents an increase of approximately 83,000 over this period (ROPA 38, 2009). A significant proportion of these increases are expected to occur within North Oakville:

- The North Oakville East Planning Area has an ultimate population target of between 45,000 and 55,000 persons and an ultimate employment target of 25,000 jobs (North Oakville East Secondary Plan, 2008); and
- The North Oakville West Planning Area has an ultimate employment target of 10,200 jobs (North Oakville West Secondary Plan, 2009).

The Trafalgar Road corridor serves the intensification areas located alongside the corridor, including Midtown Oakville and the Uptown Core.

The Growth Plan identifies Midtown Oakville as one of 25 areas identified as an urban growth centre in the GGH. Urban growth centres are to be transit-supportive regional focal areas that accommodate a significant portion of future population and employment growth in the GGH. In accordance with the Growth Plan, Midtown Oakville shall provide for a minimum gross density of 200 residents and jobs combined per hectare by 2031. This translates to approximately 20,000 residents and jobs. A mix of approximately 5,900 residential units and 186,000 – 279,000 square metres of commercial and employment space is accommodated to provide for an estimated 12,000 residents and 8,000 jobs.

The Uptown Core is intended to be a focus for new mixed use development and redevelopment. The Uptown Core shall function as an urban community with an emphasis on residential, office and commercial development. The Uptown Core shall also have a significant civic and public presence with various government, institutional, cultural, recreational and public open space uses. It is anticipated that the Uptown Core will evolve and, at full build out, accommodate approximately 16,600 residents and 3,000 jobs. This target includes the existing population and employment, and the addition of approximately 4,960 residential units.

Development pressures are already being felt on Trafalgar Road adjacent to these intensification areas, as well as further north along Trafalgar Road in the future North Oakville East Secondary Plan area.

2.3 Planning Policies and Designated Land Uses

2.3.1 Regional Municipality of Halton

In 2006, Halton Region began the Sustainable Halton process to respond to the province's *Places to Grow Plan*, the *Greenbelt Plan* and the PPS, helping to develop Halton Region's growth management strategy to 2031.

In 2009, as part of the Sustainable Halton process, Halton Region initiated two Official Plan Amendments to their *Official Plan*. These amendments included *Regional Official Plan Amendment No. 38* (ROPA 38) and *Regional Official Plan Amendment No. 37* (ROPA 37). On December 16, 2009, Halton Regional Council unanimously adopted ROPA 38 *An Amendment to Incorporate the Results of Sustainable Halton, Official Plan Review Directions and Other Matters*. Regional Council's decision to adopt ROPA 38 is recorded in By-law No. 162-09.

The Regional *Official Plan* (2006) designates the lands throughout the Study Area as part of the *Land Use Designations,* specifically *Urban Area.*

As part of the ROPA 38 amendments, the objectives of an *Urban Area* (Section 72 of the amendment) are to:

- "Accommodate growth in accordance with the Region's desire to improve and maintain regional unity, retain local community identity, create healthy communities, promote economic prosperity, maintain a high quality, sustainable natural environment, and preserve certain landscapes permanently.
- Support a form of growth that is compact and supportive of transit usage and non-motorized modes of travel, reduces the dependence on the automobile, makes efficient use of space and services, promotes live-work relationships and fosters a strong and competitive economy.
- Provide a range of identifiable, interconnected and complete communities of various sizes, types and characters, which afford maximum choices for residence, work and leisure.
- Ensure that growth takes place commensurately both within and outside the Built Boundary.
- Establish a rate and phasing of growth that is consistent with the policies of this Plan.
- Identify an urban structure that supports the development of Intensification Areas.
- Plan and invest for a balance of jobs and housing in communities across the Region to reduce the need for long distance commuting and to increase the modal share for transit and active transportation.
- Promote the adaptive re-use of brownfield and greyfield sites.
- Facilitate and promote intensification and increased densities.
- Provide for an appropriate range and balance of employment uses including industrial, office and retail and institutional uses to meet long-term needs.
- To direct where employment uses should be located and to protect areas designated for such uses.
- Provide opportunities for post-secondary education facilities to locate within Halton".

The Regional *Official Plan* (2006) states that: "the range of permitted uses and the creation of new lots in the Urban Areas will be in accordance with Local Official Plans and Zoning By-laws; however, development shall be subject to the policies of the Regional Official Plan".

Trafalgar Road is an Intensification Corridor as it "consists of areas along Higher Order Transit Corridors and selected Arterial Roads" (Regional Official Plan, 2006). As part of the ROPA 38 amendments, the objectives of *Intensification Areas* (Section 78 of the amendment) are to:

- "Provide an urban form that is complementary to existing developed areas, uses space more economically, promotes live-work relationships, fosters social interaction, enhances public safety and security, reduces travel by private automobile, promotes active transportation and is environmentally more sustainable."
- Provide opportunities for more cost-efficient and innovative urban design.
- Provide a range of employment opportunities, facilities and services in centralized locations that are readily accessible by public transit.
- Promote a greater mix of land uses.
- Create a vibrant, diverse and pedestrian-oriented urban environment.
- Cumulatively attract a significant portion of population and employment growth.
- Provide high quality public open spaces with site design and urban design standards that create attractive and vibrant places.
- Support transit and active transportation for everyday activities.
- Generally achieve higher densities than the surrounding areas.
- Achieve an appropriate transition of built form to adjacent areas.
- For Major Transit Station Areas and Intensification Corridors:
  a. Achieve increased residential and employment densities in order to ensure the viability of existing and planned transit infrastructure and service.
  b. Achieve a mix of residential, office, institutional and commercial development, where appropriate.
  c. For Major Transit Station Areas, provide access from various transportation modes to the transit facility, including consideration of pedestrian, bicycle parking and commuter pick-up/drop-off areas.
  d. For Intensification Corridors, accommodate local services, including recreational, cultural and entertainment uses."

On July 13, 2011, Regional Council adopted *Regional Official Plan Amendment No. 39 (*ROPA 39) – *Regional Development Phasing to 2031*. This amendment was adopted in response to the adopted policies of ROPA 38, which required Regional staff to undertake a process to determine the phasing of growth in accordance with the population and employment distributions of Table 1 of ROPA 38, and to amend Map 5 of the *Official Plan* to show the Regional development phasing to 2031. The Trafalgar Road Corridor within ROPA 39-amended Map 5 of the Halton Region Official Plan continues to be located within the *Urban Area with Regional Phasing to 2021*.

2.3.2 Town of Oakville

The Town of Oakville's Official Plan is referred to as the *Livable Oakville Plan*. The *Livable Oakville Plan*, as adopted in June 2009 by Town Council:

a) "establishes the desired land use pattern for lands within the Town, south of Dundas Street and north of Highway 407, to 2031;
b) co-ordinates land use and infrastructure requirements to ensure that the anticipated growth can be accommodated;
c) establishes a framework and policy context for decision making that provides certainty for the planning process; and,
d) conforms or does not conflict with provincial plans, has regard to matters of provincial interest, and is consistent with provincial policy statements".

The mission of the plan is to enhance the Town's natural, cultural, social and economic environments by ensuring that environmental sustainability, cultural vibrancy, economic prosperity and social well-being are incorporated into growth and development decisions.

The North Oakville East and West Secondary Plans (2008) are not part of the *Livable Oakville Plan*, and provide a separate policy framework with a land use pattern and policies for the lands between Dundas Street and Highway 407.

The Study Area for this Municipal Class EA is within the Southeast, and Central Boundaries of the *Livable Oakville Plan* (2009), and the North Oakville East Secondary Plan (2008).

The Town of Oakville's Trafalgar Road Corridor Planning Study examined the existing context of the lands along Trafalgar Road from the QEW to Dundas Street with the aim of identifying where potential intensification opportunities may exist, and to what extent. The study's findings contribute to the land use and built form policies of the *Livable Oakville Plan*.

From Cornwall Road to the QEW

This area is identified as a Growth Area (Midtown Oakville) within the *Livable Oakville Plan* (2009) and an Urban Growth Centre in the Growth Plan for the GGH (2006). The land use for the area is consistent with the land use defined in the Metrolinx *Midtown Oakville Mobility Hub Study* (2012), and follows the framework for land use set in the Draft *Oakville Midtown Business and Development Plan* (2008).

The area bounding Trafalgar Road on both east and west sides is designated as Office Employment and is within the Trafalgar and Station Districts of Midtown Oakville. Building heights are defined as being between six and 12 stories.

Further to the classification as an Office Employment area, Sections 20.3.1 and 20.3.2 of the *Livable Oakville Plan* (2009) describe each district, respectively;

> *"The Trafalgar District will develop as the focus of Midtown Oakville with a mix of office, civic, cultural and recreational uses and public spaces."*

> *"The Station District includes the transportation facilities that define Midtown Oakville as a major transit station area."*

From the QEW to Upper Middle Road

This portion of the Study Area is within the Central portion of the *Livable Oakville Plan* (2009) Land Use Boundaries.

The following land uses are designated along the east side of Trafalgar Road, from south to north:

- Office Employment
- Natural Area
- Institutional
- Low Density Residential
- High Density Residential
- Medium Density Residential

The following land uses are designated along the west side of Trafalgar Road, from south to north:

- Core Commercial
- Natural Area
- Low Density Residential
- Natural Area
- Institutional
- Low Density Residential

The land uses listed above are within the former College Park Community Plan Area, as defined in the 2006 Oakville Official Plan, which extends from north of Leighland Avenue to Upper Middle Road. The area remains depicted as *College Park* on the Urban Structure Schedule A1 of the *Livable Oakville Plan*.

From Upper Middle Road to Dundas Street

This portion of the Study Area is also within the Central portion of the *Livable Oakville Plan* (2009) Land Use Boundaries.

The following land uses are designated along the east side of Trafalgar Road, from south to north:

- Low Density Residential
- Medium Density Residential
- Office Employment
- Community Commercial
- Natural Area

The land uses listed above are within the former Iroquois Ridge North Community Plan Area, as defined in the 2006 Oakville Official Plan. The area remains depicted as 'Iroquois Ridge North' on the Urban Structure Schedule A1 of the *Livable Oakville Plan* (2009).

The following land uses are designated along the west side of Trafalgar Road:

- Low Density Residential
- Growth Area

From Dundas Street to Highway 407

This area is within the *North Oakville East Secondary Plan* (2008). The Town of Oakville's North Oakville East Secondary Plan (2008) covers the portion of Oakville bounded to the north by Highway 407, to the east by Ninth Line, to the south by Dundas Street, and to the west by the Centre Line of Sixteen Mile Creek, and the westerly limit of Lot 25, Concession 1, North of Dundas Street (NDS). The primary focus of development in this area has been planned along Trafalgar Road and is named the *Trafalgar Urban Core Area*.

The following land uses are designated along the east side of Trafalgar Road from south to north:

- Trafalgar Urban Core Area
- Natural Heritage System Area
- Transitway

The following land uses are designated along the west side of Trafalgar Road south to north:

- Natural Heritage System Area
- Trafalgar Urban Core Area
- Urban Square
- Stormwater Management Area
- Transitway

2.4 Transportation

2.4.1 Provincial Transportation Planning Context

2.4.1.1 Provincial Policy Statement (2014 Update)

The Provincial Policy Statement (PPS), 2014, is issued under Section 3 of the Planning Act. The PPS came into effect on April 30, 2014 and replaces the PPS issued on March 1, 2005. The PPS provides the following updated policies regarding the provision of transportation infrastructure.

PPS Section 1.6 Infrastructure and Public Service Facilities

1.6.5 "Public Service Facilities should be co-located in community hubs, where appropriate, to promote cost-effectiveness and facilitate service integration, access to transit and active transportation."

1.6.7.1 "Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs."

1.6.7.3 "As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries."

1.6.8.1 "Planning authorities shall plan for and protect corridors and rights-of-way for infrastructure, including transportation, transit and electricity generation facilities and transmission systems to meet current and projected needs."

PPS Section 1.7.1 Long-Term Economic Prosperity

"f) Providing for an efficient, cost-effective, reliable multi-modal transportation system that is integrated with adjacent systems and those of other jurisdictions, and is appropriate to address projected needs to support the movement of goods and people."

2.4.1.2 Metrolinx Regional Transportation Plan (2008)

In 2006, the *Greater Toronto Transportation Authority Act* established Metrolinx "to create a long-term strategic plan for an integrated, multi-modal, regional transportation system" (Metrolinx, 2008). In November 2008, the Metrolinx Board of Directors adopted 'The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area' Regional Transportation Plan (RTP). The RTP provides a vision, goals and objectives for the future in which transportation within the Greater Toronto and Hamilton Area (GTHA) "is seamless, co-ordinated, efficient, equitable, and user-centred" (Metrolinx, 2008). The RTP builds on the extensive work that has been carried out by Metrolinx and others to date, and aims to:

- Reduce demands on the transportation system;
- Increase choices for travel;
- Meet the needs of the traveller first;
- Build communities that make travelling easier; and
- Commit to continuous improvement.

Nearly 100 actions will be implemented over the course of the RTP's 25-year time horizon in order to achieve the abovementioned goals (Metrolinx, 2008).

The Metrolinx RTP (2008) identifies Trafalgar Road in the 15-year plan for 'Regional Rapid Transit and Highway Improvements', as a corridor for *Other Rapid Transit (Bus Rapid Transit (BRT)/Light Rail Transit (LRT)/Automated Guideway Transit (AGT))*. In addition, it identifies Trafalgar Road as an Urban Corridor that creates a critical linkage in the local transit network for Halton Region. The area between the Queen Elizabeth Way (QEW) and Cornwall Road is identified as a Provincial 'Mobility Hub' as part of The Big Move. Trafalgar Road is situated at the centre of this designated area.

2.4.2 Regional Transportation Planning Context

2.4.2.1 Halton Region Official Plan

In accordance with Section 171 of ROPA 38 for the Regional *Official Plan* (2006), "the goal for transportation is to provide a safe, convenient, accessible, affordable, and efficient transportation system in Halton, while minimizing the impact on the environment and promoting energy efficiency". As defined in ROPA 38, the Function of a Major Arterial is to:

- "Serve mainly inter-regional and regional travel demands;
- May serve an Intensification Corridor;
- Accommodate truck traffic;
- Accommodate higher order transit services and HOV lanes;
- Connect Urban Areas in different municipalities;
- Carry high volumes of traffic; and,
- Distribute traffic to and from Provincial Freeways and Highways."

ROPA 38 lists the general design criteria for a Major Arterial as:

- "High degree of access control;
- Transit supportive, high density, mixed use development to be encouraged along right-of-way within urban areas; and
- Right-of-way requirements up to 50 metres."

2.4.2.2 Halton Region Transportation Master Plan (to 2031) – The Road to Change

Building upon the Functional Plan of Major Transportation Facilities identified in the Regional *Official Plan*, the *Halton Region Transportation Master Plan (2031) – The Road to Change* (Halton Region TMP), was completed to meet Phases One and Two of the Municipal Class EA process (October 2000, as amended in 2007 and 2011). The purpose of the study was to develop a strategy that reflects Halton Region's transportation vision over the next 20 years to 2031, which would be a dynamic integrated transportation strategy that considers multiple modes of travel.

The study provides Halton Region with the strategies, tools and policies needed to manage traffic safely, effectively and cost efficiently, to offer a range of transportation choices to meet the needs of Halton Region residents, to identify and protect future transportation corridors, and to identify the estimated costs and timing of transportation improvements.

The Halton Region TMP has identified:

- **Between Cornwall Road and Dundas Street:**
  A 50 metre right-of-way on Trafalgar Road, with an urban cross-section including off-road Active Transportation facilities. Four general purpose lanes plus provisions for two reserved lanes for HOV/transit.

- **Between Dundas Street and Highway 407:**
  A 50 metre right-of-way on Trafalgar Road, with an urban cross-section including off-road Active Transportation facilities. Four general purpose lanes, plus provisions for two reserved HOV/transit.

2.4.3 Local Transportation Planning Context

2.4.3.1 Livable Oakville (Oakville Official Plan, 2009)

The Town of Oakville's Official Plan *the Livable Oakville Plan* (consolidated September 12, 2012) designates Trafalgar Road throughout the Study Area as a Major Arterial/Transit Corridor, as defined in Table 4 and shown in Schedule C: Transportation Plan (Oakville, 2012). According the *Livable Oakville Plan*, the functions of Major Arterial/Transit Corridors are to:

- accommodate high volumes of traffic moving between communities travelling to activity centres and traffic en-route to or from the Provincial Highway system;
- act as major transit corridors;
- accommodate rapid transit services and HOV;
- distribute traffic to or from multiple classes of roads; and
- be comprised of four or six lanes, and serve 40,000 or 60,000 vehicles per day.

Access is controlled by Halton Region or the Province, where appropriate.

The Trafalgar Road corridor serves the intensification areas located alongside the corridor, including Midtown Oakville, and the Uptown Core which are designated as primary growth areas intended to accommodate the highest level of intensification (for both people and employment). Midtown Oakville is also identified as a major transit station area.

The Growth Plan identifies Midtown Oakville as one of 25 areas identified as an urban growth centre in the GGH. Urban growth centres are to be transit-supportive regional focal areas that accommodate a significant portion of future population and employment growth in the GGH. In accordance with the Growth Plan, Midtown Oakville shall provide for a minimum gross density of 200 residents and jobs combined per hectare by 2031. This translates to approximately 20,000 residents and jobs. A mix of approximately 5,900 residential units and 186,000 – 279,000 square metres of commercial and employment space is accommodated to provide for an estimated 12,000 residents and 8,000 jobs.

The Uptown Core is intended to be a focus for new mixed use development and redevelopment. The Uptown Core shall function as an urban community with an emphasis on residential, office and commercial development. The Uptown Core shall also have a significant civic and public presence with various government, institutional, cultural, recreational and public open space uses. It is anticipated that the Uptown Core will evolve and, at full build out, accommodate approximately 16,600 residents and 3,000 jobs. This target includes the existing population and employment, and the addition of approximately 4,960 residential units.

2.4.3.2 Town of Oakville Transportation Master Plan – Switching Gears (2012)

The *Town of Oakville's Transportation Master Plan – "Switching Gears"* (Town of Oakville TMP) (2012) established transportation policy direction and infrastructure plans for multiple travel modes (automobiles, ride-sharing, public transit, cycling, walking) along with strategic roadway improvements in Oakville to 2031. The plan incorporates the planning framework from the Livable Oakville Plan and the North Oakville Secondary Plans. The 2012 Town of Oakville TMP recommended plan integrates the following elements:

- Land use and transportation planning
- Travel demand management strategies
- Cycling and pedestrian facilities
- Transit service expansion, transit priority measures
- Road network capacity improvements
- Urban sustainable design standards

The plan calls for higher frequency bus service on Trafalgar Road and Dundas Street, with 10-minute frequency and dedicated rapid transit lanes and HOV corridors to be consistent with the Dundas Street and Trafalgar Road Class EA studies. Network improvements include the extension of Cross Avenue from Trafalgar Road to Royal Windsor Drive, and the widening of Iroquois Shore Road to four lanes from Trafalgar Road to Eighth Line. QEW/Trafalgar Road interchange improvements are also recommended.

2.4.3.3 North Oakville East Secondary Plan (2008)

The Town of Oakville's *North Oakville East Secondary Plan* (2008) designates Trafalgar Road between Dundas Street and Highway 407 as a Major Arterial/Transit Corridor. The function of this corridor is to:

- "Serve mainly interregional travel demands including the movement of heavy trucks;
- Accommodate high order transit and/or HOV lanes;
- Connect urban areas and nodes in different municipalities;
- Carry high volumes of traffic; and
- Distribute traffic to and from the Provincial Freeways".

The Town of Oakville's North Oakville Urban Design and Open Space Guidelines (November 23, 2009) allow the corridors to have up to six lanes, excluding dedicated bus lanes and two additional transit lanes located in the centre of Trafalgar Road. The Trafalgar Road right-of-way may not exceed 50 metres. Transit interchanges have been identified at Highway 407 and Trafalgar Road and Trafalgar Road and Dundas Street. These transit interchanges "will provide for transfers from local transit routes and for connections from local to regional and inter-regional transit services" (Town of Oakville, 2008).

The North Oakville East Planning Area capacity or ultimate population target, which may not be achieved within the 2021 planning period, is a population of between 45,000 and 55,000. The total population target which will be achieved in North Oakville will reflect the population target for North Oakville East in combination with the population target for North Oakville West established in the North Oakville West Secondary Plan. The employment target for North Oakville East is approximately 300 net hectares of employment land and 16,500 jobs at capacity. In addition, it is anticipated that there will be approximately 8,500 population related employees for a total target of 25,000 jobs at capacity.

2.4.3.4 Trafalgar Road Corridor Planning Study (2014)

This study was completed in early 2014. "The direction of the study was to:

- identify key opportunity sites that may have potential for new development and or redevelopment;
- examine built form, public realm, streetscape, parking, compatibility with adjacent uses, movement of people, and availability of infrastructure;
- assess land use options for the identified opportunity sites to determine appropriate uses; and
- make recommendations for new or revised land use designations and policies."

Official Plan Amendment 5

The findings of the Trafalgar Road Corridor Planning Study initiated an amendment to the Livable Oakville Plan to incorporate the study recommendations (OPA 5). Changes to the Livable Oakville Plan include policies specific to the Trafalgar Road Corridor Special Policy Area, provisions for the urbanization of specified sites within the Trafalgar Road Corridor Special Policy Area; address compatibility and transition of uses and built form within the Trafalgar Road Corridor and with surrounding uses; and, the creation of new land use policies and/or designations for certain sites.

The effect of the changes to the schedules of the Livable Oakville Plan include the identification of the Trafalgar Road Corridor Special Policy Area on Schedule I, Central Land Use, and redesignation of several properties to reflect the recommendations of the Trafalgar Road Corridor Study.

2.4.3.5 Midtown Oakville Class EA Study (2014)

In 2012, the Town of Oakville began the Midtown Oakville Class EA Study to develop a practical, long-term strategy to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville to 2031, as identified in *the Livable Oakville Plan*, the Town's Official Plan. This project is a continuation of Switching Gears, Oakville's Transportation Master Plan study, to further assess the infrastructure needs in Midtown Oakville, focusing on the following:

- Improved access and circulation within Midtown Oakville (including the easterly extension of Cross Avenue)
- Additional north-south capacity over the QEW for vehicles, transit, cyclists and pedestrians
- Improved access to the QEW to and from the eastern section of the Midtown Oakville area
- Improved access from eastbound QEW to employment south and east of Trafalgar Road interchange
- Improved capacity on existing corridors:
    - Eighth Line, from Iroquois Shore Road to North Service Road
    - Iroquois Shore Road, from Trafalgar Road to Eighth Line
    - Chartwell Road, from Cornwall Road to South Service Road

There was significant co-ordination between the Town of Oakville and Halton Region in conducting both the Town's Midtown Oakville Class EA Study and the Region's Trafalgar Road Class EA Study. As the study areas overlap, both the Town and the Region met multiple times to discuss the requirements to complete both projects, and provide input as stakeholders in each study. Of greatest significance to the Trafalgar Road Study is that north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations, described below.

Midtown Oakville is a designated urban growth centre in the province's Places to Grow growth plan and a mobility hub within the Metrolinx regional transportation plan The Big Move. Midtown Oakville is envisioned to be a vibrant, transit-supportive mixed-use urban community, as identified in the Livable Oakville Plan. Improvements to the existing network to enhance growth and economic development opportunities, as well as stormwater system improvements to support the proposed transportation network, will help ensure that Midtown Oakville has a balanced, accessible and sustainable transportation network for multiple modes of travel (walking, cycling, transit and vehicles).

Midtown Oakville is centred on Trafalgar Road and the QEW, as shown in the **Exhibit 2.1**.

Exhibit 2-1. Midtown Oakville Class EA Study Area

The study area is bounded by the QEW to the north, Cornwall Road to the south, Chartwell Road to the east, and Sixteen Mile Creek valley to the west. The study area also encompasses areas to the north and east of the urban growth centre limits. The Midtown Oakville Class EA Study Area overlaps with the study area of the Trafalgar Road ESR, which extends south to Cornwall Road.

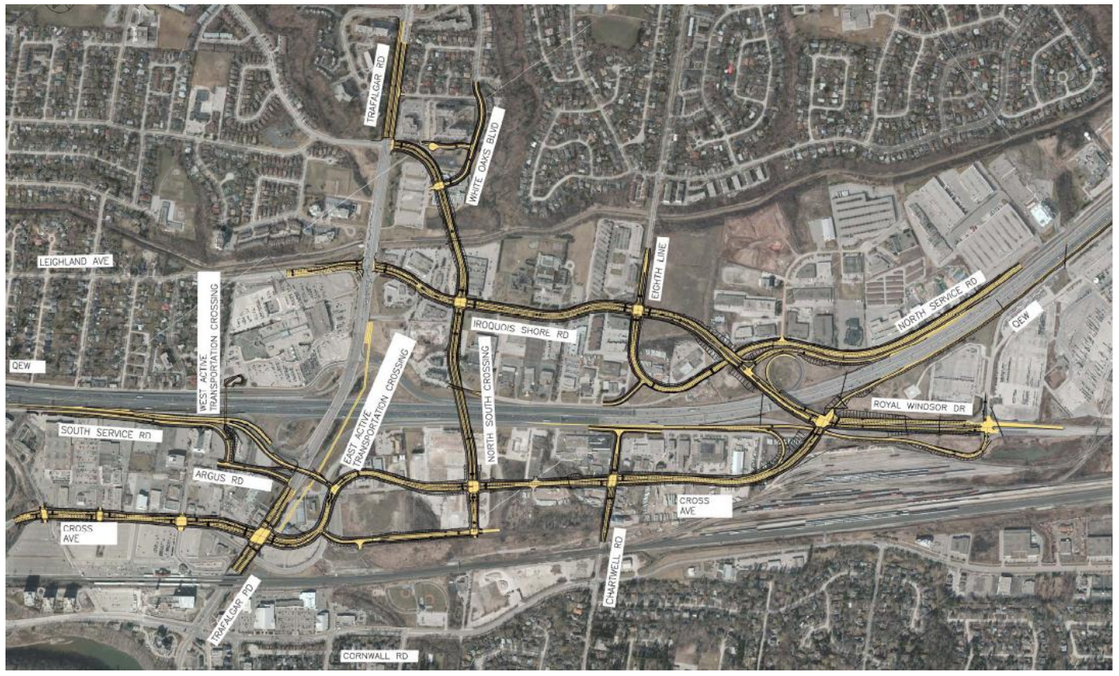
The Midtown Oakville growth area is envisioned for a minimum gross density of 200 residents and jobs (combined) per hectare by 2031 in accordance with the Province's Growth Plan. Currently the road network for Midtown Oakville is made up of one key north-south arterial, which is Trafalgar Road, and the QEW corridor (primarily an east-west highway), along with a supporting network of arterial and local roads. The Oakville GO Station is a major transit hub within Midtown Oakville and is well served by transit with 16 Oakville Transit routes connecting to GO Rail and GO Bus routes.

The observed traffic in the Midtown Oakville area indicates capacity constraints and congestion at peak periods. The study showed that the existing municipal road network does not have enough reserve capacity to accommodate full build-out of Midtown Oakville, and that transit service on Trafalgar Road and Cross Avenue will be significantly impacted by traffic delays on the road network.

The preferred concept, shown in **Exhibit 2.2**, is comprised of various elements including:

- A new North-South Crossing of the QEW with designated transit lanes
- Improvements to the Trafalgar Road QEW interchange
- Cross Avenue extension
- Iroquois Shore Road widening
- Improvements to Royal Windsor Drive interchange and extension of Royal Windsor Drive
- New pedestrian / cycling connections and facilities
- Improvements to transit connections and new transit facilities

Exhibit 2-2. Midtown Oakville Class EA Study Preferred Concept



To meet the need for additional north-south capacity over the QEW, the preferred concept provides a new crossing of the QEW midblock between Trafalgar Road and Eighth Line and an extension of Royal Windsor Drive over the QEW to connect to Iroquois Shore Road at Eighth Line.

To accommodate QEW traffic to and from Midtown Oakville and to provide an alternate access to the Trafalgar Road interchange, several improvements are provided, including a new direct off-ramp from eastbound QEW at Trafalgar Road and a new ramp to/from the QEW at Royal Windsor Drive:

The new direct off-ramp from eastbound QEW to Midtown Oakville is provided via an off-ramp that crosses under Trafalgar Road. This reduces the impacts of future traffic demand on the existing constrained intersections along Trafalgar Road at the off-ramp as well as at Cross Avenue. The underpass of Trafalgar Road also provides the opportunity for improved active transportation connections into Midtown Oakville.

A direct route from eastbound QEW to Midtown Oakville is also provided via a new off-ramp to Cross Avenue at the Royal Windsor Drive interchange while a direct route from Midtown Oakville to eastbound QEW is provided via a new on-ramp at Royal Windsor Drive opposite Cross Avenue. A new westbound QEW off-ramp at Royal Windsor Drive will provide an alternative route to Midtown Oakville and the surrounding areas.

For access and circulation within Midtown Oakville, Cross Avenue is extended from Trafalgar Road to Royal Windsor Drive, where it connects with the enhanced QEW interchange. Cross Avenue will be the new "main street' for Midtown Oakville with streetscaping and built form elements that provide accessible facilities for pedestrian and cyclists to travel safely, on-street parking where appropriate, and four lanes of vehicular travel.

Improved capacity is provided on Iroquois Shore Road by widening of the road to a four-lane cross-section plus a centre-turning lane, with on-street bike lanes and sidewalks on both sides. Iroquois Shore Road connects with the extension of Royal Windsor Drive providing one continuous corridor.

Additional connections to the proposed new transit station are provided in the form of designated transit lanes that connect to Trafalgar Road via the north-south crossing and continuing on to the transit station. Additionally, transit-only access from the Cross Avenue extension to the proposed transit station will be provided.

Additional links for pedestrians and cyclists are provided by two grade-separated, active transportation crossings of the QEW – one west of Trafalgar Road and one east of Trafalgar Road. These crossings will meet required accessibility design standards and enhance the safety of those wishing to cross the QEW on foot or by bicycle. These active transportation crossings provide pedestrians and cyclists with alternatives for crossing the QEW and improved access to transit.

2.4.3.6 Metrolinx Midtown Oakville Mobility Hub Study (2012)

Metrolinx' 2008 *The Big Move Regional Transportation Plan* identified 51 'mobility hubs' throughout the GTHA. Mobility hubs consist of major transit stations and the surrounding area. The mobility hub directions of *The Big Move* build on the policy framework for major transit station areas established in the *Provincial Growth Plan for the Greater Golden Horseshoe (2006)*. The *Growth Plan* defines a major transit station area as "the area including and around any existing or planned higher order transit station within a settlement area, or …a major bus depot urban core." (MI, 2012)

In October 2012, Metrolinx completed the *Midtown Oakville Mobility Hub* Study that covers an area of approximately 100 ha, bounded by the QEW to the north, Cornwall Road to the south, Chartwell Road to the east, and Sixteen Mile Creek to the west.

The Midtown Oakville Mobility Hub incorporates many of the elements identified in *The Livable Oakville Plan*, draft *Midtown Business and Development Plan*, Regional *Official Plan*, and *Places to Grow Act* into its vision. Among the other objectives in the vision, achieving the seamless integration of modes at the rapid transit station (including a new bus loop) identifies the need for many improvements along Trafalgar Road.

As part of the Midtown Oakville Mobility Hub Study (October 2012), GO/Metrolinx has proposed an expansion of the existing Oakville GO Station to the east side of Trafalgar Road, south of an extended Cross Avenue link. The study identified that in the long term, expanding the station to the east side has a number of advantages, including allowing direct access to the station without having to cross Trafalgar Road, and locating the existing bus and future BRT station to a more functionally accessible location (i.e., the bus station would be close to the proposed BRT overpass and relocating it would reduce traffic volumes and conflicts west of Trafalgar Road).

2.4.4 Existing Conditions Traffic Analysis

2.4.4.1 Road Network

Trafalgar Road (Regional Road 3) is a major arterial within Halton Region extending from Lakeshore Road in the Town of Oakville northerly to the Town of Halton Hills. Major highway interchange connections along the corridor are provided at the QEW and Highways 407 and 401. The northerly limit of Trafalgar Road connects to Highway 7 in the Town of Halton Hills. Trafalgar Road is an important component of the existing road network serving the entire Region and its local communities.

Road Characteristics

As shown in **Exhibit 2.3** through **Exhibit 2.5**, the existing Trafalgar Road corridor consists of three distinct sections which exhibit specific characteristics described as follows:

- **Exhibit 2.3:** Section 1 – Cornwall Road to QEW

  This section of Trafalgar Road is located in what is known as Midtown Oakville area which is a hub for commercial and transportation activities. This section provides a major link to the Oakville GO Station located at Cross Avenue. The roadway has six basic lanes between the QEW and Cross Avenue and transitions from a 6-lane cross-section south of Cross Avenue to a 4-lane cross-section (two lanes north and two lanes south) at Cornwall Road. A railway grade separation, consisting of three independent, two-span concrete structures, crosses over Trafalgar Road at the Oakville GO Station. Cornwall Road is a signalized intersection with the north leg consisting of four lanes with dedicated right turn lanes and double southbound (SB) left turning lanes. South of Cornwall Road, Trafalgar Road consists of a two lane cross-section and services mainly an older residential area of Oakville. Trafalgar Road crosses the QEW with a two span concrete bridge structure and interchange. The bridge consists of a 6-lane cross-section with a raised concrete centre median and illumination. Concrete sidewalks and barrier walls are located on both sides of the bridge. This section of Trafalgar Road is located in a highly urbanized area with high volumes of traffic, illumination, signalized intersections and both overhead and underground utilities.

- **Exhibit 2.4**: Section 2 – QEW to Dundas Street (Regional Road 5)

  The central section of the Study Area consists of a mix of residential, institutional and commercial land uses. Two major land owners located within this section are the Town of Oakville (Town Hall) and Sheridan College. Just north of the QEW, Trafalgar Road crosses the concrete-lined Morrison-Wedgewood diversion channel. South of Dundas Street, significant commercial development has been completed with additional expansion underway. At this location, Trafalgar Road also crosses a section of the East Morrison Creek. The right-of-way contains a major utility pole line along its east side for the entire length of the section and the corridor is fully illuminated.

  The roadway cross-section varies throughout this section. From the QEW northerly to Leighland Avenue the cross-section is six basic lanes plus continuous auxiliary lanes. From Leighland Avenue to approximately Sheridan College, the roadway is a six-lane, urban cross-section with a flush, painted median. At signalized intersections, additional turning lanes and raised, concrete medians are provided. The remaining portion of the roadway northerly to Dundas Street reduces to a four-lane cross-section with additional turning lanes and raised concrete medians at signalized intersections. The roadway consists mainly of a semi-urban cross-section with roadside ditches and sidewalks and a mix of granular shoulders and concrete curbs. Municipal services are located within the road allowance to service the adjacent land uses.

- **Exhibit 2.5**: Section 3 – Dundas Street to Highway 407

  The roadway for this section consists of a four lane rural cross-section with a 1.0 m flush painted median. Adjacent land uses consist of agriculture with a few residences and driveway entrances. Two communication towers have been constructed on the west side of the road. Drainage for the roadway is provided by roadside ditches which convey drainage to several small to medium sized culvert crossings. These culverts consist of both CSP and concrete structures. The Study Area ends at Highway 407 where Trafalgar Road is linked to the Highway 407 with an interchange. A major intersection is located at Burnhamthorpe Road, south of Highway 407, and a signalized intersection is present at the GO Transit Station entrance, located north of Burnhamthorpe Road, and south of Highway 407.

Throughout the corridor, the southbound and northbound travel lanes are separated by either a painted median or yellow pavement line marking except for the section between Iroquois Shore Road and Cornwall Road which has a raised median island separating the lanes.

The posted speed is 60 km/h from Cornwall Road to Dundas Street and 80 km/h from Dundas Street northerly to Highway 407.

Right-of-Way

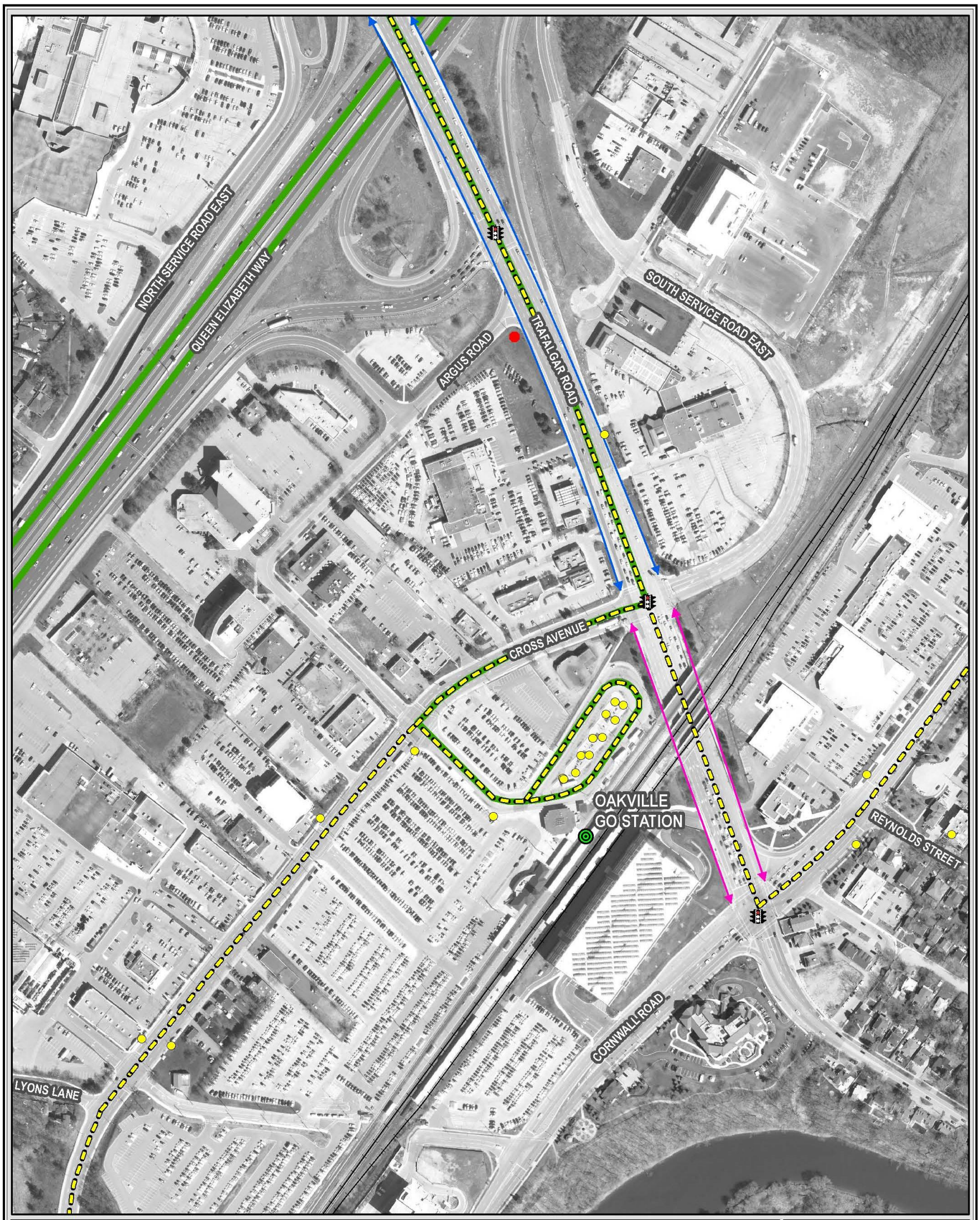
As identified in **Exhibits 2.3** to **2.5**, the existing Trafalgar Road right-of-way consists of a variety of roadway characteristics with a mixture of different land uses along the corridor as described above. The width of the road allowance also varies along the corridor from between approximately 32 metre wide to as wide as 53 metres. Generally, the average road allowance width is approximately 40 to 42 metres.

Intersections and Access

The Study Area corridor contains a number of intersections located mainly in the section from Dundas Street southerly to Cornwall Road. The majority of these intersections are controlled with traffic signals. Some driveway accesses exist along this section however the number is minimized due to existing land uses and lack of direct frontages resulting from the adjacent subdivision design such as the use of parallel local roads and rear yard lots. The rural section north of Dundas Street has several driveway accesses to service the existing farms and the two communication tower sites located on the west side of the roadway. There are two signalized intersections along the section north of Dundas Street, located at Burnhamthorpe Road and at the GO Transit Station entrance just south of Highway 407. Intersection control is identified in **Exhibit 2.3** to **2.5**.

Exhibit 2-3. Trafalgar Road Corridor Existing Network Characteristics

Section 1: Cornwall Road to QEW



Basemapping from Halton Region & Land Information Ontario:

N W E S

m
0 12.5 25 50 75 100 125

1:3,000

UTM Zone 17N, NAD 83

Legend

- Signalized Intersection
- Stop Control Intersection
- Four-Lane Cross-Section
- Six-Lane Cross-Section
- Railway Station-Passenger
- Oakville Transit Routes
- Oakville Transit Stops
- GO Bus
- Railways

Trafalgar Road
Environmental Assessment

Section 1
Cornwall Road - QEW

April 2015

Exhibit 2-4. Trafalgar Road Corridor Existing Network Characteristics

Section 2: QEW to Dundas Street (Regional Road 5)

Exhibit 2-5. Trafalgar Road Corridor Existing Network Characteristics

Section 3: Dundas Street to Highway 407

This page is intentionally blank.

2.4.4.2 Transit Services

Trafalgar Road serves as a major north-south transit corridor through eastern Oakville. It provides access to the Oakville GO Station (south of the QEW), Sheridan College and major east-west travel corridors such as the QEW, Highway 407, Dundas Street and Upper Middle Road. Sections of Trafalgar Road within the Study Area are used by nine regular Oakville Transit bus routes connecting to various destinations including the Oakville GO Station and Sheridan College.

At the time the assessment was completed, the local transit service provided by Oakville Transit along Trafalgar Road generally between Cornwall Road and Dundas Street included Routes #1, #11, #13, #14, #19, #20, #24, #26, and #190 (Town of Oakville Website, 2014). Oakville Transit connects with the GO Transit train and bus services at Clarkson, Oakville and Bronte GO stations. GO Transit buses travel from Milton to the Oakville GO Station at Trafalgar Road and Cross Avenue (Route #20 Milton-Oakville GO Bus). GO Transit has bus routes along Trafalgar Road with various stops along the corridor.

Since completion of the modeling work undertaken in this study, there have been minor changes to the current year 2014 bus service schedule, resulting in the addition of service routes, including Route #120, in the area surrounding the Trafalgar Road study area (Town of Oakville Website, 2014). These additional bus service changes would have minimal to no impact on the modelling analysis results undertaken for the study. The 2014 transit routes are shown in **Exhibit 2.6**.

Exhibit 2-6. Trafalgar Road Corridor Transit Routes

2.4.4.3 Active Transportation

Existing pedestrian facilities in the Study Area include sidewalks and crosswalks at the signalized intersections. Sidewalks are provided on Trafalgar Road as follows:

- on both sides from Cornwall Road to Glenashton Drive; and
- on the east side only between Glenashton Drive and Dundas Street.

With respect to sidewalk width, existing sidewalks within the study corridor generally meet Accessibility for Ontarians with Disabilities Act (AODA) requirements as well as the Town of Oakville's 2008 Guideline for Design of Accessible Facilities (i.e., width of 1.5m), with the required curb cuts. Sidewalks are not currently provided on the section of Trafalgar Road between Dundas Street and Highway 407.

Observed pedestrian volumes at the various intersections ranged from 10 to 20 pedestrians per hour in the peak hours. As expected, higher pedestrian volumes were observed at the southern intersections with mature communities with a number of roadside developments and amenities of interest. The highest volume recorded was 126 pedestrians crossing Trafalgar Road at Ceremonial Drive in front of Sheridan College. The Town of Oakville has observed that north of Dundas Street there are areas where pedestrians stand on the shoulder while waiting for transit.

A multi-use trail exists along sections of the west side of Trafalgar Road between Sheridan College and Glenashton Drive. There are also existing trail sections at Trafalgar Road / Oak Park Boulevards and Trafalgar Road / Hays Boulevard. On the east side of Trafalgar Road north of Glenashton Drive the Town has two major trails on utility gas corridors. Crosstown Trail is part of the Town's Heritage Trail system and is located along the TransCanada / Enbridge Natural Gas Pipeline from Bronte Provincial Park to the west bank of 16 Mile Creek, and from the East Bank of 16 Mile Creek to Ninth Line. These trails will be maintained in the future Trafalagar Road corridor.

Access to Midtown Oakville and to Oakville Place via Trafalgar Road is a necessity for seniors that reside near Cornwall Road and at Queen's Avenue. Mobility issues include ease of walking and use of wheelchairs and scooters, and these means of transportation should be accommodated in the future Trafalgar Road corridor.

Halton Region Active Transportation Master Plan

Halton Region is currently carrying out an Active Transportation Master Plan study to create a 20-year vision for active transportation in Halton Region. Active transportation is any form of human-powered transportation, including walking, cycling, roller-blading, skateboarding and moving with mobility devices. An active transportation network includes sidewalks, multi-use paths, crosswalks, on-road bike lanes and off-road trails. The objective of the Active Transportation Master Plan is to create a network that will make it easier for people to walk, bike and roll around Halton. As part of the Trafalgar Road improvements, features of active transportation were considered, including multi-use paths and sidewalks for pedestrians and cyclists.

North Oakville Trails Plan (2013)

The North Oakville Trails Plan (Trails Plan), together with the North Oakville East Transit Plan, and the North Oakville East Urban Design Guidelines, form the basis of an active transportation strategy for the Secondary Plan area. This document replaces the North Oakville East Trails Plan and the North Oakville East Cycling Strategy that were originally published in 2008. The purpose of the Trails Plan is to guide the planning, development, and management of a sustainable trail network which embraces the diversity of users and user groups, and supports social, cultural, health, economic and environmental benefits for our local communities.

Building upon Vision 2057 and the mandates of the North Oakville Secondary Plans, and other background documents, the objectives of the North Oakville Trail Plan are that the trails plan network should:

- provide connections between neighbourhoods and different land uses, and provide links to schools and parks
- support connections to major transit stations and transportation hubs
- be suitable for a variety of users
- encourage alternative modes of transportation
- limit the impacts to the Natural Heritage System

In the Trails Plan, Trafalgar Road is identified as a Regional Bicycle Facility, with Dundas Street also classified as a Regional Bicycle Facility, and other lower classification roadways crossing Trafalgar Road classified as having bicycle lanes/multi-use trails (William Halton Parkway), and signed bike routes. Multi-use trails will be a minimum of 3m wide and typically asphalt paved. Major Trails are off-road, soft surface pathways primarily for pedestrian and recreational use. Major trails are for pedestrians and cyclists. Minor Trails are off-road, software surface pathways also primarily used by pedestrians, but cyclist use is allowed.

Town of Oakville Active Transportation Master Plan (2009)

The Town of Oakville developed an Active Transportation Master Plan (ATMP), with a focus on walking and cycling. The ATMP study formulated a plan consisting of short, mid and long term actions and recommendations that establish and support a desired level of active transportation (cycling and walking) for Town residents. The plan recommended a grade separated pedestrian overpass at the intersection of Glenashton Drive and Trafalgar Road, in addition to four previously planned grade separated pedestrian crossings along the Trafalgar Road Study Area corridor.

2.4.4.4 Existing Transportation Conditions

Study analyses and results were documented as each phase of the Study was completed. Data and/or assumptions used in the Study analyses were the most current available at the time the work was performed. In order to ensure that recommendations and conclusions remained valid, checks of critical assumptions were made and report documentation updated as the study progressed.

Traffic Data

Halton Region provided the traffic data used in the existing conditions analysis in this report. The data included turning movement count (TMC) volumes at intersections and mid-block automatic traffic recorder (ATR) volume counts. As this component of the study was completed in 2009, most of the TMC data was collected in the year 2007. Halton Region also provided collision data for the four year period from 2004 to 2007. As the purpose of the "existing" conditions analysis is to determine the need for road improvements, and the analyzed data does show this need, the following section has not been updated to include more recent traffic count data, and "Existing" primarily refers to year 2007. Recent traffic count data (year 2009-2012) was assessed to assist with specific recommendations for intersection improvements and other transit priority measures, as documented in **Section 5**.

Operating Conditions – Volume to Capacity Comparison

Existing traffic volumes through the Study Area were established using the TMCs provided by Halton Region. Under existing conditions, peak hour directional traffic volumes on Trafalgar Road range from 950 to over 2,800 vehicles per hour (vph). These volumes translate to an Annual Average Daily Traffic (AADT) volume ranging from 20,000 to 40,000 vehicles per day (vpd).

An initial assessment of the potential need for capacity improvements in the Study Area was completed by comparing link volumes derived from the turning movement counts to a planning level capacity of 900 vehicles per hour per lane (vphpl). This assessment is summarized in **Exhibit 2.7**.

As link volumes approach the planning level capacity, recurring congestion and delays at intersections can be expected to increase. To avoid severe congestion and its related environmental, safety and economic impacts, roadway capacity and operational improvements should generally be considered when the ratio of link volumes to planning level capacity (v/c) exceeds 0.9. As shown by the highlighted results in **Exhibit 2.5**, existing link volumes are approaching or exceeding the planning level capacity in the section of Trafalgar Road from the QEW to Upper Middle Road with v/c ratios ranging from 0.94 to 1.24.

The traffic volumes provided in **Exhibit 2.7** include buses and commercial vehicles such as light and heavy trucks. The proportion of trucks ranged from three to five percent with light and heavy trucks accounting for approximately one to two percent and two to three percent respectively.

Exhibit 2-7. Summary of Existing Operating Conditions – Comparison of Volumes and Available Capacity by Link

Section	# of Lanes[1]	Southbound (SB)		Northbound (NB)	
		Link Volume[2]	*Volume to Capacity (v/c)[3]*	*Link Volume[2]*	*Volume to Capacity (v/c)[3]*
407 ETR Westbound (WB) Off-Ramp to 407 ETR Eastbound (EB) On-Ramp	2	1,330	0.74	1,330	0.74
407 ETR EB On-Ramp to Burnhamthorpe Rd	2	1,350	0.74	1,330	0.74
Burnhamthorpe Rd to Dundas St	2	1,190	0.66	1,260	0.70
Dundas St to Hays Blvd	2	1,050	0.58	1,160	0.65
Hays Blvd to Oak Park Blvd	2	950	0.53	1,240	0.69
Oak Park Blvd to Rosegate Way	2	1,190	0.66	1,480	0.82
Rosegate Way to Glenashton Drive	2	1,200	0.67	1,460	0.81
Glenashton Drive to Briar Hall Gate	2	1,480	0.82	1,430	0.79
Briar Hall Gate to Upper Middle Rd	2	1,600	0.89	1,470	0.82
Upper Middle Rd to White Oaks Blvd	2	2,110	1.17	2,230	1.24
White Oaks Blvd to Ceremonial Drive	2	1,690	0.94	1,740	0.97
Ceremonial Drive to Marlborough Court	2	1,790	1.00	1,730	0.96
Marlborough Court to Lynnwood Drive	2	1,940	1.08	2,130	1.18
Lynnwood Drive to White Oaks Blvd (S)	2	1,940	1.08	2,110	1.17
White Oaks Blvd (S) to Iroquois Shore	3	1,790	0.66	2,400	0.89
Iroquois Shore to QEW WB Off-Ramp	3	2,880	1.06	2,610	0.97
QEW WB Off-Ramp to QEW EB Off-Ramp	3	2,610	0.97	2,570	0.95
QEW EB Off-Ramp to Argus Rd	3	2,400	0.89	1,930	0.72
Argus Rd to Cross Ave	3	2,140	0.79	2,590	0.96
Cross Ave to Cornwall Rd	3	2,300	0.85	2,040	0.76

Notes: 1. # of lanes in each direction of travel
2. Link volume is the maximum volume during the AM or PM peak hour
3. Assumes a lane capacity of 900 vph totalling to 1,800 vph and 2,700 vph for the two lane and three lane sections respectively in each direction

Intersection Operating Conditions

A traffic operations analysis was undertaken to confirm the existing traffic operations at signalized intersections within the Study Area. The analysis was undertaken by applying TMC data into the Synchro traffic software to obtain the Level of Service (LOS), volume to capacity (v/c) ratios and average delays.

As noted previously, Halton Region provided the traffic data used in the existing conditions analysis. As this component of the study was completed in 2009, most of the TMC data was collected in the year 2007. As the purpose of the "existing" intersection operating conditions analysis is to determine the need for road improvements, and the analyzed data does show this need, the following section has not been updated to include more recent traffic count data, and "Existing" primarily refers to year 2007. Recent traffic count data (year 2009-2012) was assessed to assist with specific recommendations for intersection improvements and other transit priority measures as documented in **Section 5**.

The LOS is based on the Highway Capacity Manual (HCM 2000) procedures which provide a means to measure the quality of service experienced at intersections on the basis of the average delay per vehicle. LOS is measured on a six letter scale with "A" representing excellent conditions and "F" representing over-capacity conditions. While LOS D or better is desirable, in dense urban areas with good levels of transit service, intersections operating at LOS E or better (representing capacity) are considered to be acceptable. The analysis results for the signalized intersections are summarized in **Exhibit 2.8**.

The "critical movements", highlighted in **Exhibit 3.7**, are those having a LOS of E or F and/or a v/c of 0.90 or greater. Since the analysis is based on traffic data collected in the field, v/c > 1.00 indicates that the counted traffic volume exceeded the capacity calculated by the analysis procedure/software, that is, the actual capacity of the movement/intersection is higher than calculated. Movements/intersections with calculated v/c > 1.00 are operating essentially at capacity and can be expected to experience severe recurring queuing and travel delay during peak periods.

The analysis results show that at least a third of the intersections are operating at or over capacity with LOS E or F and v/c ratio greater than 1.0 during the peak hours. Those intersections include Dundas Street, Upper Middle Road, White Oaks Boulevard, Iroquois Shore Road, Cross Avenue and Cornwall Road, as shown by the two AM / PM columns to the left in **Exhibit 2.8**.

The two right-most columns in **Exhibit 2.8** identify the operating conditions for individual turning movements that are over-capacity at each intersection, as follows:

- the southbound and westbound through movements at Dundas Street,
- the westbound shared left-right turn at Rosegate Way
- the eastbound left-turn at Glenashton Drive
- the northbound left-turn and through lanes at Upper Middle Road
- the eastbound left-turn lane at White Oaks Boulevard North
- the westbound left-turn and northbound left-turn at White Oaks Boulevard South
- the westbound dual left and northbound left-turn lanes at Iroquois Shore Road
- the southbound through lanes at Cross Avenue
- the westbound through and westbound shared through/right-turn lane, and the southbound through lanes at Cornwall Road.

As noted in **Section 1.1**, the north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations. The recommendations of the Midtown Oakville Class EA Environmental Study Report are identified in **Section 2.4.3.5**.

Exhibit 2-8. Summary of Existing Intersection Operating Conditions

Trafalgar Road Intersection	AM			PM			AM			PM		
	LOS	*v/c*	*Delay*	*LOS*	*v/c*	*Delay*	*Critical Movement*	*LOS≥E*	*v/c≥0.9*	*Critical Movement*	*LOS≥E*	*v/c≥0.9*
407 Ramp (N)	B	0.79	16	B	0.84	17	-	-	-	-	-	-
407 Ramp (S)	B	0.76	16	C	0.90	22	-	-	-	-	-	-
Burnhamthorpe Rd	D	0.94	36	D	0.98	52	EB-T/R	E	0.94	WB-T/R	E	0.98
							SB-L	E	0.93	NB-T/T/R	E	0.91
Dundas St	E	1.22	69	F	1.29	81	EB-T/T	F	1.13	EB-L	F	1.29
							SB-L	F	1.22	WB-T/T	F	1.18
							-	-	-	NB-T/T/R	E	0.94
							-	-	-	SB-T/T	F	0.98
Hays Blvd	A	0.52	5	B	0.94	20	-	-	-	EB-L/T/R	E	0.94
Postridge Drive	B	0.67	12	B	0.89	16	-	-	-	-	-	-
Rosegate Way	A	-	7	A	-	4	WB-L/R	F	0.91	WB-L/R	F	0.83
Glenashton Drive	B	0.85	19	C	0.81	24	EB-L	F	0.85	EB-L	F	0.81
River Oaks Blvd	B	0.68	19	A	0.64	9	-	-	-	-	-	-
Upper Middle Rd	D	0.96	38	E	1.62	79	WB-L	E	0.92	WB-T/T/R	E	1.01
							NB-L	E	0.80	NB-L	F	1.62
							-	-	-	NB-T/T	F	1.14
White Oaks Blvd	C	0.91	29	E	1.28	62	WB-L	E	0.30	EB-L	F	1.28
							NB-L	E	0.91	NB-T/T/R	E	1.09
Ceremonial Rd	B	0.62	18	B	0.58	10	-	-	-	EB-L	E	0.39
Marlborough Court	B	0.77	12	A	0.63	8	WB-L/T/R	E	0.77	-	-	-
White Oaks Blvd	B	0.93	19	D	1.31	51	WB-L	F	0.93	WB-L	F	1.31
							-	-	-	NB-L	F	1.19
Iroquois Shore Rd	C	0.93	34	E	1.27	61	-	-	-	WB-L/L	F	1.21
							-	-	-	NB-L	F	1.27
QEW Ramp (N)	B	0.75	15	B	0.96	19	-	-	-	WB-R	E	0.96
QEW Ramp (S)	B	0.64	20	C	0.51	20	-	-	-	-	-	-
Cross Ave	D	1.05	51	F	1.44	93	SB-T/T	E	1.05	SB-T/T	F	1.44
Cornwall Rd	E	1.20	63	F	2.21	226	NB-T/T/R	E	0.96	WB-T/T/R	F	1.61
							SB-L/L	E	0.91	NB-T/T/R	E	0.95
							SB-T	F	1.20	SB-L/L	E	0.91
							-	-	-	SB-T	F	2.21

Growth in the traffic volumes is expected to contribute to further operational issues at these intersections in the future. **The analysis results indicate that many of the existing intersections have little capacity to accommodate higher traffic volumes, particularly in the PM peak hour, should no additional road improvements be implemented in the future.**

2.4.5 Future Conditions Traffic Analysis

2.4.5.1 Key Issues

The southern section of Trafalgar Road is comprised of a mature urban mix of residential, commercial and institutional land uses. Trafalgar Road is the principle north-south major arterial roadway that must accommodate the traffic generated by these land uses, as well as through movement for both people and goods accessing the east-west freeway corridors (QEW, 407 ETR) and GO Rail Transit. The need for increased vehicular capacity on Trafalgar Road in the Study Area must consider these functions and other key issues as listed below:

- Significant population and employment growth is planned in the Town of Oakville, particularly in the North, in Uptown Core and in Midtown Oakville. Trafalgar Road will play a key role in accommodating the traffic generated by this growth, including moving the traffic to and from the east-west freeways and major transit facilities. The Trafalgar Road Corridor Planning Study, discussed in **Section 2.4.3.4**, examined the existing context of the lands along Trafalgar Road from the QEW to Dundas Street with the aim of identifying where potential intensification opportunities may exist, and to what extent, as growth will continue in the corridor.
- Trafalgar Road plays an important role as a Transit spine carrying many bus routes and providing a vital link to the Oakville GO Station. With planned developments and various transit initiatives within the general Study Area, the road is expected to carry even higher transit demands in the future years.
- Local residents are concerned about safety and service for local traffic. Increased traffic volumes and congestion result in increased concerns for pedestrian, cyclist and motorist safety, particularly at crossings, entrances and intersections.
- As traffic volumes and congestion increase, transit travel times and reliability of service on Trafalgar Road will be degraded. Measures to facilitate and enhance transit service delivery are necessary to ensure that the function of Trafalgar Road as a major transit corridor is maintained.
- The Sheridan College Trafalgar Campus generates significant volumes of vehicular, transit, pedestrian and cyclist traffic, and the campus is expanding in size. Safe and efficient movement of multiple travel modes to and from the college must be maintained.
- As a Major Arterial road, Trafalgar Road is a key route for goods movement through Oakville. Growing traffic volumes may compromise this role due to increased delays to trucks.

2.4.5.2 Do Nothing Scenario – Year 2031 Future Traffic Conditions

Volume to Capacity Assessment

The need for roadway improvements is shown through the analysis of horizon year 2031 future conditions. Future traffic volumes were assessed from traffic volume projections developed from Halton Region's EMME/2 traffic forecasting model. The model takes into account the planned road network improvements in the Study Area to year 2031 as documented in the Halton Region TMP (2011), including:

- widening the QEW to accommodate HOV lanes;
- widening of Dundas Street to four General Purpose Lanes (GPLs) and one HOV lane in each travel direction;

Construction of the realigned Burnhamthorpe Road (William Halton Parkway) through northern Oakville was also assumed. However, no improvements were considered on Trafalgar Road for the Do Nothing Scenario.

With these noted improvements, the model predicts growth rates averaging two percent per annum, to the year 2031, on various sections of Trafalgar Road and the crossing streets. The growth rates were applied to existing data to estimate future Do Nothing traffic volumes in the year 2031. These projected volumes were used to estimate future v/c ratios on sections of Trafalgar Road.

In the year 2031, the projected volumes will exceed capacity on most sections of Trafalgar Road with directional volumes of up to 3,920 vph on the section between Burnhamthorpe Road and Highway 407 resulting in v/c ratios of up to 2.2. Projected volumes will exceed roadway capacity on the southbound and northbound lanes on virtually all sections of the road.

These results indicate that under the Do Nothing scenario, projected demands will exceed capacity resulting in congestion and potential for increased collisions. ***Roadway improvements should therefore be considered on Trafalgar Road to accommodate future demands.***

2.4.5.3 Intersection Operations

Traffic operations analysis was undertaken for the 2031 horizon year under the Do Nothing scenario that assumes no improvements on Trafalgar Road. Synchro traffic analysis software was used in the analysis with optimized traffic signal timings applied at the intersections. The results are summarized in **Exhibit 2.9**.

Exhibit 2-9. Summary of Future (2031) Intersection Operations under Do Nothing Scenario

Trafalgar Road Intersection	AM			PM			Comments
	LOS	*v/c*	*Delay [s]*	*LOS*	*v/c*	*Delay [s]*	
Trafalgar Rd./407 Ramp (N)	F	1.30	144	F	1.48	162	Multiple approaches fail in AM and PM
Trafalgar Rd./407 Ramp (S)	C	0.78	22	B	0.86	12	
Trafalgar Road/Burnhamthorpe Road	F	2.04	250	F	1.82	242	Multiple approaches fail in AM and PM
Trafalgar Rd./Dundas St.	F	1.79	170	F	1.73	200	Multiple approaches fail in AM and PM
Trafalgar Rd./Hays Blvd.	B	0.65	17	E	2.32	59	Some movements fail in the PM
Trafalgar Rd./Old Park Blvd.-Postridge Dr.	B	0.81	17	E	2.08	61	
Trafalgar Rd./Glenashton Dr.	C	0.95	32	D	0.96	37	
Trafalgar Rd./River Oaks Blvd.-Briar Hall Gate	D	1.07	48	C	1.04	30	
Trafalgar Rd./Upper Middle Rd.	F	1.45	85	F	1.54	118	Most approaches fail in AM and PM
Trafalgar Rd./Sheridan College- White Oaks Blvd.	F	1.61	160	F	1.89	193	Most approaches fail in AM and PM
Trafalgar Rd./Ceremonial Rd.	E	1.12	78	B	0.87	19	
Trafalgar Rd./Marlborough Ct.	F	1.27	89	D	1.13	41	Several approaches fail in AM and PM
Trafalgar Rd./McCraney St-White Oaks Blvd.	C	0.98	35	F	1.98	135	Several approaches fail in PM
Trafalgar Rd./Leighland Ave.-Iroquois Shore Rd.	F	1.95	201	F	2.21	202	All approaches fail in AM and PM
Trafalgar Rd./QEW Ramp (North)	F	1.07	83	D	1.11	50	
Trafalgar Rd./QEW Ramp (South)	C	0.96	29	B	0.68	20	
Trafalgar Rd./Cross Ave.-S Service Rd.	F	1.45	114	F	1.91	215	All approaches fail in AM and PM
Trafalgar Rd./Cornwall Rd.	F	1.42	133	F	2.41	310	All approaches fail in AM and PM

Under future conditions, the operational issues will increase significantly in comparison to existing conditions. In all but three of the 18 intersections analyzed, traffic operations will be at either LOS E or F indicating operations at or over capacity. In most instances, operations during both the AM and PM peak hours will be at LOS F with v/c ratios well above 1.0 on multiple approaches and movements. Average delays greater than 180 seconds (three minutes) will be experienced at seven or more intersections during either peak hour period. The greatest delays of up to 474 seconds (eight minutes) are expected at the QEW off-ramp terminal and at the Burnhamthorpe Road intersection.

Such operations would be characterized with long queues and delays resulting in potential safety concerns with increased collisions. Long delays would also degrade the delivery of Emergency Services as well as transit operation on Trafalgar Road.

As noted in **Section 1.1**, the north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations. The recommendations of the Midtown Oakville Class EA Environmental Study Report are identified in **Section 2.4.3.5**. Improvements at the Trafalgar Road / Cornwall Road intersection to accommodate future projected traffic volumes are discussed in **Section 5.4.4**. Improvements at the Trafalgar Road / Dundas Street intersection to accommodate future projected traffic volumes are discussed in **Section 5.4.5**.

2.4.5.4 Traffic Safety Review

A detailed safety review of the Study Area was undertaken. The review examined the collision history and patterns, as well as the Potential for Safety Improvements (PSI) in the corridor. A location with potential for safety improvement is defined as any location that exhibits a collision potential that is significantly high when compared with a "normal" collision potential derived from a group of similar locations. Many road agencies describe the collision potential of a location using a measure of collision frequency, which is defined as the number of collisions occurring at a location during a specific time period. Evaluating the PSI for the study area involved the following steps:

- Use safety performance function (SPFs) developed for the Region of Halton for similar types of roadways and intersections, to predict yearly number of severe collisions (fatal and injury) and minor collisions (property damage only) for the intersections and mid-block road sections within the study area.
- Use the Empirical Bayes (EB) technique to calculate the expected number of collisions by combining the predicted yearly number of fatal and injury (FI) and property damage only (PDO) collisions and the observed number of FI and PDO respectively.
- Calculate the potential for safety improvement at each location which is the difference between the expected and predicted number of collisions.

Throughout the entire study area there were a total number of 979 collisions which occurred over the four-year period between 2004 and 2007. From the total of 979 collisions, 174 collisions occurred along the midblock road sections. The remaining 805 collisions were reported at 16 intersections along Trafalgar Road. The majority of collisions were PDO collisions; 66.4 % for intersections and 72.9 % for mid-block road sections. There were also a significant number of collisions with severity classified as "Other"; 43.0 % for intersections and 38.5% for mid-block road sections). Five fatal collisions were reported within that period; three at intersections and two at mid-block road sections.

The following preliminary conclusions can be made from the collision analysis.

Observed Collision Trends:

- The predominant impact type along this portion of Trafalgar Road were "rear-end" collisions (59.1% for intersections and 55.7% for mid-block road sections), followed by "turning movement" collisions (12.9%) for intersections and "angle" collisions (13.2%) for mid-block road sections. No general trends were observed on the study area as a whole in terms of distribution of collisions with respect to season, month, or time of day of collisions. The collisions tend to be occurring during fairly different periods among the different intersections and road sections. The majority of the collisions occurred during daylight condition.

Locations with Potential for Safety Improvement (PSI):

- There are four intersections that have positive PSI values, including the intersection of Trafalgar Road and Ceremonial Road with the highest PSI value.
- There are nine road sections within the Study Area that were found to have a positive PSI. Among those road sections, Trafalgar Road between Cross Avenue and Argus Road had the highest PSI value.

Over-Represented Collision Characteristics:

- As rear-end collisions were over-represented, design elements could be examined to determine potential mitigation measures to reduce rear-end collisions. This type of collision is often related to congestion and queues. Typical mitigation measures include, but are not limited to:
  - Improve progression of traffic through interconnection of signals and potentially "smart" (demand responsive) signals; note: subsequent to the completion of this collision assessment, Halton Region has made improvements to signal timing, and will continue to make revisions as necessary.
  - Improve visibility of signal heads;
  - Use skid-resistant asphalt surface mix (if friction is determined to be a contributing cause of rear-end collisions);
  - Decrease speed limit or take measures to ensure traffic is not exceeding speed limits, including enforcement;
  - Where channelized right-turns correspond to rear-end collisions (such as north of Cornwall), revise the intersection geometry; and
  - Take other actions to decrease queues and traffic speeds approaching the queues, potentially including implementing Intelligent Transportation Systems (ITS).

2.5 Problems and Opportunities

The need and justification assessment for improvements on Trafalgar Road has identified a number of issues that should be addressed as part of the Class EA Study. The reviews of existing and projected future conditions have demonstrated a need for improvements to Trafalgar Road between Cornwall Road and Highway 407 to address the following:

- Several sections of Trafalgar Road operate near, at or above capacity;
- Under existing conditions, nine of the 19 assessed intersections are operating at or over capacity (i.e., volume to capacity (v/c) ratio >1.0, LOS F), including intersections at Dundas Street, Upper Middle Road, White Oaks Boulevard, Iroquois Shore Road, Cross Avenue and Cornwall Road;
- Travel demand in the Trafalgar Road corridor will exceed capacity by the 2031 horizon year due to forecasted traffic growth; with the projected increase in traffic volumes, 12 of the 19 assessed intersections will operate at or over capacity by the year 2031;
- Promote pedestrian and cyclist travel and enhance safety at intersections through the introduction of pedestrian facilities, and by filling in gaps and improving the sidewalk/multi-use trail system;
- Preserve and enhance the role of Trafalgar Road as a major north-south transit corridor in the Town of Oakville.

This page is intentionally blank.

3. Existing and Future Conditions

3.1 Introduction

This section provides a description of the existing and future conditions for the Trafalgar Road Study Area corridor and the broader Study Area for planning context. It deals with the provincial and municipal planning framework and the natural, physical, socio-economic, cultural, and transportation conditions for the Study Area corridor. For the purpose of this inventory, the Study Area corridor includes an area up to 250 metres on either side of Trafalgar Road and beyond the Study Area limits. The existing conditions are depicted in **Exhibit 3.1**; these exhibits are referenced throughout this section.

In preparing the baseline description of the Study Area corridor, available background information was assembled and reviewed. Information from a number of secondary sources (e.g., maps, reports) was used to characterize the Study Area corridor and record significant natural, socio-economic and cultural features. Much of the data collected were obtained from provincial agencies, Halton Region, the Town of Oakville, and Conservation Halton.

In addition, roadside reconnaissance activities and technical studies were carried out to confirm and/or augment the secondary source information collected and reviewed. The scope of the data collection exercise was to provide Halton Region with sufficient information to identify, evaluate and compare Planning Alternatives.

3.2 Physical Environment

3.2.1 Physiology, Topography, and Geology

The Study Area is situated within two physiographic regions: the South Slope and Iroquois Plain of Southern Ontario. The Iroquois Plain is located south of Leighland Avenue/Iroquois Shore Road and the South Slope extends northwards from Leighland Avenue/Iroquois Shore Road to the Niagara Escarpment.

The South Slope lies across the limestones of the Verulam and Lindsay Formations, the grey shales of the Georgian Bay Formation, and the reddish shales of the Queenston Formation, and contains a variety of soils, some of which have proven to be excellent through more than a century of agricultural use (Chapman & Putnam, 1984).

The Iroquois Plain physiographic region is comprised of lacustrine deposits along the western end of Lake Ontario that were created by glacial Lake Iroquois. The plain extends from the Niagara River to the Trent River, a length of 300 kilometres, varying from a few hundred metres to 13 kilometres in width. Across Peel and Halton, the Iroquois Plain has a constant pattern with the old shoreline marked by bluffs or gravel bars. The land is generally level and the coarse sandy soil is often poorly drained. The soils of the general Study Area corridor consist of clay loams derived from the underlying Ordovician red shale of the Queenston Formation (Chapman & Putnam, 1984).

3.2.2 Soils and Agricultural Capability

Soils and agricultural capability within the Study Area corridor are documented in the *Soil Survey of Halton County - Report No. 43 of the Ontario Soil Survey* (Gillespie, Wickland and Miller, 1971). There are three major types of soil found between Highway 407 and Dundas Street, including Oneida Clay Loam, Chinguacousy Clay Loam, and Jeddo Clay Loam.

Oneida Clay Loam soils are found interspersed among sections of other soils from Highway 407 to Burnhamthorpe Road, and become more predominant generally south of Burnhamthorpe Road to Dundas Street. Moderately well-drained in nature, Oneida series soils are generally found within imperfectly drained Chinguacousy soils as well as poorly drained Jeddo soils (Gillespie, Wickland and Miller, 1971). These soils follow the pattern of the Trafalgar Moraine, as these soils typically develop on fine textured glacial tills that occupy steeper slopes. Oneida series soils are generally good from an agricultural perspective as they are capable of growing a variety of crops including hay, fall wheat, barley, oats, and corn.

Chinguacousy Clay Loam soils are mapped within the Study Area corridor generally south of Highway 407 to south of Burnhamthorpe Road. These soils are imperfectly drained and are found on gently sloping landscapes. The soils developed as a result of clay and silty clay glacial till deposits found within and beyond Halton (Gillespie, Wickland and Miller, 1971). From an agricultural perspective, Chinguacousy soils may support a variety of crops at a higher drainage limit to a smaller variety at a lower drainage limit.

Jeddo Clay Loam soils are situated within the Study Area corridor where intermittent surface water occurs on agricultural fields south of Burnhamthorpe Road to Dundas Street. These soils are poorly drained and are comprised of slightly stony calcareous clay till parent material (Gillespie, Wickland and Miller, 1971). These soils are generally found in narrow, shallow drainage basins or in depressional topographical areas. From an agricultural perspective, these soils are capable of supporting hay and some late-sown grain crops.

3.3 Natural Environment

The existing natural environment was documented to identify significant aquatic and terrestrial features as well as identify potential Species at Risk habitat located within the Trafalgar Road study area. This was achieved through a review of existing background documentation (including extensive natural environment data collected as part of the North Oakville East Secondary Plan and area land development planning), and agency records followed by the confirmation of existing conditions through field investigations, including detailed field surveys within 50 m of either side of Trafalgar Road. **Exhibit 3.1** and the following sub-sections provide an overview of the key findings. The complete Natural Environment Report is located in **Appendix B**.

3.3.1 Atlas of Breeding Birds of Ontario

Formal breeding bird surveys were not completed for the study area; however, the Atlas of Breeding Birds of Ontario provides a tool where existing breeding bird data for 10 km squares can be downloaded. This information can then be used to target specific breeding birds for the area during detailed design. Based on information provided in the Atlas of Breeding Birds, a total of 91 bird species were identified within the study area. Of the listed species, Barn Swallow (*Hirundo rustica*), Bobolink, Chimney Swift (*Chaetura pelagica*), Eastern Meadowlark, and Whip-poor-will (*Caprimulgus vociferus*) are protected under the ESA (2007).

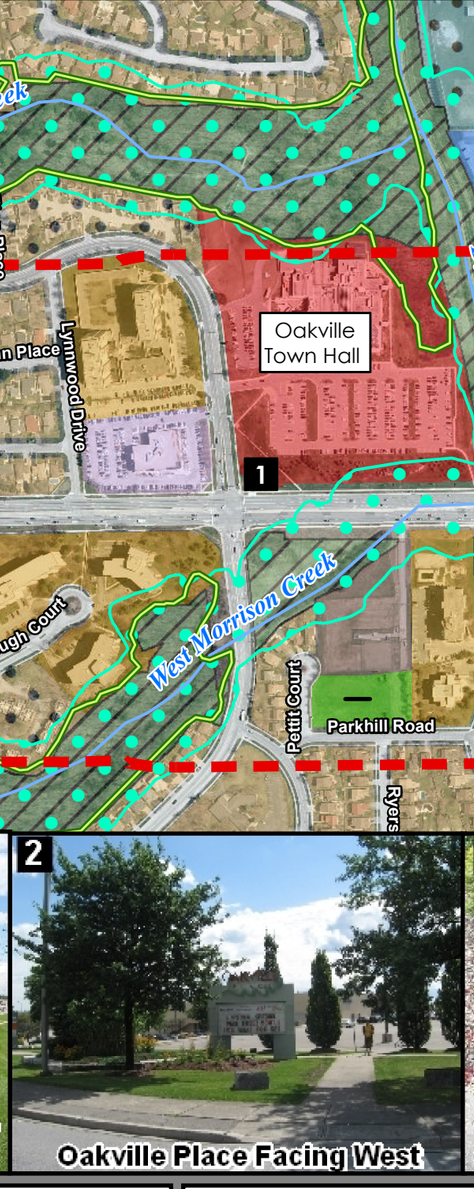
REGIONAL MUNICIPALITY OF HALTON

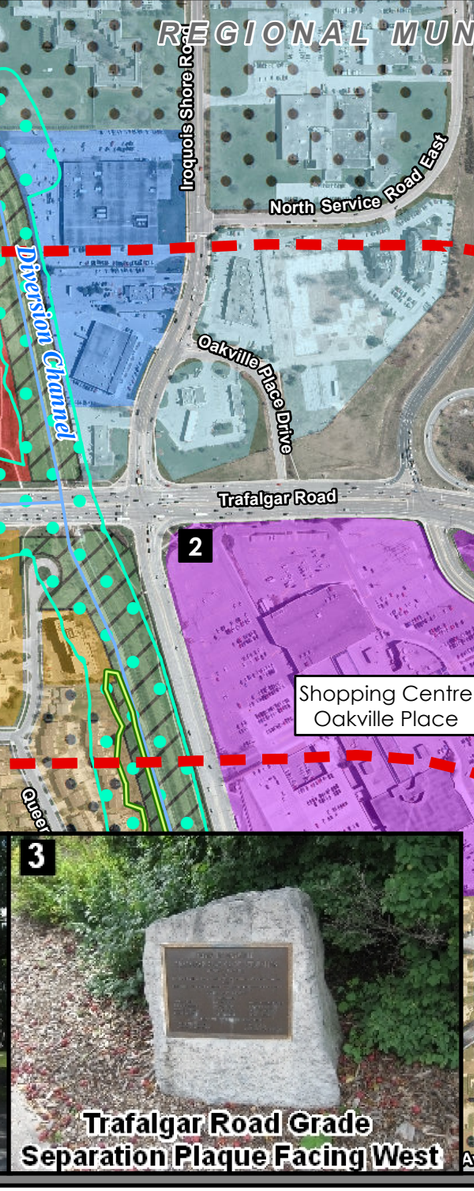
East Morrison Creek
West Morrison Creek
Diversion Channel
Morrison Creek
Oakville Creek
Oakville Creek Wetland Complex

Holton Heights
Eton Place
White Oaks Boulevard
Marlborough Court
Forest Hill
Lynn Place
Lynnwood Drive
Oakville Town Hall
Iroquois Shore Road
North Service Road East
QEW
Oakville Place Drive
Davis Road
Trafalgar Road
Parkhill Road
Pettit Court
Ryers
Queen
Shopping Centre Oakville Place
North Service Road East
Argus Road
Cross Avenue
South Service Road East
Avenue
Oakville GO Station
Cornwall Road
Old Mill Road
Allan Street
Pine Avenue
Spruce Street
MacDonald Road
Inglehart Street North

1 2 3 4


1225 Trafalgar Rd. Facing South


Oakville Place Facing West


Trafalgar Road Grade Separation Plaque Facing West


Grade Separation Facing South

N E S W

0 50 100 200 300
Metres

Co-ordinate System: NAD 1983 UTM Zone 17N

Data collected from: The Government of Canada, The Ministry of Environment, The Ministry of Natural Resources, Land Information Ontario, The Regional Municipality of Halton, and The Town of Oakville.

Legend

- Community
- 250m Study Area Corridor
- Municipal Boundary
- Watercourses
- Railway
- CH Approximate Regulation Limits
- Wooded Areas
- Pipeline Crossing
- Provincial ANSI

Significant Wetlands
- Provincial
- Regional

Heritage Structures
- Listed
- Designated

Oakville Official Plan Designations

- Office Employment
- Business Employment
- Business Commercial
- Neighbourhood Commerical
- Community Commercial
- Core Commercial
- Main Street 2
- Low Density Residential
- Med Density Residential
- High Density Residential
- Natural Area
- Parks and Open Space
- Institutional
- Utility
- Growth Area

North Oakville Master Plan

- NP Neighbourhood Park Area
- CP Community Park Area
- Village Square/Urban Square
- Stormwater Management Facility
- Natural Heritage System Area
- S Elementary School Site
- HS Secondary School Site
- General Urban Area
- Sub Urban Area
- Neighbourhood Centre Area
- Dundas Street Urban Core Area
- Employment Area
- Joshua Creek Floodplain Area
- Transitional Area
- Transitway
- Trafalgar Road Urban Core Area

Trafalgar Road:
Highway 407 to Cornwall Road

Existing Conditions Map (1 of 4)

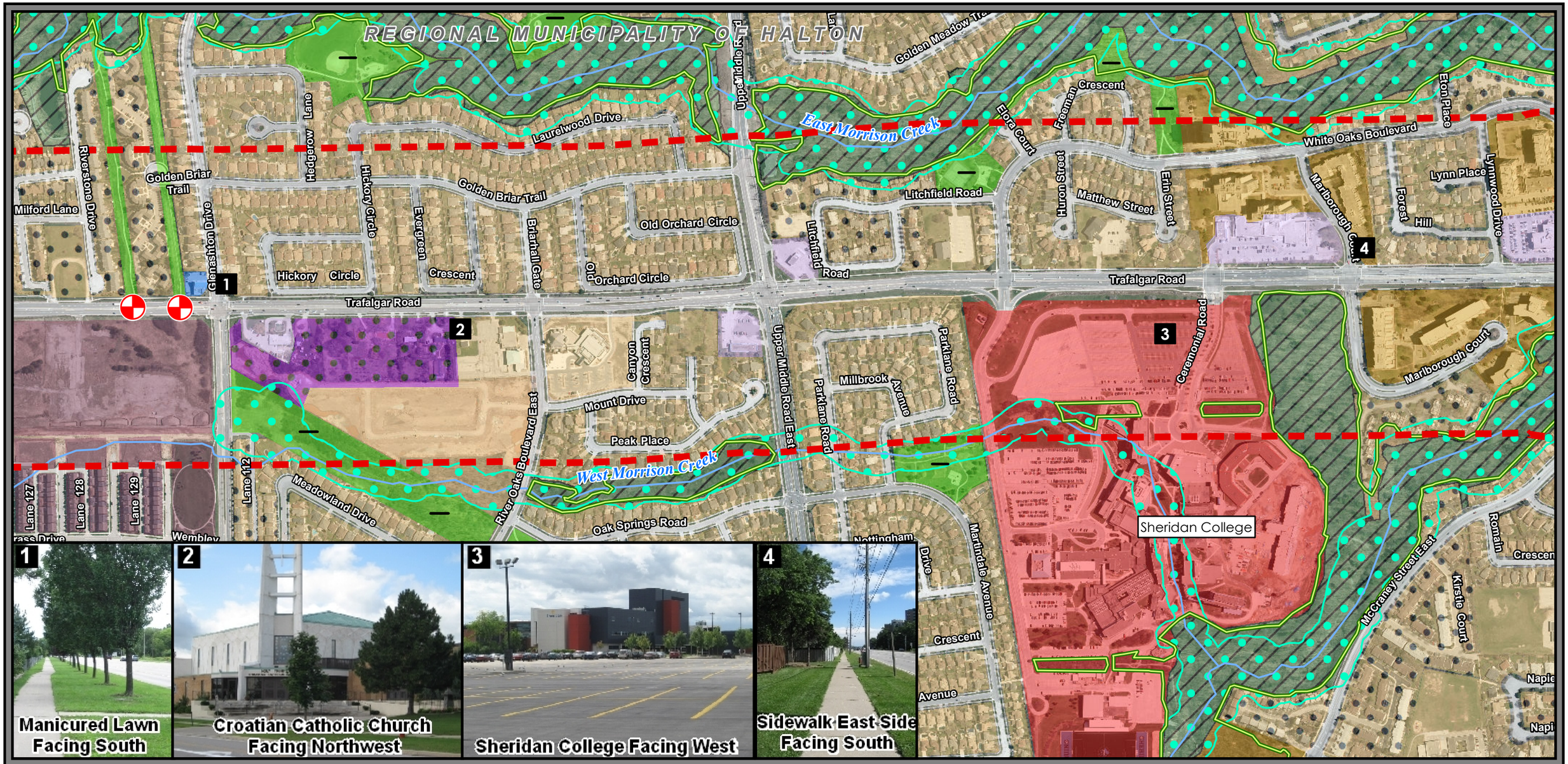
The Regional Municipality of Halton

Last Revised: April, 2015

AECOM

60119993

Path: L:\work\60119000\60119993\03-Report\Existing Conditions\GIS Data\Maps\60119993_Existing_Con_Map1_20150330.mxd



N E S W

0 50 100 200 300

Metres

Co-ordinate System: NAD 1983 UTM Zone 17N

Data collected from: The Government of Canada, The Ministry of Environment, The Ministry of Natural Resources, Land Information Ontario, The Regional Municipality of Halton, and The Town of Oakville.

Legend

- Community
- 250m Study Area Corridor
- Municipal Boundary
- Watercourses
- Railway
- CH Approximate Regulation Limits
- Wooded Areas
- Pipeline Crossing
- Provincial ANSI

Significant Wetlands

- Provincial
- Regional

Heritage Structures

- Listed
- Designated

Oakville Official Plan Designations

- Office Employment
- Business Employment
- Business Commercial
- Neighbourhood Commerical
- Community Commercial
- Core Commercial
- Main Street 2
- Low Density Residential
- Med Density Residential
- High Density Residential
- Natural Area
- Parks and Open Space
- Institutional
- Utility
- Growth Area

North Oakville Master Plan

- NP Neighbourhood Park Area
- CP Community Park Area
- Village Square/Urban Square
- Stormwater Management Facility
- Natural Heritage System Area
- S Elementary School Site
- HS Secondary School Site
- General Urban Area
- Sub Urban Area
- Neighbourhood Centre Area
- Dundas Street Urban Core Area
- Employment Area
- Joshua Creek Floodplain Area
- Transitional Area
- Transitway
- Trafalgar Road Urban Core Area

Trafalgar Road:
Highway 407 to Cornwall Road

Existing Conditions Map (2 of 4)

The Regional Municipality of Halton
Last Revised: April, 2015

AECOM 60119993

Path: L:\work\60119000\60119993\03-Report\Existing Conditions\GIS Data\Maps\60119993_Existing_Con_Map2_20150330.mxd

REGIONAL MUNICIPALITY OF HALTON

North Oakville-Milton East Wetland Complex

North Oakville-Milton East Wetland Complex

North Oakville-Milton East Wetland Complex

North Oakville-Milton East Wetland Complex

NP

HS

Morrison Creek East Tributary

East Morrison Creek

West Morrison Creek

Trafalgar Road

Trafalgar

Dundas Street East

Ravinebrook Crescent

Postridge Drive

Ravineview Way

Dalebrook Drive

Penrose Lane

Rosegate Way

Milford Lane

Riverstone Drive

Taunton Road

Oak Park Boulevard

Oak Walk Drive

Hays Boulevard

Uptown Core Tranist Terminal

Lane 127

Lane 128

Sawgrass Drive

1

2

3

4

5

6

N E S W

0 50 100 200 300

Metres

Co-ordinate System: NAD 1983 UTM Zone 17N

Data collected from: The Government of Canada, The Ministry of Environment, The Ministry of Natural Resources, Land Information Ontario, The Regional Municipality of Halton, and The Town of Oakville.

Legend

- Community
- 250m Study Area Corridor
- Municipal Boundary
- Watercourses
- Railway
- CH Approximate Regulation Limits
- Wooded Areas
- Pipeline Crossing
- Provincial ANSI

Significant Wetlands

- Provincial
- Regional

Heritage Structures

- Listed
- Designated

Oakville Official Plan Designations

- Office Employment
- Business Employment
- Business Commercial
- Neighbourhood Commerical
- Community Commercial
- Core Commercial
- Main Street 2
- Low Density Residential
- Med Density Residential
- High Density Residential
- Natural Area
- Parks and Open Space
- Institutional
- Utility
- Growth Area

North Oakville Master Plan

- NP Neighbourhood Park Area
- CP Community Park Area
- Village Square/Urban Square
- Stormwater Management Facility
- Natural Heritage System Area
- S Elementary School Site
- HS Secondary School Site
- General Urban Area
- Sub Urban Area
- Neighbourhood Centre Area
- Dundas Street Urban Core Area
- Employment Area
- Joshua Creek Floodplain Area
- Transitional Area
- Transitway
- Trafalgar Road Urban Core Area

Trafalgar Road:
Highway 407 to Cornwall Road

Existing Conditions Map (3 of 4)

The Regional Municipality of Halton

Last Revised: April, 2015

AECOM

60119993

Path: L:\work\60119000\60119993\03-Report\Existing Conditions\GIS Data\Maps\60119993_Existing_Con_Map3_20150330.mxd

REGIONAL MUNICIPALITY OF HALTON

Town of Oakville

Town of Milton

407 ETR Express Toll Route

Burnhamthorpe Road East

CP

HS

S

Oakville-Milton Wetlands and Uplands

North Oakville-Milton East Wetland Complex

Trafalgar Road

1

2

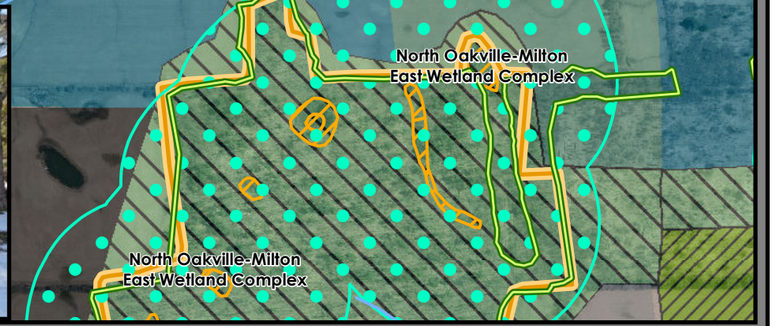
3

4

GO Transit Parking Lot

Regional Water Tower

Morrison Creek East Tributary



N W E S

0 50 100 200 300

Metres

Co-ordinate System: NAD 1983 UTM Zone 17N

Data collected from: The Government of Canada, The Ministry of Environment, The Ministry of Natural Resources, Land Information Ontario, The Regional Municipality of Halton, and The Town of Oakville.

Legend

- Community
- 250m Study Area Corridor
- Municipal Boundary
- Watercourses
- Railway
- CH Approximate Regulation Limits
- Wooded Areas
- Pipeline Crossing
- Provincial ANSI

Significant Wetlands

- Provincial
- Regional

Heritage Structures

- Listed
- Designated

Oakville Official Plan Designations

- Office Employment
- Business Employment
- Business Commercial
- Neighbourhood Commerical
- Community Commercial
- Core Commercial
- Main Street 2
- Low Density Residential
- Med Density Residential
- High Density Residential
- Natural Area
- Parks and Open Space
- Institutional
- Utility
- Growth Area

North Oakville Master Plan

- NP Neighbourhood Park Area
- CP Community Park Area
- Village Square/Urban Square
- Stormwater Management Facility
- Natural Heritage System Area
- S Elementary School Site
- HS Secondary School Site
- General Urban Area
- Sub Urban Area
- Neighbourhood Centre Area
- Dundas Street Urban Core Area
- Employment Area
- Joshua Creek Floodplain Area
- Transitional Area
- Transitway
- Trafalgar Road Urban Core Area

Trafalgar Road:
Highway 407 to Cornwall Road

Existing Conditions Map (4 of 4)

The Regional Municipality of Halton

Last Revised: April, 2015

AECOM

60119993

Path: L:\work\60119000\60119993\03-Report\Existing Conditions\GIS DataMaps\60119993_Existing_Con_Map4_20150330.mxd

3.3.2 Species at Risk

Based on responses received from the MNRF and DFO in association with this study, eleven Species at Risk records were identified as being potentially present within the study area. These included:

- Bobolink (*Dolichonyx oryzivorus*)
- Eastern Meadowlark (*Sturnella magna*)
- Northern Map Turtle (*Graptemys geographica*)
- Milksnake (*Lampropeltis triangulum*)
- Snapping Turtle (*Chelydra serpentina*)
- Lake Sturgeon (*Acipenser fulvescens*)
- Silver Shiner (*Notropis photogenis*)
- Redside Dace (Historical) (*Clinostomus elongates*)
- Eastern Ribbonsnake (*Thamnophis sauritus*)
- Canada Warbler (*Wilsonia Canadensis*).

In addition, it should be noted that the MNRF indicated that butternut had the potential to be located within the study area.

3.3.3 Terrestrial Habitat

Terrestrial features identified within the study area based on a review of existing background information are described herein.

North Oakville – Milton East Provincially Significant Wetland complex – is located within and around the eastern section of the Trafalgar Moraine. The wetland complex is bordered to the north by Highway 407, to the south by Dundas Street, to the west by Sixteen Mile Creek Valley, and to the east by Highway 403. This wetland is comprised of 105 individual wetlands consisting of both swamp and marsh communities covering a total of 34.67 ha. The wetland is significant based upon its high concentration of significant plant species and its rare wetland types.

Identified Candidate Significant Woodlands – there are portions of six candidate significant woodlands found within 120 m of Trafalgar Road totalling approximately 6.4 ha. Other candidate significant woodlands are outside of the 120 m boundary.

3.3.3.1 September 2009 Field Investigations

The field investigation carried out in September 2009 indicated that terrestrial features in the study area consisted mainly of planted roadside trees as well as planted trees within several fenced apartment building complexes and strip malls. The dominant species observed included: red pine (*Pinus resinosa*), Norway maple (*Acer platanoides*), honey locust (*Gleditsia triacanthos*), Colorado spruce (*Picea pungens*), Russian olive (*Elaeagnus angustifolia*), sugar maple (*Acer saccharum*) and crab apple (*Malus pumila*). A ditch running along both the east and west sides choked with common reed grass and cattail was noted from Dundas Street to Highway 407.

Woodland/riparian features were identified within 50 m along the study area recognized in the Halton Region's Official Plan as candidate Significant Woodlands according to Section 132 (2). This regulation requires the consideration of woodlands that are 0.5 ha or larger to be an important natural heritage feature and candidates for assessment as Significant Woodlands through the completion of an evaluation. These include:

- *Oak Park*: This woodland is located at the corner of Trafalgar Road and Glenashton Drive and is approximately 7.8ha in size. Approximately 95% of this woodland is concentrated west of the existing buildings located along the road and is at least 100 m from the existing right-of-way. The northern section of Oak Park (0.01ha) is approximately 18 m from the edge of pavement. Dominant species observed include American elm, Scotch pine, and buckthorn. This woodland has been severely damaged by edge effect from the adjacent buildings. This could explain the abundance of buckthorn near the northern section of the woodland.

- *McCraney Valley Park*: This small woodlot is part of McCraney Valley Park and is located southwest of Upper Middle Road East, on the Sheridan College Campus. It consists of a series of well used trails connected to the College through a small woodlot. Dominant species observed include white oak, red oak, shagbark hickory, bitternut hickory, and sugar maple.

- *Morrison Valley Trail North*: This small feature is linked with the existing watercourse that runs east under Trafalgar Road near Dundas Street. Dominant species observed included: Green ash, black walnut, sugar maple, silver maple, and white oak.

Two additional woodland features found along Trafalgar Road north of Dundas Street are identified as candidate significant woodlands. These areas are associated with two abandoned house properties. These properties were not accessed for field investigations as they are located on private property; therefore field investigations were completed via roadside investigations.

3.3.3.2 February 2013 Field Investigations

The findings of the field investigations carried out in February 2013 indicated that terrestrial conditions within the study area are similar to those reported in 2009, with the exception of the two locations described as follows:

- A new GO Transit Station parking lot has been constructed since the 2009 field investigations were completed. The lot is located on the west side of Trafalgar Road just south of the Highway 407 off ramp; and,
- The previously mentioned Oak Park has been mostly removed to accommodate a new subdivision. A small portion of the woodland feature remains near the intersection of Trafalgar Road and Glenashton Drive, mainly dominated by buckthorn, ash species and American elm.

3.3.3.1 June 2014 Field Investigations

A supplement field investigation was carried out on June 9, 2014 to collect a plant species list within McCraney Valley Park, located adjacent to Sheridan College, and confirm the presence and/or absence of Barn Swallow within the entire study area.

The findings of the vegetation survey identified 43 plant species within McCraney Valley Park, 26 of which were native species. Four of the plant species observed at the time of the investigation are considered locally significant. The south limit of the park's woodland area was primarily occupied by Sugar Maple. The north limit of the woodland area consisted mainly of Common Buckthorn and Hawthorn tree species.

Eight watercourse crossings within the study area were surveyed for Barn Swallow at the time of the field investigation, however no nests and/or evidence of past nesting activities were noted.

3.3.4 Aquatic Species and Habitat

Aquatic features identified within the study area based on a review of existing background information are described herein.

Sixteen Mile Creek – The Sixteen Mile Creek watershed is located at the western end of Lake Ontario within Halton Region and the City of Mississauga. The main branches of Sixteen Mile Creek are formed in wetlands and forested swamps associated with the Niagara Escarpment. From here the main branches and their tributaries flow southwards through natural, rural, urban and agricultural lands before meeting its confluence with Lake Ontario within the Town of Oakville (Sixteen Mile Creek Monitoring Project, 2005). Sixteen Mile Creek has a capture area of approximately 372 km^2 and contains nine different sub-watersheds (Dunn, 2005).

East Morrison Creek – This watercourse is located within the Sixteen Mile Creek watershed. The headwaters of East Morrison Creek originate north of Dundas Street as intermittent shallow swales and agricultural drains. The creek flows in a south easterly direction flowing through residential developments and parkland before ending at the Morrison-Wedgewood Diversion channel north of the QEW West industrial district. The MNRF designated East Morrison Creek as potential coldwater based on historical records of Redside Dace in the watercourse. However, agricultural land use and increasing urbanization may limit the coldwater habitat potential (TSH, 2006).

It should also be noted that through correspondence with the MNRF and DFO, neither agency has listed the potential for the occurrence of Redside Dace within the study area. Any mention hereon in of Redside Dace should be considered a historical record.

West Morrison Creek – West Morrison Creek is located within the Sixteen Mile Creek watershed. The western branch of Morrison Creek originates north of Dundas Street and immediately east of Sixth Line. The majority of this channel is surrounded by residential parcels. In some cases infrastructure and property loss is in jeopardy because of bank and valley wall erosion. The creek flows into the Morrison-Wedgewood Diversion channel immediately north of Leighland Avenue.

3.3.4.1 September 2009 Field Investigations

The field investigations carried out in September 2009 indicated that eleven aquatic features occur within the study area. In the study area north of Dundas Street, box culverts and corrugated steel pipe (CSP) culverts convey surface water from agricultural fields. The surface water is intermittent in nature. Small cyprinids and/or brook stickleback were observed in the culverts south of Burnhamthorpe Road East with sufficient water depth.

South of Dundas Street, East Morrison Creek flows under Trafalgar Road through a 6 m CSP. On both sides of Trafalgar Road, mean wetted width = 1.2 m; mean wetted depth = 0.12 m; mean bankfull width = 6 m and mean bankfull height = 1 m. Substrate consisted of cobbles, silt and boulders and the riparian zone was in a natural state with well-established trees and shrubs. Water temperature was 16.5°C, while air temperature was 26°C. Cyprinids were observed in this section.

A surface water conveyance ditch runs parallel to the west side of Trafalgar Road adjacent to Sheridan College. At the time of the survey, mean wetted width was 1 m and mean wetted depth was 0.03 m. No fish were observed in this system.

Two aquatic features occur between McCraney Street and Leighland Avenue: Morrison Creek and a large trapezoidal concrete surface water drain. Morrison Creek, now referred to as a tributary to Sixteen Mile Creek via a diversion channel, flows southeast into an underground system 15 m west of Trafalgar Road where it is then diverted into a concrete surface water drain to the south.

The concrete drain conveys water to the west under Trafalgar Road approximately 40 m north of Leighland Avenue into a lower reach of Sixteen Mile Creek.

3.3.4.2 February 2013 Field Investigations

The findings of the field investigations carried out in February 2013 indicated that aquatic conditions within the study area remained generally the same as reported in 2009 with the exception of a few locations where more detailed information was collected. The supplemental detail consisted mainly of new wetted widths and depths as well as further description of the associated culverts. This data was collected and added to the data available for the east side of the study area, between the QEW to Leighland Avenue, and to the east and west sides, between Oak Park Boulevard and Highway 407.

3.3.4.3 Species at Risk Habitat Screening

In order to better understand which species may be present within the Trafalgar Road study area, a habitat assessment of each species listed as Endangered, Threatened and Special Concern identified through background review was completed. This was completed to refine possible candidate species that are more likely to be present within the study area based on preferred habitat characteristics. This screening is based upon a combination of available information:

i) the presence/absence of suitable preferred habitat identified during site investigations; and
ii) known populations, obtained through range maps, COSEWIC reports, and MNRF records.

An Information Gathering Form (IGF) was submitted to the MNRF based on the assessment of SAR in the study area.

Based on compiled background information, a total of 22 Species at Risk are identified to potentially be located within the Town of Oakville (i.e. within and/or beyond the study area limits). Following the aquatic and terrestrial characterization of the study area, through background review and field investigations, a habitat screening was completed to assess whether suitable habitat is present within the study area. It was determined that six species, protected under the ESA, as well as three additional species listed as Special Concern, have suitable habitat present within the study area. A description of each is presented below. For the species listed as Special Concern, though they are not legally protected under the *ESA,* it is important to have regard for these species and their habitats due to their conservation status and to avoid future implications should the species change status under the ESA (2007). None of the following species were observed during field investigations completed by AECOM.

American Chestnut (*Castanea dentata)***,** Endangered **–** The American Chestnut prefers dryer upland deciduous forests with sandy, acidic to neutral soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species. Within the subject study area, this species has potential habitat located within McCraney Valley Park.

Butternut, Endangered – Butternut is found in deciduous forests having rich, moist, and well-drained soils and is often found along streams. The species may also be found on well-drained gravel sites, especially in limestone areas. Butternut is shade intolerant and usually occurs along or near the edge of deciduous woodlots and hedgerows. Within the subject study area, suitable habitat for this species is found within the riparian and wooded communities associated with East and West Morrison Creek.

Barn Swallow (*Hirundo rustica)*, Threatened – Barn Swallows are often associated with human settlements, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces. Within the subject study area, suitable habitat for this species is found within the northern portion of the study area where two abandoned buildings and a pond were observed.

Bobolink (*Dolichonyx oryzivorus)*, Threatened **–** Nests primarily in forage crops, particularly hayfields and pastures, dominated by a variety of species such as clover, tall grasses and broadleaved plants; also occurs in wet prairie, graminoid, peatlands and abandoned fields; generally requires tracts of grassland >5 ha. Also nests in lightly grazed pastures, fallow and abandoned fields and shallow grassy marshes. Within the subject study area, suitable habitat for this species is found within the northern portion of the study area where there are several agricultural fields.

Chimney Swift (*Chaetura pelagica)*, Threatened – Chimney Swifts formerly nested in the trunks of large, hollow trees. Today, they mainly use chimneys or abandoned buildings as nesting sites. Species may forage over a wide variety of habitats and requires dead trees >30 cm for roosting and possibly nesting. Where swifts are observed foraging only, it is not considered significant habitat. Within the subject study area, suitable habitat for this species is within the East and West Morrison Creek valley areas.

Eastern Meadowlark (*Sturnella magna)*, Threatened – Most common in native grasslands, savannah, old fields, hayfields, lightly grazed pastures, weedy meadows, and fields with occasional shrubs. Minimum area of grassland required is about 5 ha. Within the subject study area, suitable habitat for this species is found within the northern portion of the study area where there is a mixture of agricultural lands, cultural meadows and cultural thickets.

Milksnake (*Lampropeltis triangulum)*, Special Concern - The Milksnake can be found in a range of habitats including rocky outcrops, fields and forest edges. In southern Ontario, it is often found in old farm fields and farm buildings where there is an abundance of mice. The Milksnake hibernates underground, in rotting logs or in the foundations of old buildings. Within the subject study area, suitable habitat for this species is found within the northern portion of the study area where there is a mixture of agricultural lands, cultural meadows and cultural thickets.

Eastern Ribbon Snake (*Thamnophis sauritus)*, Special Concern – It is most frequently found along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting. Within the subject study area, suitable habitat for this species is found within the East and West Morrison Creek valley areas.

Snapping Turtle (*Chelydra serpentine*), Special Concern - Although Snapping Turtles have been observed in shallow water in almost every kind of freshwater habitat, the preferred habitat of the species is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Established populations are most often located in ponds, sloughs, shallow bays or river edges, and slow streams, or areas combining several of these wetland habitats. Individual turtles will persist in urbanized water bodies, such as golf course ponds and irrigation canals, but it is unlikely that a population could become established in such habitats. Within the subject study area, suitable habitat for this species is found within the East and West Morrison Creek.

3.3.4.4 Assessment of Significance

The features and species found within the study area have been assessed using local, provincial and federal rankings systems outlined by Halton Region, MNRF, the Federal Species at Risk Act (SARA) and the Ontario Endangered Species at Risk Act (SARO). The following significant features and species listed below were not observed during investigations completed by AECOM, but information was obtained from the NHIC's Biodiversity Explorer, Atlas of Breeding Birds, correspondence with the MNRF and the completed Species at Risk Screening.

Federally Significant Features and Species

The following Federally Recognized Species have been identified as potentially occurring within the study area by NHIC and Bird Studies Canada, and deemed to have suitable habitat located on-site through the completion of the Species at Risk Habitat Screening:

- **American chestnut** (*Castanea dentate)* – listed as Endangered, SARA – protected under the *Federal Endangered Species Act*
- **Butternut** (*Juglans cinerea*) – listed as Endangered, SARA - protected under the *Federal Endangered Species Act*
- **Chimney swift** (*Chaetura pelagica*) - listed as Threatened, SARA - protected under the *Federal Endangered Species Act*
- **Eastern Ribbonsnake** (*Thamnophis sauritus*) **–** listed as Special Concern, SARA
- **Milksnake** (*Lampropeltis triangulum*) – listed as Special Concern, SARA
- **Snapping Turtle** (*Chelydra serpentine*) – listed as Special Concern, SARA

No Federally ranked Natural Areas were observed within the study area.

Provincially Significant Features and Species

The following Provincially Recognized Feature is located within the study area as documented by the MNRF:

- North Oakville – Milton East Provincially Significant Wetland complex

The following Provincially Recognized Species have been identified as potentially occurring by NHIC, MNRF Correspondence and Bird Studies Canada, and deemed to have suitable habitat located within the study area:

- **American chestnut** – listed as Endangered, SARO - protected under the *Ontario Endangered Species Act*
- **Butternut** – listed as Endangered, SARO - protected under the *Ontario Endangered Species Act*
- **Chimney swift** - listed as Threatened, SARO - protected under the *Ontario Endangered Species Act*
- **Barn Swallow** (*Hirundo rustica*) – listed as Threatened, SARO – protected under the *Ontario Endangered Species Act*
- **Bobolink** – listed as Threatened, SARO - protected under the *Ontario Endangered Species Act;*
- **Eastern Meadowlark** (*Sturnella magna*) **–** listed as Threatened – protected under the *Ontario Endangered Species Act*
- **Eastern Ribbonsnake** – listed as Special Concern, SARO
- **Northern Myotis** – listed as Endangered, SARO
- **Milksnake** – listed as Special Concern, SARO
- **Snapping Turtle** – listed as Special Concern, SARO

Regionally Significant Features and Species

The following Locally Recognized Features are located within the study area as documented by the Halton Region Official Plan:

- Portions of six candidate significant woodlands found within 120 m of Trafalgar Road totalling approximately 6.4 ha including Morrison Valley Trail North, Oak Park, East Morrison Creek and McCraney Valley Park.

3.4 Social Environment

3.4.1 Existing Land Uses

The existing land uses are illustrated on **Exhibit 3.1**, Existing Conditions Maps 1 through 4. Based on a review of mapping of the area and site reconnaissance, the following land uses were identified.

Cornwall Road to QEW

At the southwest corner of Cornwall Road there is a Senior Living complex with entrances off Trafalgar Road and Cornwall Road and approximately 42 parking spaces. On the southeast corner is a commercial establishment with an entrance off Cornwall Road and approximately 12 parking spaces. At the northeast corner of the Cornwall Road intersection is a commercial complex. It has a multi-unit building abutting the intersection of Cornwall Road and Trafalgar Road, a boating and marine supply store, and a specialty food store that share approximately 125 parking spaces. At the northwest corner of the intersection is the GO Transit parking structure that abuts the Oakville GO Station.

North of Cornwall Road on the west side of Trafalgar Road there is a right-in and right-out entrance to the Oakville GO Station. On the east side of the road there is a right-in and right-out entrance to the commercial/business centre. After the entrance to the Oakville GO Station, Trafalgar Road underpasses three train lines with elevated sidewalks.

At the southwest corner of the Cross Avenue intersection there is a plaque for the Trafalgar Grade Separation that opened in 1983. The plaque is located beside a pathway to the Oakville GO Station. The formal entrance to this station is located at 214 Cross Avenue, and provides 2,724 parking spaces. Bus platforms include:

- Eastbound (EB)-Clarkson/Port Credit/Union Station;
- Eastbound (EB)-Square One/Bramalea GO/York University; and,
- Eastbound (EB)-Square One/Yorkdale/York Mills/Finch.

Train and bus stops at the Oakville GO Station include:

- 01 Lakeshore West GO Train and Bus;
- 07 Niagara Falls Weekend GO Train;
- 09 Lakeshore East GO Train and Bus, Lakeshore East and West GO Train and Bus;
- 19 Oakville Highway 403 GO Bus; and,
- Highway 407 West GO Bus.

The Oakville Transit bus platforms at the Oakville GO Station include:

- 1 Trafalgar
- 4 Speers - Cornwall
- 10 West Industrial
- 11 Linbrook
- 13 Westoak Trails
- 14 Lakeshore West
- 15 Bridge
- 17 Kerr
- 18 Glen Abbey South
- 19 River Oaks
- 20 Northridge
- 24 South Common
- 26 Falgarwood
- 28 Glen Abbey North
- 120 East Industrial
- 190 River Oaks Express

The Town of Oakville has noted that these bus platforms at the Oakville GO Station are over-capacity.

In addition to the Oakville GO Station, there is a retail building to the west of the Trafalgar Grade Separation plaque with approximately 26 parking spaces.

The southeast corner of the Cross Avenue intersection includes small trees and herbaceous vegetation. The northeast corner has a tree buffer between the roadway and a car dealership. The entrance to the dealership is located on the South Service Road. At the northwest corner of the intersection is the Trafalgar Square, with six retailers. Entrances are provided along southbound Trafalgar Road and Cross Avenue, with approximately 90 parking spaces on the property. To the north of Trafalgar Square is an auto dealership.

QEW to Lynnwood Drive

The Study Area crosses the Trafalgar Road/QEW interchange with access on the north side to the North Service Road.

Oakville Place Shopping Centre is located at the southwest corner of Leighland Avenue and Trafalgar Road. Oakville Place has over 100 retailers. There are approximately 2,317 parking spaces on the property. The shopping centre is served by Oakville Transit on the #13 Route that connects the mall to the Oakville GO Station. There are bike racks provided at the three major entrances to the mall.

The southeast corner of Iroquois Shore Boulevard and Trafalgar Road is ringed by Oakville Place Drive that connects Oakville Place with northbound traffic via a grade separation under Trafalgar Road. There is a gas station within the limits of these roadways.

North of Leighland Avenue, west of Trafalgar Road is a thin band of greenspace that contains Leighland Avenue Park. Also within this greenspace is the Wedgewood Diversion Channel draining east to west beneath Trafalgar Road. A high density residential cul-de-sac (Queen's Avenue) backs onto the west side of Trafalgar Road. Reservoir Park is bounded by Queen's Avenue, Petitt Court and Trafalgar Road. It contains tennis courts, greenspace and a section of the McCraney Valley.

North of Iroquois Shore Boulevard and east of Trafalgar Road is a commercial area. This area is bounded to the north by the Wedgewood Diversion Channel. North of the diversion channel is a thin band of greenspace that borders on the Town of Oakville Municipal Offices. The Town Municipal Offices have approximately 300 people working at this site with approximately 400 parking spots available. North of White Oaks Boulevard is a medical building with approximately 234 parking spaces.

South of McCraney Street on the west side of Trafalgar Road is Reservoir Park and a cul-de-sac of residential homes on Pettit Court. North of McCraney Street on the west side of Trafalgar Road is McCraney Valley Park and high density apartment buildings backing onto Marlborough Court.

Lynnwood Drive to Dundas Street

North of Lynnwood Drive east of Trafalgar Road is residential, with properties backing onto the roadway.

Sheridan College – Trafalgar Campus is situated on the west side of Trafalgar Road between Marlborough Court and the White Oaks Boulevard access. The Trafalgar Road Campus includes an athletic facility, a Student Centre, library, cafeteria and other food outlets. The campus has two signalized entrances. The southerly access is located opposite Ceremonial Plaza and the north (primary) access is provided opposite to White Oaks Boulevard. The campus currently caters to over 6,700 students. The campus is served internally by the Oakville Transit Route #24 that enters and exits the campus at the north site access. Routes #13, #29 and #190 also serve the campus along Trafalgar Road. The college is also served by Oakville Transit Routes #1 and #24 (on Sheridan College), and by GO Transit with service that directly accesses the campus.

North of Marlborough Court east of Trafalgar Road is a retail centre and a place of worship (Faith Baptist Church). There are residential properties that back onto Trafalgar Road and another place of worship along Trafalgar Road up to White Oaks Boulevard (St. Simon's Anglican Church of Oakville).

North of Sheridan College on the west side of Trafalgar Road to Upper Middle Road is a residential area that backs onto Trafalgar Road. A number of residences associated with Litchfield Road are present on the east side of Trafalgar Road. In addition, a gas station occupies the southeast corner of Trafalgar Road and Upper Middle Road.

On the northwest corner of Trafalgar Road and Upper Middle Road is a gas station and auto repair shop. On the northeast corner of Trafalgar Road and Upper Middle Road are residences that front onto Old Orchard Circle, which provides a buffer to Trafalgar Road.

The east side of Trafalgar Road is residential from Upper Middle Road to Glenashton Drive. The west side of Trafalgar Road is residential to the north of Upper Middle Road followed by the Ukrainian Catholic Episcopal Church. To the north of River Oaks Boulevard East there is a place of worship (Croatian Parish Hall), followed by six residential properties with entrances onto Trafalgar Road. At the southwest corner of Glenashton Drive there is a medical office building with approximately 18 parking spaces.

At the northwest corner of Glenashton Drive, land adjacent to Trafalgar Road is open space for development until north of Georgina Drive. There is a car dealership north of Georgina Drive and the sidewalk begins. North of Oak Park Boulevard is open space/vacant land until south of Hayes Boulevard. Land at the southwest corner of Oak Park Boulevard is restaurant and commercial and at the northwest corner is commercial.

At the northeast corner of Glenashton Drive is a medical and dental centre followed by trail access to the Morrison Valley Trail and residential property with a second trail to the Morrison Valley Trail. The east side is residential until Rosegate Way, where the land use is commercial/retail until north of Hays Boulevard.

Morrison Creek crosses Trafalgar Road to the north of Hays Boulevard with an entrance on the east side for the Morrison Valley Trail North.

Dundas Street to Highway 407

At the southeast corner of the Dundas Street intersection there is a large commercial development, with access from Trafalgar Road and Dundas Street. The southwest corner is grassy, with a wooded buffer for Morrison Creek. Northwest of the intersection is a gas station with access from Dundas Street and Trafalgar Road, and to the northeast is a gas station with access from Dundas Street and Trafalgar Road. Immediately north of this intersection the speed limit increases to 80 km/h for vehicles going northbound, and for vehicles traveling southbound the speed limit reduces to 60 km/h.

North of Dundas Street is primarily rural and agricultural in land use.

On the west side of Trafalgar Road there is an abandoned residence, followed by two residences listed as heritage buildings (but not designated). There are two more non-farm residences followed by the former Oak Park Pet Hospital. Across from the animal hospital is a small commercial operation (top soil/fire wood).

There are cornfields on the northeast and west sides of the road. On the west side of the Study Area there is a radio/phone tower with access to Trafalgar Road, followed by a Coast Guard Telecom Depot. To the north is fields, and a listed heritage property, to Burnhamthorpe Road.

On the east side of Trafalgar Road there is a residential property followed by a religious centre (Joshua Crossing) with an accompanying residence. To the north of this property is a field followed by fields and two heritage properties.

At the southeast corner of the Burnhamthorpe Road intersection there is a driving range with access along Burnhamthorpe Road. At the northwest corner of the Burnhamthorpe Road intersection there is a retail/commercial building with entrances on both Trafalgar Road and Burnhamthorpe Road. At the northeast corner of the intersection there is a field.

On the west side of Trafalgar Road north of Burnhamthorpe Road is the Oakville – Halton water tower with a bulk water depot surrounded by a corn field. North of the corn field is a soybean field that extends to the Highway 407 interchange.

The east side of Trafalgar Road, north of Burnhamthorpe Road is primarily corn fields. South of the Highway 407 interchange set back from the road is a 'listed' heritage property.

3.4.2 Proposed and New Development

A series of development activities are being planned in the general vicinity of the study area, as described herein.

Ward 3

915643 Ontario Inc. - 177 and 185 Cross Avenue and 580 Argus Road

- Rezone lands to permit a mixed use condominium consisting of 7,020 square metres retail commercial space and 552 residential units, within four towers. Additional 168 units included in development as of April 25, 2014.

Ward 5

Dunpar Developments - 2160, 2172 and 2184 Trafalgar Road - 2160, 2172 and 2184 Trafalgar Road

- Construction of 119 freehold townhomes with common element roads

Oak Park Boulevard

- Four storey building with ground floor commercial and three stories of residential units, and 212 maisonettes units.

Hood Development Corporation - 360 Iroquois Shore Road/360 Oakville Place Drive

- Description: Site Plan Proposal to construct a six storey office building.

Trafalgar Heights Inc. - 278 Dundas Street East

- Site Plan Proposal for mixed use development. Proposed redevelopment of the site involving the phased construction of four residential towers ranging in height from 16 to 20 stories with connecting podiums.

Star Oak Developments Limited - Part of Lots 14 & 15 on Con. 2, North of Dundas Street

- Zoning by-law amendment and plan of subdivision for 217.5 dwelling units in single detached and townhouse buildings and about 34.5 hectares of Employment Lands supported by a private driveway, village square and storm water facility.

Ward 6

Minto Communities - Dundas Trafalgar Inc. - 3075 Trafalgar Road

- Subdivision with medium & high density residential development, park, school, stormwater management pond, natural area and commercial uses.

467 Dundas Street East

- A modification of previously submitted files 24T-05005/1311 and Z.1311.02. A total of 520 units reflecting land uses within the Dundas Street Urban Core area, General Urban Area, Neighbourhood Centre area and Suburban area.

3.4.3 Aboriginal Interests

Consultation with Aboriginal people is integral to the EA process. As noted in **Section 6.4** of this ESR, a number of Aboriginal communities and organizations were contacted throughout the course of this study.

The following websites were reviewed on December 17, 2009, to identify which Aboriginal communities/organizations may have an interest in the Study Area:

- Ontario Ministry of Aboriginal Affairs website - http://www.aboriginalaffairs.gov.on.ca/english/default.asp
- Chiefs of Ontario website - http://www.chiefs-of-ontario.org/
- Six Nations Lands and Resources website - http://www.sixnations.ca/LandsResources/index.htm
- The Mississaugas of the New Credit First Nation website - http://www.newcreditfirstnation.com/

Review of the websites determined that the two nearest First Nations bands are the Mississaugas of the New Credit First Nations and Six Nations. Based on a review of the Mississaugas of the New Credit First Nation website, it is understood that the study area is located within this First Nations' Traditional Territory. A response was not received from the Mississaugas of the New Credit First Nation during the course of this study. However a copy of the Stage 1 Archaeological Assessment report was issued to each of the First Nations contacted as part of this study. In addition, a copy of the Stage 2 Archaeological Assessment will be issued to these communities once completed during detailed design.

3.4.4 Noise

The MTO/MOECC Protocol states that if the impact (change in noise level above ambient) of implementing roadway improvements is expected to be within 0-5 dB, no mitigation effort is required. However, if the change in noise level above the ambient is expected to be greater than 5 dB, investigation of mitigation effort is required. The objective sound level is specified as the greater of the predicted future "No Project" ambient or 55 dBA. As part of the Noise Assessment Report completed for this study, ten locations were identified as being representative of the most noise sensitive points of reception within the Study Area. These included townhouses and detached houses with outdoor living areas. Of the ten Noise Sensitive Receptors identified for assessment, only one receptor (R01) was identified to be below 60dBA in the existing conditions (year 2011), while the other receptors were above 60dBA.

Residential subdivisions on the east side of Trafalgar Road between Lynnwood Drive to Marlborough Court and Ceremonial Road to White Oaks Boulevard North were provided with noise mitigation in 2012. There are also noise walls north of White Oaks Boulevard on both the east and west side of Trafalgar Road that range between 20 to 25 years old.

The complete Noise Assessment Report is located in **Appendix C**.

3.4.5 Air Quality

The study area is situated within a mixed use area of the town, and includes residential with some Public Use/Education, Mixed Use and Commercial land uses. Environmentally protected (e.g., Open Space, Conservation) land uses are also located to the southwest and northeast of the Study Area along creeks and tributaries. Lands zoned as Agricultural are located to the southwest of Trafalgar Road, between Upper Middle Road and Glenashton Drive.

In total, 42 potentially sensitive receptors were identified within a 500 m radius of the Study Area. These include residences, education facilities, healthcare facilities, day care facilities, places of worship and community centres (please refer to Appendix D of the Air Quality Assessment Report for receptor locations).

A copy of the Air Quality Assessment Report is provided in **Appendix D**.

3.4.6 Sources of Potential Contamination

The potential presence of sources of contamination within the Study Area corridor was reviewed based on a 'windshield survey' carried out along the study area and activities and aerial photography interpretation undertaken by AECOM.

Landfill Operations

The Ministry of Environment Waste Disposal Site Inventory (1991) was reviewed to identify the presence of any active (as of October 30, 1999) and/or closed landfill sites within the study area. No waste disposal sites are located within the study area.

Aboveground and/or Underground Storage Tanks

No obvious sources of contamination were identified (e.g., aboveground storage tanks). However, evidence of underground storage tanks (concrete pad and caps) was observed at the following existing and former gasoline service station locations:

West Side of Trafalgar Road, Between South Service Road and Argus Road

- Evidence of USTs located approximately 11 m west of the existing Trafalgar Road curb line.

Southeast portion of Trafalgar Road intersection with Iroquois Shore Road

- Evidence of USTs observed approximately 40 m east of the existing Trafalgar Road curb line.

Northwest Quadrant of Trafalgar Road at Dundas Street Intersection

- Evidence of USTs historically located approximately 15 m west of the existing Trafalgar Road curb line.

Northeast Quadrant of Trafalgar Road at Dundas Street Intersection

- Evidence of USTs located approximately 75 m east of existing Trafalgar Road curb line.

Northwest Quadrant of Trafalgar Road and Upper Middle Road Intersection

- Historical evidence of USTs observed approximately 40 m west of the existing Trafalgar Road curb line. The gasoline service station is no longer in service; an auto repair facility currently occupies the property.

Southeast Quadrant of Trafalgar Road and Upper Middle Road

- Evidence of USTs observed approximately 45 m east of the existing Trafalgar Road curb line.

In general, the agricultural character of land uses surrounding the corridor north of Dundas Street suggests that each of the agricultural operations could represent both a potential point source, as well as a non-point source of contamination. Due to the nature of agricultural operations, potential point sources include sites where large volumes of chemicals and fuels are stored and used to facilitate farm operations. The more diffuse spreading of potential contaminants over a larger area, such as fertilizer and manure spreading, is very common, and is largely related to nutrient loadings.

Another non-point source is road salting, which is associated with typical road salt application activities for winter conditions.

Based on the potential sources of contamination described above, contaminants that may be present within proximity to the road right-of-way include both hydrocarbons (i.e., gasoline, diesel fuel, and fuel oils) and fuel additives, among others.

3.4.7 Groundwater Resources

Regional groundwater in the study area generally flows in a southerly direction towards Lake Ontario. Local groundwater is expected to flow south/southeast towards Joshua and East Morrison Creeks. Based on information collected as part of the geotechnical investigation completed for this EA study, groundwater in the study area was encountered during drilling at depths ranging from 3.7 m to 4.6 m.

The MOECC maintains an online dataset of well construction information for wells reported and installed within Ontario. Records for water wells and associated decommissioning activities in the study area date from at least 1952 to present. These records consist of original water well records and include any subsequent updates. The MOECC Water Well Records were briefly reviewed to generally determine existing groundwater uses in the study area. It is understood that private/dug wells may be situated within the north portion of the study area in association with rural residences/domestic uses. However, according to the MOECC water well records, some of these wells have subsequently been decommissioned. Some monitoring wells have been previously installed within the south portion of the study area, however many are inferred to have been associated with subsurface investigations or development on properties adjacent to Trafalgar Road.

It should be noted that the study area will be fully serviced by municipal water mains/sewers once ultimate conditions/planned development in the area has been completed. In addition, no significant changes to the roadway profile (i.e. cuts) are required to accommodate the proposed modifications. It should be further noted that stormwater management measures are being planned in compliance with design criteria defined by the Town of Oakville, Conservation Halton and the MTO. As such, no significant impacts to groundwater are anticipated in association with this project.

3.5 Cultural Environment

3.5.1 Cultural Landscape and Built Heritage Resources

Unterman McPhail Associates (UMA) was retained to identify built heritage resources and cultural heritage landscapes within the Study Area.

A review of primary and secondary sources and historical mapping reveals that for the most part, the Study Area corridor north of Dundas Street East to the project limits at Highway 407 is still characterized by rural agricultural landscape distinguished by agricultural fields marked by fence lines and tree lines and former 19th century farm complexes. However, these rural lands are in transition to urban use. Historically, the intersection of Dundas Street East and Trafalgar Road was the location of the 19th century hamlet of Trafalgar. Today, there are a few residences, one in commercial use, located on the west side of Trafalgar Road as visible reminders of the former community. The northwest and northeast corners of the intersection contain service stations, while the southwest and southeast corners have been developed into retail and residential use. A landscaping business is located on the east side of Trafalgar Road just north of Dundas Street East. North of the intersection at Dundas Street to the intersection at Burnhamthorpe Road, the Study Area corridor includes one farm complex and two abandoned 19th century farmhouses and a former farmhouse. From Burnhamthorpe Road north to Highway 407, one former farmhouse is located in the southeast quadrant of Highway 407 and Trafalgar Road.

Within the Trafalgar Road Study Area corridor there is one historical settlement and seven cultural heritage resources that are contained in the *Town of Oakville Heritage Register* (shown in **Exhibit 3.3**), all north of Dundas Street. They include the location of the historical 19th century hamlet of Trafalgar and three properties, namely, 3030 Trafalgar Road, 3040 Trafalgar Road and 3048 Trafalgar Road which are located close to the existing road right-of-way in the former hamlet of Trafalgar. The properties at 3040 Trafalgar Road and 3048 Trafalgar Road are included in *Section E: Register of Properties of Cultural Heritage Value or Interest (Not Designated)* of the Town of Oakville's Heritage Register (September 1, 2012).

At the northern project limit near Highway 407, there are four identified cultural heritage resources. The four sites are included in *Section E: Register of Properties of Cultural Heritage Value or Interest (Not Designated)* of the Town of Oakville's Heritage Register (September 1, 2012). They are: 3371 Trafalgar Road, 3437 Trafalgar Road, 3444 Trafalgar Road, and 4233 Trafalgar Road.

A copy of the Cultural Landscape and Heritage Resources Report is provided in **Appendix E** of this ESR.

3.5.2 Archaeology

In July 2009, Archeoworks Inc. conducted an initial Stage One archaeological assessment of the Study Area. In January 2013 the assessment was updated to reflect the Preliminary Design. The results of the assessment are summarized below; the complete Stage One Archaeological Assessment Report is located in **Appendix F**.

3.5.2.1 Determining Archaeological Potential

To establish the archaeological and historical significance of the Study Area corridor, Archeoworks Inc. conducted a comprehensive review of listed and designated heritage properties, and registered archaeological sites within close proximity to its limits. Furthermore, a review of the physiography of the overall area and its correlation to locating archaeological remains, as well as consultation of available historical documentation was performed.

3.5.2.2 Registered Archaeological Sites

The Ontario Archaeological Sites Database (OASD) maintained by Ministry of Tourism, Culture and Sport (MTCS) was consulted to inventory archaeological resources within a one kilometre radius of the Study Area corridor. Using mapping received from the MTCS, Archeoworks Inc. confirmed that 30 sites are located within 250 metres of the Study Area corridor. As a result, there is an elevated archaeological potential for undisturbed lands within 250 metres of these registered archaeological sites.

3.5.2.3 Physical Features

As noted in **Section 3.2.1**, the Study Area corridor is situated within the South Slope and Iroquois Plain physiographic regions of Southern Ontario. In terms of archaeological potential, potable water is a highly important resource necessary for any extended human occupation or settlement. As water sources have remained relatively stable in Southern Ontario since post-glacial times, proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. The Study Area corridor is bisected by Morrison Creek, tributaries associated with Morrison Creek, as well as a watercourse associated with McCraney Valley Park, and is situated within close proximity to Sixteen Mile Creek.

3.5.2.4 Historical Features

To assess the Study Area's potential for the recovery of historic remains, the *Illustrated Historical Atlases* for Counties of Ontario is reviewed in order to gain an understanding of the past land use history. A review of the *1877 Illustrated Historical Atlas of Halton County* indicated that the overall Study Area is located within parts of Lots 12 and 13, Concessions 1 and 2 North of Upper Middle Road East, and Concessions 2 and 3 South of Upper Middle Road East, in the former Township of Trafalgar South, County of Halton.

3.5.2.5 Field Methods

The final component of the Stage One investigation included a desktop review of the current field conditions using the Google Earth application. The desktop review was conducted in compliance with the *2009 Draft Standards and Guidelines for Consulting Archaeologists* ('2009 S&G') published by the MTCS.

Along Trafalgar Road from Cornwall Road to 200 metres South of Dundas Street

Disturbances consisting of paved roadways, highway intersections, gravel and paved shoulders, driveways, sidewalks, the Wedgewood Diversion Channel, drainage ditches, underground utilities, berms and graded and developed lands were identified within this section of the Study Area. Physiographic factors negatively affecting archaeological potential include low-lying and wet terrain associated with Morrison Creek and its relic tributaries. In addition to the aforementioned physiographic factors, sloping terrain was encountered surrounding Morrison Creek, south of Dundas Street East. Therefore, due to the low archaeological potential classification of those listed above, further systemic survey will not be warranted.

In 2003, Archeoworks Inc. was retained to conduct a Stage One Archaeological Assessment for a portion of this segment, from Upper Middle Road, southerly to Iroquois Shore Road/Leighland Avenue. The Stage One survey identified all of the surveyed lands, with the exception of one woodlot, located just south of Ceremonial Road, running for approximately 135 metres to just north of Marlborough Court, on the west side of Trafalgar Road, to be entirely disturbed by extensive urban development.

Trafalgar Road from 200 metres South of Dundas Street to Highway 407

In 2004, Archeoworks Inc. was retained to conduct a Stage One and Two Archaeological Assessment of Lot 12-14, Concession 1 NDS. A portion of this 2004 archaeological assessment overlaps the Study Area just north of Dundas Street. This area was subjected to a pedestrian form of survey and subsequently cleared of any further archaeological concern.

A large portion of this segment consists of disturbed, existing road right of ways. As such, a Stage 2 systemic survey is warranted for the undisturbed agricultural and fallow fields identified north of Dundas Street East, beyond the right of way limits, as well as undisturbed grassed margins and frontages bounding the residential and minimal commercial structures both north and south of Dundas Street East, within the right of way limits. Finally, due to the established high potential for recovery of both Euro-Canadian and Aboriginal archaeological remains, undisturbed lands adjacent to historic structures and the valleylands surrounding Morrison Creek would warrant further Stage 2 investigations.

3.6 Flood Hazards and Stormwater Management

3.6.1 Background Descriptions and Approach

Trafalgar Road crosses watercourses at ten mainline crossing locations in the Study Area, four of which convey tributaries of Joshua's Creek while the other six convey East Morrison Creek. The section of the Study Area south of Upper Middle Road drains to West Morrison Creek and the Morrison-Wedgewood Diversion Channel. There are currently no features in the Study Area to control stormwater quantity or quality other than the Diversion Channel and roadside ditches.

Several proposed development projects located adjacent to Trafalgar Road were underway simultaneous to the completion of this EA study, including the following:

- Dunpar Developments Inc. townhouse subdivision southwest of Glenashton Drive and Trafalgar Road
- Green Ginger Inc., Mattamy, and Argo subdivisions northwest of Dundas Street and Trafalgar Road (Main Branch EIR/FSS)
- Dundas-Trafalgar Inc. (Minto) and Shieldbay Inc. subdivision northeast of Dundas Street and Trafalgar Road (East Branch EIR/FSS)

- Reconstruction of Dundas Street between Oak Park Boulevard to Highway 403
- New North Oakville Transportation Corridor and Crossing of Sixteen Mile Creek Class EA Study

The most recent reports for each development and roadway project were reviewed during the preparation of this study to identify opportunities to coordinate the management of runoff and are further discussed in the SWM report provided in **Appendix G**.

North of Dundas Street, the study area and the adjacent developments are subject to the requirements defined in the *North Oakville Creeks Subwatershed Study* (NOCSS). The NOCSS design criteria are further discussed in a subsequent section of this report.

The subsequent sections and SWM Report in **Appendix G** provide an evaluation of the existing mainline crossings based on physical properties and capacity as per the applicable design criteria. Preliminary recommendations for SWM measures and approximate sizing were determined to provide adequate quality and quantity control following the improvements to Trafalgar Road. In addition, changes to the mainline crossings were proposed when the existing infrastructure was found in very poor condition, is inadequately sized, or requires extensions to accommodate road widening.

For reference between various reports, **Exhibit 3.2** cross references culvert naming conventions used in the stormwater management, structural, and fluvial geomorpohology assessments.

Exhibit 3-2. Cross-Reference Table for Culvert Naming Conventions

Station	Structure ID	NOCSS ID#	Fluvial Geomorphology Crossing ID #
18+385			C1
18+080			CA
17+750			C2
17+315			CB
16+725		ME-T5	C3
16+200		ME-T4	CC
15+820		ME-T3	C4
15+665	03-1182530 CU01	ME-T2	C5
15+500	03-1182530 CU02	ME-T1	C6
15+228	03-1182510 CU01		C7
11+820	03-1182340 CU01		C8
11+775	03-1182340 BR01		C9

**Note that for the SWM report, all station numbers do not indicate the 10km placeholder, i.e. station 15+820 is identified in the SWM report as station 5+820.*

3.6.2 Potential Drainage Impacts

The widening of Trafalgar Road would have the potential to impact drainage through the Study Area. Widening of the roadway platform could potentially require culvert replacements and watercourse relocations in addition to culvert extensions at the existing culverts. A widened roadway would also generate more runoff from storm events, potentially impacting the quantity and quality of runoff delivered to the receiving drainage systems.

Relative to natural ground cover, the paved surfaces of highways and roadways generate significantly greater volumes of runoff from the same storm event. Associated drainage infrastructure such as ditches and storm sewers have the potential to deliver the runoff to the receiving system much earlier relative to natural, sheet flow conditions. The above have the potential to increase the peak flow delivered to the receiving water body and can lead to increased flooding and erosion in the receiving watercourse.

Vehicular traffic deposits materials such as oil, grease, trace organics, trace metals, and other pollutants on roadway surfaces, which can be washed off during storm events and delivered to the receiving water body. In addition, water bodies also receive sand, salt, and other de-icing agents applied to roads during winter months but washed off by snowmelt and rainfall events. These pollutants have the potential to impair water quality in the receiving systems, with associated impacts to aquatic habitat and other water users. In the event that Trafalgar Road is widened, it would be expected to impact quality and quantity of runoff delivered to the receiving watercourses. The total area of asphalt and concrete through the Study Area would increase due to widening and the roadway drainage systems would be altered. Therefore, the volume, rate, and timing of delivery of runoff to the receiving watercourses would be impacted by the proposed improvements. As the paved area and the rate and volume of runoff generated by the road would be expected to increase, a corresponding increase in pollutant loadings delivered to the receiving watercourses would also be expected. In some areas, improvements to the area's drainage system may reduce existing natural hazards, regardless of the future road cross-section.

3.6.3 Stormwater Management Criteria

The SWM criteria applicable to the Study Area were obtained from the *North Oakville Creeks Subwatershed Study* (NOCSS) (August, 2006), NOCSS Addendum (September, 2007), MOECC guidelines, and the Town of Oakville's *January 2011 Development Engineering Procedures and Guidelines Manual*.

The criteria from the NOCSS are applicable within the portion of the Study Area located north of Dundas Street and include the following:

Water Quality: The NOCSS defines water quality targets, including targets for phosphorus, suspended solids, chloride, dissolved oxygen, and temperature as follows:

- Total phosphorus (TP) in loadings must not increase after development.
- Level 1 (enhanced protection) is required in the Morrison Creeks to achieve 80% total suspended solids (TSS) removal whereas Level 2 (normal protection, 70% TSS removal) is required for Joshua's Creek. The NOCSS further details that Level 1 protection is required for Joshua's Creek to achieve the TP removal criterion.
- No specific chloride target is provided in the NOCSS however it is recommended that Halton Region review the Federal Code of Practice for Environmental Management of Road Salts (Canada 2004), to identify areas that are vulnerable to road salt, and update their salt management plan.
- A dissolved oxygen level of 6 mg/L is required in the Morrison Creeks while 5 mg/L is required for Joshua's Creek.

- A daily maximum mid-summer water temperature of 18°C is recommended for the Morrison Creeks. No water temperature recommendations are provided for Joshua's Creek within the Study Area.

Peak Flow Control: Post-development peak flows are to be controlled to rates based on target unit area peak flows ($m^3/s/ha$) published in Table 7.4.1 in the NOCSS Addendum (September 5, 2007) for the 2- to 100-year design storm events and the Regional storm. The target unit area peak flows documented within the NOCSS Table 7.4.1 are based on existing conditions and are to be used to calculate target peak flows for new development projects at the EIR/FSS stage by applying updated subcatchment boundaries using more detailed topography.

Fluvial Geomorphology: The NOCSS requires that erosion rates in receiving watercourses be maintained at existing levels. Preliminary threshold flows for erosion were established in the NOCSS and continuous simulation modelling is required to demonstrate that the existing frequency and duration of exceedance of this threshold is not increased following development. Surrounding development has verified the erosion threshold locations and has carried out the associate modelling for development (including Trafalgar Road) north of Dundas Street only. It is recommended that erosion threshold flow rates be verified and established during the detailed design phase with application of updated and more detailed modeling, currently being prepared by the proposed developments adjacent to Trafalgar Road; assumptions made by others may need to be confirmed and/ or updated by the Region at detailed design.

Hydrogeology: The NOCSS specifies that infiltration should be maximized to the extent feasible.

Post-development peak flows from Trafalgar Road located south of Dundas Street must be controlled to existing peak flows, up to the 100-year design storm event in accordance with the Town's guidelines and SWM facilities must provide Enhanced Level of treatment (i.e., 80% TSS removal) as per CH requirements.

The East Morrison Creek Subwatershed Study (EMCSS) provided recommended locations and sizing for extended detention ponds beyond the extents of this Study Area and therefore does not provide criteria applicable to the Study Area.

3.6.3.1 Hydraulic Criteria

The mainline culverts crossing Trafalgar Road must be in accordance with the hydraulic requirements of the MTO *Highway Drainage Design Standards* (HDDS), Conservation Halton (CH), and the Town.

Return Periods: The HDDS defines the design flow return period for culverts based on functional road classification and culvert span. Within the Study Area, Trafalgar Road is classified as a major arterial according to the *Livable Oakville*, Schedule C Transportation Plan (September, 2012) and is assumed to be the equivalent classification to an urban arterial in the HDDS. The ten existing culverts in the Study Area are therefore considered as crossing an urban arterial road. Standard WC-1 (Sections 1.1.1) of the HDDS states for culverts crossing an urban arterial with a span less than 6 m, the 50-year return period design flow should be applied. The check flood return period for culverts crossing an urban arterial is defined in Standard WC-1 (Section 1.1.1) and Standard WC-7 (Section 3.6) as 130% of the 100-year flood. Additional analysis is required during detailed design using the Regional storm due to the availability of floodline mapping and the potential risk to adjacent properties, as per Standard WC-1 (Section 1.1.2).

Freeboard: For culverts crossing an urban arterial on a defined watercourse, the minimum freeboard from the lowest edge of the travelled lane to the high water level for the design flood is 1.0 m as per Standard WC-7, Section 3.2. Standard WC-7 (Section 3.6) requires that the water level generated by the check flood (130% of the 100-year) shall not exceed the elevation of the travelling lanes. Conservation Halton's *Policies, Procedures and Guidelines for the Administration of Ontario Regulation 162/06 and Land Use Planning Policy Document* (April 2006) does not specifically require that Regional roads be flood-free under Regional storm conditions. However, this is the current standard recommended by Conservation Halton for all major roads within Conservation Halton jurisdiction that may serve an emergency route purpose and has become a standard requirement for all roadways that will be experiencing an increase in use due to development.

Clearance: Open-bottom culverts with an erodible bottom must allow for a minimum clearance of 0.3 m from the high water level during the design storm (50-year) to the soffit of the culvert in accordance with Standard WC-7, Section 3.4.2.

Headwater to Depth Ratio: Open- and closed-footing culverts with a non-erodible bottom up to 3 m in diameter are subject to HDDS Standard WC-7 (Section 3.5) which limits the headwater-to-depth ratio (HW/D) to 1.5:1 during the design storm event.

The Town's *Development Engineering Procedures and Guidelines Manual* (January, 2011) defines additional criteria for culvert capacity in Section 3.1.3.16. The manual states that, as a minimum requirement, arterial road crossings of watercourses shall be designed to provide capacity for 100-year to Regional flood frequencies, with allowance for overtopping of roads and road crossings, and shall not result in an increase in upstream Regional flood levels.

3.6.3.2 Stream Constraint Classifications

The NOCSS also classified several sections of the East Morrison Creek and Joshua's Creek that receive runoff from Trafalgar Road as low, medium, or high constraint riparian corridors. The NOCSS defines the management requirements for each constraint category within the *Management Report,* Section 6.3.4.5 and is summarized as follows:

1. High Constraint Streams where current form and function are to be preserved (red streams) and must be protected (and/or enhanced) in their current location;
2. Medium Constraint Streams where the current function is to be preserved (blue streams) but can be relocated or deepened if their function can still be preserved, subject to acquiring relevant agency approvals (DFO, CH, MNRF, and Town of Oakville);
3. Low Constraint Streams (green streams) can be replaced through infrastructure or SWM.

The NOCSS requirements for high and medium constraint streams are further defined within the NOCSS *Management Report*, (Section 6.3.4.5) where drainage of flows within these corridors must be maintained and conveyance of flows outside the stream corridors must be maintained for both frequent and infrequent events.

3.6.4 Existing Roadway Drainage System

Through most of its length north of Dundas Street, Trafalgar Road is currently a four-lane rural roadway with roadside ditches draining parallel to the roadway to tributaries of Joshua's Creek and the east branch of East Morrison Creek. The southern portion of the Study Area is predominantly an urban cross section with storm sewers directing runoff to East Morrison Creek, West Morrison Creek, and the Morrison-Wedgewood Diversion Channel. Short rural sections with ditch drainage systems are found at several locations in the southern portion of the Study Area.

3.6.5 Existing Watercourse Crossings and Culvert Descriptions

A site visit was completed on December 8, 2011 to investigate the existing conditions of the ten mainline culverts crossing Trafalgar Road within the Study Area. Interior and exterior photographs were taken at both ends of each culvert in addition to documenting material condition, presence and severity of deformation, water levels, sediment depth, and inlet/outlet configuration. The size and shape of each culvert was also verified. Using the documented observations, each culvert's condition was rated as 'good', 'acceptable', 'poor', or 'very poor'.

A hydraulic analysis was completed to assess the ability of the culverts crossing Trafalgar Road within the Study Area to safely convey the applicable peak flow under existing conditions. The performance of each culvert was evaluated based on the MTO and Town drainage criteria. Two previously developed hydraulic models of East Morrison Creek were updated to evaluate the existing level of service of several culverts while the remaining culvert crossings were modelled using CulvertMaster.

During field inspection, significant sediment accumulation was recorded in several of the crossing culverts in addition to deformation of the original barrel. The hydraulic analysis of the existing conditions assumed that the accumulated sediment would be removed and the full capacity of each culvert was considered. The results of the hydraulic models are subject to changes in future phases of the Trafalgar Road Improvements project due to coordination with hydraulic modeling of adjacent development and reconstruction projects and should be confirmed during detailed design. The hydraulic models are discussed in further detail in the Stormwater Management Report in **Appendix G**.

The following subsections describe the findings of the field investigation and summarize the hydraulic performance of each existing culvert in the Study Area. Right-of-way catchment areas and culvert drainage areas are depicted in **Exhibits 3.3** and **3.4**, respectively (these exhibits are also found in Appendix A of the Stormwater Management Report).

Exhibit 3-3. Right of Way Catchment Areas

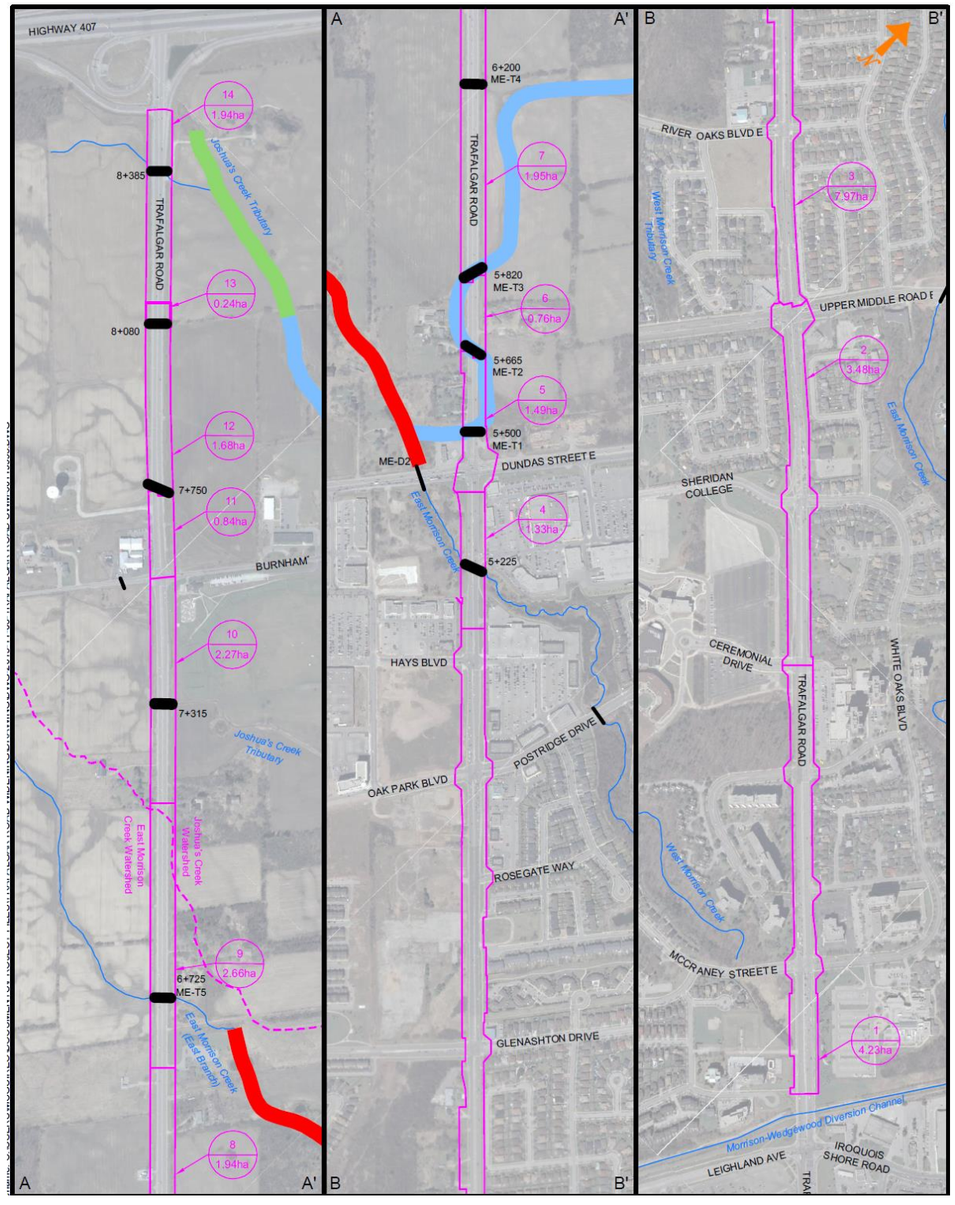
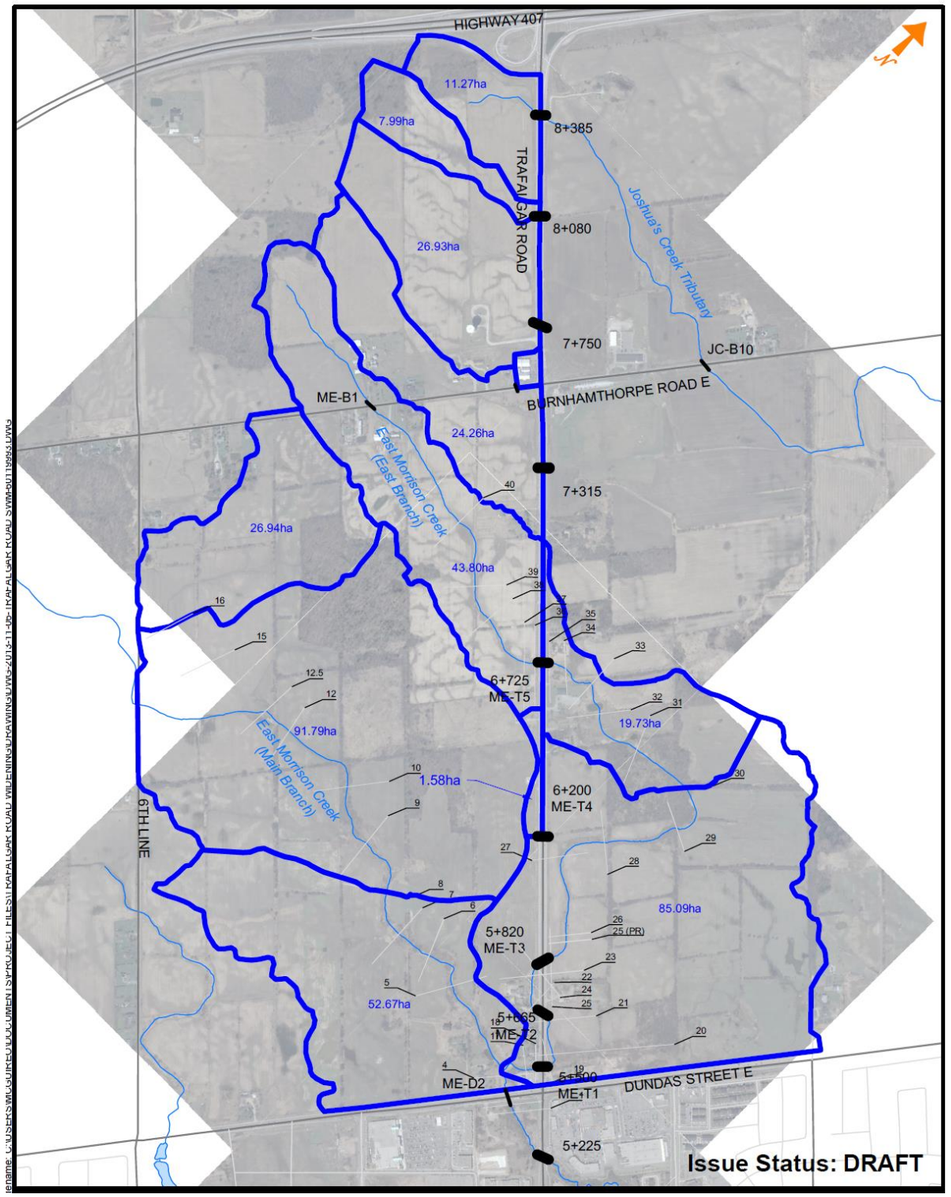


Exhibit 3-4. Culvert Drainage Areas



3.6.5.1 Highway 407 to Burnhamthorpe Road

Between Highway 407 and Burnhamthorpe Road, there are three culverts that convey drainage from west to east under Trafalgar Road at stations 8+385, 8+080, and 7+750. The three drainage courses lead to a tributary of Joshua's Creek classified as a low to medium constraint stream corridor in the NOCSS. Drainage courses crossing Trafalgar Road in this area do not have assigned constraint ratings in the NOCSS and can be replaced by drainage infrastructure.

Culvert 8+385

The culvert located at station 8+385 is a corrugated steel pipe (CSP) with a diameter of 800 mm and was found to be in good condition overall. This culvert appears to be an older culvert with a new extension on the upstream end (west face). The downstream end (east face) was found to be crushed, likely due to recent roadside ditch grading. A small amount of sedimentation was found within this culvert, likely due to the construction and consequential ditch disturbance upstream. This culvert was found to have a low flow shallow depth of water throughout its length and the hydraulic analysis found the culvert has sufficient capacity to meet design criteria under existing conditions.

Culvert 8+080

The existing mainline culvert crossing Trafalgar Road at station 8+080 is a 1000 mm CSP that showed some corrosion and internal buckling with a crushed upstream end. The overall condition of this culvert was determined to be poor. The culvert was found to have a significant amount of sedimentation (300 mm) at the downstream end as well as a significant depth of water throughout. The upstream end had a water depth of 500 mm where the downstream end had a water depth of 300 mm above the sedimentation. The downstream (east) end of the culvert was found to be largely overgrown with vegetation. The hydraulic analysis found the culvert has sufficient capacity to meet design criteria under existing conditions.

Culvert 7+750

The culvert located at station 7+750 appears to be a relatively new 1400 mm diameter (CSP). Field reconnaissance found little sedimentation at the culvert inlet and 500 mm of sediment has accumulated at the outlet. A water depth of 350 mm was found at the upstream end whereas a water depth of 100 mm was found above the sedimentation at the downstream end. The culvert condition was evaluated as acceptable due to corrosion of the steel and the assessed degree of deformation. Both ends were found to have a significant amount of vegetative growth. The hydraulic analysis found the culvert has sufficient capacity to meet design criteria under existing conditions.

3.6.5.2 Burnhamthorpe Road to Oak Park Boulevard

Seven mainline culverts crossing Trafalgar Road are located between Burnhamthorpe Road and Oak Park Boulevard. One culvert drains to a tributary of Joshua's Creek while the other six culverts drain to or convey the east branch of East Morrison Creek.

The first three culverts south of Burnhamthorpe Road are located at stations 7+315, 6+725 (ME-T5), and 6+200 (ME-T4). The mainline culvert crossing Trafalgar Road at station 7+315 is located on the south side of the golf centre immediately south of Burnhamthorpe Road and drains to a tributary of Joshua's Creek. This drainage course does not have a constraint rating defined in the NOCSS.

The watershed divide between Joshua's Creek and East Morrison Creek is located approximately a third of the way between culverts 7+315 and 6+725 (ME-T5). Two small drainage courses cross under Trafalgar Road at stations 6+725

(ME-T5) and 6+200 (ME-T4), approximately mid-way between Burnhamthorpe Road and Dundas Street. These drainage courses are within the headwaters of East Morrison Creek and although they do not have a constraint rating in the NOCSS, the watercourse at 6+725 (ME-T5) is located approximately 150 m upstream of a high constraint stream corridor section and the watercourse at 6+200 (ME-T4) is located approximately 85 m upstream of a medium constraint stream corridor section.

East Morrison Creek crosses Trafalgar Road three times over a short length north of Dundas Street at stations 5+820 (ME-T3), 5+665 (ME-T2) and 5+500 (ME-T1). The creek then crosses Dundas Street west of Trafalgar Road through culvert ME-D2 and returns under Trafalgar Road from west to east, south of Dundas Street at station 5+225. The reach along the three crossings north of Dundas Street is considered a medium constraint stream corridor in NOCSS and as such, may be relocated but the form and function must be maintained.

Culvert 7+315

Twin corrugated steel pipe arches (CSPA) with a span of 1390 mm and rise of 970 mm are located at station 7+315 of Trafalgar Road. Both the inlet and outlet are concrete headwalls. The twin CSPAs were both found to have acceptable levels of corrosion and deformation. Field reconnaissance found that sedimentation has accumulated in the CSPAs to a depth of 270 mm at the upstream end of both cells. Sedimentation depth at the downstream end of the north cell is 420 mm and is 370 mm in the south cell. Water depths of 100 mm above the sedimentation in both cells upstream and downstream were found. Both upstream and downstream ends of the twin CSPA culverts were found to be overgrown with vegetation. The hydraulic analysis found the culvert has sufficient capacity to meet design criteria under existing conditions.

Culvert 6+725 (ME-T5)

A single CSPA culvert crosses Trafalgar Road at station 6+725 (ME-T5) with a span of 1880 mm and rise of 1260 mm. Physical assessment of this culvert determined that the material was in good condition with some corrosion and the degree of deformation was found to be acceptable due to the internal buckling located two thirds from the upstream end. An accumulation of sediment was found within the culvert that measured 210 mm at the upstream end and 460 mm at the downstream end. Water depths of 300mm upstream and 200 mm downstream above the sedimentation were found. Both upstream and downstream ends of the CSPA culvert were found to be overgrown with vegetation. The presence of watercress was detected indicating the surfacing of groundwater in the vicinity of this culvert crossing. The hydraulic analysis found the culvert has insufficient capacity to meet design criteria under existing conditions.

Culvert 6+200 (ME-T4)

The culvert crossing Trafalgar Road at station 6+200 (ME-T4) is a 600 mm diameter CSP. Physical assessment of this culvert determined that the material was in poor condition with corrosion along the entire length and at several locations at both ends where perforations had corroded completely through the culvert walls. The degree of deformation was found to be good due to minor deformation of the upstream (west) end and compression of the downstream (east) end. An accumulation of sediment was found within the culvert that measured 80 mm at the upstream end and 55 mm at the downstream end. Both upstream and downstream ends of the CSP culvert were found to be overgrown with vegetation. The hydraulic analysis found the culvert has sufficient capacity to meet design criteria under existing conditions.

Culvert 5+820 (ME-T3)

The mainline culvert crossing Trafalgar Road at station 5+820 (ME-T3) is a twin 1000 mm CSP with a concrete headwall at both ends that conveys flow from east to west. The north cell showed some corrosion and minor deformation deeming it to have an overall condition of good. The south cell also showed some corrosion however it was found to be buckled approximately one third from the downstream end and the overall condition was determined to be acceptable, according to MTO guidelines.

Sedimentation was found at both ends of each cell. Both cells had 100 mm of sediment accumulated at the upstream end while the downstream ends had 200 mm and 250 mm in the north and south cells, respectively. A depth of water above the sedimentation was found throughout the length of each CSP. At the upstream end, 150 mm of water was observed in the north cell and 200 mm in the south cell. The water depth at the downstream ends reached 200 mm in the north cell and 100 mm in the south. Both upstream and downstream ends of each CSP culvert were found to be overgrown with vegetation. The presence of watercress was detected indicating the surfacing of groundwater in the vicinity of this culvert crossing. The hydraulic analysis found the culvert has insufficient capacity to meet design criteria under existing conditions.

Culvert 5+665 (ME-T2)

The mainline culvert crossing Trafalgar Road at station 5+665 (ME-T2) is a concrete box with a span of 1800 mm, a rise of 1050 mm, and an open footing that conveys flow from west to east. The culvert appeared to have an extension previously installed however both the original and extension portions of the culvert appeared to be in good condition. An accumulation of sediment was found only at the downstream end and measured 150 mm. Water depths above the invert upstream and above the accumulated sediment downstream were found to be 250 mm and 200 mm, respectively. Both ends of the culvert were found to be overgrown with vegetation. The presence of watercress was detected indicating the surfacing of groundwater in the vicinity of this culvert crossing. The hydraulic analysis found the culvert has insufficient capacity to meet design criteria under existing conditions.

Culvert 5+500 (ME-T1)

The mainline culvert crossing Trafalgar Road at station 5+500 (ME-T1) is a concrete box with a span of 2440 mm and rise of 1520 mm that conveys flow from east to west. This box culvert appeared to be an older culvert with a recently installed extension. Both the original and extension portions of the culvert appeared to be in good condition. An accumulation of sediment was found at both the upstream and downstream end measuring 420 mm and 270 mm, respectively. Water was steadily flowing with a depth above the sediment at the upstream end of 100 mm and 250 mm at the downstream end. The presence of watercress was detected indicating the surfacing of groundwater in the vicinity of this culvert crossing. The hydraulic analysis found the culvert has insufficient capacity to meet design criteria under existing conditions.

Culvert 5+225

A large CSPA culvert with a span of 3480 mm and rise of 2210 mm conveys East Morrison Creek from west to east under Trafalgar Road at station 5+225, south of Dundas Street. This culvert was found to be severely corroded with perforations completely through the culvert walls. The degree of deformation was found to be minimal however the overall condition of this culvert was determined to be very poor due to the severity of corrosion. There was no sediment accumulation on either the upstream or downstream ends. A water depth of 150 mm was found throughout the culvert and watercress was present indicating the surfacing of groundwater. The hydraulic analysis found the culvert has insufficient capacity to meet design criteria under existing conditions.

3.6.5.3 Summary of Culvert Inspection and Hydraulic Analysis

Overall, five of the ten existing culvert crossings provide inadequate hydraulic capacity, and two other culverts were in poor condition and require replacement. The remaining three culverts achieve the relevant criteria regarding clearance

and freeboard. The results of the culvert inspection, hydraulic analysis, and the NOCSS constraint classification of each culvert are summarized in **Exhibit 3.5**.

Exhibit 3-5. Summary of Existing Mainline Crossing Culverts Assessments

Station	NOCSS ID	Existing Dimensions	Hydraulic Performance	Condition Rating	NOCSS Constraint Classification
5+225		3480 x 2210 mm CSP arch	**Fail**	**Very Poor**	**n/a[1]**
n/a	ME-D2	4270 x 2000 mm CONC. box	n/a		
5+500	ME-T1	2440 x 1520 mm CONC. box	**Fail**	Good	**Medium**
5+665	ME-T2	1800 x 1050 mm CONC. box	**Fail**	Good	**Medium**
5+820	ME-T3	TWIN 1000 mm diameter CSP	**Fail**	Acceptable	**Medium**
6+200	ME-T4	600 mm diameter CSP	Pass	**Poor**	None
6+725	ME-T5	1880 x 1260 mm CSP arch	**Fail**	Acceptable	**n/a[2]**
7+315		TWIN 1390 x 970 mm CSP arch	Pass	Acceptable	None
7+750		1400 mm diameter CSP	Pass	Acceptable	None
8+080		1000 mm diameter CSP	Pass	**Poor**	None
8+385		800 mm diameter CSP	Pass	Good	None

Note: 1 – Culvert 5+225 is beyond the NOCSS Study Area and therefore is located on a watercourse without a constraint ranking
2 – This crossing is located upstream of a high constraint reach of East Morrison Creek; maintenance requirements should be confirmed during detailed design

The complete Stormwater Management Report is located in **Appendix G**.

3.6.6 Existing Sewer System and Outlet Ponds

The existing road drainage system is illustrated on Drawings 1 to 5 in Appendix A of the Stormwater Management Report (ESR **Appendix G**) with further discussion in the following sections.

3.6.6.1 Highway 407 to Dundas Street

Between Highway 407 and Dundas Street, Trafalgar Road drains to roadside ditches that lead to the mainline crossing culverts. There are localized storm sewer systems providing drainage along short urban sections where Trafalgar Road intersects Burnhamthorpe Road and Dundas Street. Runoff from the Trafalgar Road Catchment Areas 10 to 14 is then directed in an easterly direction along rural ditches that discharge to a tributary of Joshua's Creek. This tributary of Joshua's Creek is classified by the NOCSS as a low constraint stream corridor just north of the William Halton Parkway crossing and as a medium constraint stream corridor to the south. The remaining Trafalgar Road Catchment Areas in this section (Catchment Areas 5 to 9) drain to East Morrison Creek, which is classified as a high constraint stream by the NOCSS downstream of the crossing at station 6+725 (ME-T5) of Trafalgar Road and then changes to a medium constraint reach before crossing Trafalgar Road again at station 5+820 (ME-T3).

3.6.6.2 Dundas Street to Cornwall Road

South of Dundas Street, Trafalgar Road has an urban cross section that includes curbs and gutters with some sections that also have roadside ditches that appear to partially collect external drainage areas.

Dundas Street to Hays Boulevard

Trafalgar Road has an urban section between Dundas Street and Hays Boulevard with two storm sewer outlets north and south of Culvert 5+225 discharging to East Morrison Creek. As shown on Drawing 2 of Appendix A, a ditch is also located on the west side of Trafalgar Road and directs external drainage to the upstream side of Culvert 5+225.

Hays Boulevard to Upper Middle Road

The majority of this length of Trafalgar Road has an urban section with curbs and gutters and a single storm sewer system that collects drainage from both the east and west sides of the road. This storm sewer system terminates at Upper Middle Road where it outlets to another storm sewer flowing east to East Morrison Creek.

There is an intermittent roadside ditch on the west side of Trafalgar Road that starts at Hays Boulevard and ends north of River Oaks Boulevard East. Ditch inlet catchbasins (DICBs) convey drainage to the main storm sewer system on Trafalgar Road. An intermittent roadside ditch also runs along the east side of Trafalgar Road from Oak Park Boulevard/Postridge Drive to Glenashton Drive. Storm drainage from this ditch is collected in DICBs that convey flow to the Trafalgar Road storm sewer system.

Trafalgar Road has a short (250 m) rural section on both the east and west sides of the roadway from Oak Park Boulevard/Postridge Drive to approximately 75 m south of Rosegate Way.

Upper Middle Road to Ceremonial Drive

Trafalgar Road has an urban section from Upper Middle Road to approximately midway to White Oaks Boulevard North/Sheridan College. This section conveys roadway drainage through curbs and gutters into two parallel storm sewer systems that service the east and west sides of the roadway. Both parallel storm sewers terminate at the end of the urban section where the west side outlets to a roadside ditch through a 300 mm diameter round concrete pipe as shown in **Exhibit 3.6**. This storm sewer outlet was found to be largely filled with sediment and submerged.

The storm sewer on the east side of Trafalgar Road outlets to a roadside ditch that is conveyed across Trafalgar Road through a 600 mm diameter CSP and outlets to the west roadside ditch as shown in **Exhibit 3.7**. This crossing culvert was found to be largely buried and submerged as shown.

Exhibit 3-6. Trafalgar Road West Side Storm Sewer Outlet to Ditch

Exhibit 3-7. Culvert Conveying Runoff from East Roadside Ditch to West Roadside Ditch, Across Trafalgar Road

This west roadside ditch continues past Sheridan College, under Ceremonial Drive, and then departs due south through a woodlot towards West Morrison Creek. The east roadside ditch continues to collect runoff along the rural section of Trafalgar Road from White Oaks Boulevard North to approximately 75 m north of the plaza across from Ceremonial Drive. The east roadside ditch terminates at a DICB with an unknown connection to be further investigated at detailed design. For the purposes on this study, the ditch inlet is assumed to connect to the west roadside ditch and ultimately drain to West Morrison Creek.

Trafalgar Road has a rural section adjacent to Sheridan College that starts at the termination of the storm sewer system (midway between Upper Middle Road and White Oaks Boulevard North/Sheridan College access road) to approximately 75 m north of Ceremonial Drive. Roadway drainage throughout this rural section is conveyed by the previously described roadside ditches draining to West Morrison Creek.

Ceremonial Drive to Morrison-Wedgewood Diversion Channel

Trafalgar Road has an urban section throughout this length of roadway and includes curbs and gutters for roadway drainage conveyance with a storm sewer system for most of its length. Approximately midway between McCraney Street East and the Morrison-Wedgewood Diversion Channel, West Morrison Creek discharges into the Trafalgar Road storm sewer. The storm sewer system continues south and outlets at the Morrison-Wedgewood Diversion Channel.

Morrison-Wedgewood Diversion Channel to Cross Avenue/South Service Road

As-built drawings were not available for this length of Trafalgar Road. However, based on field reconnaissance, GIS data from the Town, and the utility mapping completed by T2UE, this urban section includes curbs and gutters with catchbasins collecting storm drainage into a storm sewer system that drains in the easterly direction along the North Service Road, crosses the QEW in the southerly direction, and then drains westerly across Trafalgar Road to outlet to Lower Morrison Creek.

Cross Avenue/South Service Road to Cornwall Road

As-built drawings indicate that stormwater from this urban roadway with curbs and gutters is collected by catchbasins and conveyed through a storm sewer system that outlets to Sixteen Mile Creek, directly south of Cornwall Road.

3.6.7 Structural Assessment

There are four structural culverts and one bridge structure located within the project limits as listed below:

- Structure 03-1182530 CU01 (STA 15+665) – north of Dundas Street
- Structure 03-1182510 CU01 (STA 15+500) – north of Dundas Street
- Structure 03-1182530 CU02 (STA 15+228) – north of Dundas Street
- Structure 03-1182320 CU01 (STA 11+820) – north of Leighland Avenue/Iroquois Shore Road
- Structure 03-1182340 CU01 (STA 11+775) – Morrison Wedgewood Aqueduct

The following is a summary of the visual inspection of the structures as part of biennial inspections for Halton Region.

Structure 03-1182530 CU01 (STA 15+665)

The existing structure is a reinforced cast-in-place concrete open footing rigid frame culvert built in 1991. The Condition Index Value (BCI) is 84.7 and it is in generally good condition.

Structure 03-1182530 CU02 (STA 15+500)

The existing structure is a reinforced cast-in-place concrete box culvert built in 1990. The Condition Index Value (BCI) is 73.8 and it is in generally good condition. At the east end (inlet) gabion walls/concrete block walls are provided as wingwalls. Also concrete block walls are used as head walls. At the west end (outlet) gabion walls are provided as wingwalls and to channelize the stream.

Structure 03-1182510 CU01(STA 15+228)

The existing structure is a Corrugated Steel Pipe (CSP) culvert built in 1990. The Condition Index Value (BCI) is 37.8 and it is in poor condition. This structure is to be replaced with a CSP or reinforced concrete box culvert. At both the inlet and outlet, gabion walls are provided as wingwalls.

Structure 03-1182320 CU01 (STA 11+820)

The existing structure is a reinforced cast-in-place concrete box culvert built in 1980. The Condition Index Value (BCI) is 74.6 and it is in generally good condition.

Structure 03-1182340 BR01 (STA 11+775) – Morrison Wedgewood Aqueduct

The existing structure is a reinforced cast-in-place rigid frame structure bridging a concrete channel below and was built in 1968. The Condition Index Value (BCI) is 72.3 and it is in generally good condition.

The inspection reports are located in **Appendix G.**

3.7 Fluvial Geomorphology and Erosion Hazards

A fluvial geomorphological assessment was undertaken for the watercourses crossing Trafalgar Road within the study corridor. An overview of the assessment results is provided in the following subsections. The complete Fluvial Geomorphology Report is located in **Appendix H**.

3.7.1 Field Assessment

3.7.1.1 Reconnaissance Level Field Investigation

A field reconnaissance survey was undertaken to document geomorphological baseline conditions of the watercourses at each of the Trafalgar Road crossings in the study area. The reconnaissance level field assessment was intended to confirm reach boundaries and to document observations and general measurements of channel form, channel stability (i.e., including application of the Rapid Geomorphic Assessment), riparian conditions, condition of engineering countermeasures in proximity to Trafalgar Road and to identify potential constraints and opportunities for the Trafalgar Road improvements.

These data provide for more detailed characterisation of the section of East Morrison Creek – East Tributary running immediately adjacent to Trafalgar Road, and of the existing conditions at the three crossings. These measurements are also used to inform any future natural channel design or realignment scenarios, and provide input for the sizing and orientation of any replacement crossing structures that may be required to accommodate road widening.

3.7.1.2 Rapid Geomorphic Assessment

The Rapid Geomorphic Assessment (RGA) was designed by the Ontario Ministry of Environment (1999) to assess reaches in rural and urban channels. This qualitative technique documents indicators of channel instability. Although certain limitations are inherent in this approach, it is a widely used method for assessing channel stability and is most applicable for watercourses situated within urban settings. Observations are quantified using an index that identifies channel sensitivity based on the presence or absence of evidence of aggradation, degradation, channel widening, and planform adjustment. Examples of these include, the presence of bar forms, exposed infrastructure, head cutting due to knick point migration, fallen or leaning trees and exposed tree roots, channel scour along the bank toes, transition of the channel from single thread to multiple threads, and cut-off channels. Overall, the index provides insight into whether the channel is stable/in regime, stressed/transitional, or in adjustment.

3.7.1.3 Detailed Field Data Collection

In addition to the rapid field reconnaissance, a detailed field investigation was completed to quantify channel parameters and enable an assessment of channel functions and processes. The analyses focused on the East Morrison Creek – East Tributary Crossings 4, 5 and 6. Parameters measured during the field program included:

- Measurements of bankfull cross-sections at riffle, pool and transitional sections of the field site.
- A longitudinal profile survey of channel bottom and bankfull elevations to determine local energy gradients, including top-of-riffle, bottom-of-riffle, maximum depth and any obstructions to flow.
- Digital photography showing each of the field surveyed cross-sections and surrounding channel characteristics.
- Characterization of substrate and bank materials.
- Riparian vegetation assessments.

3.7.1.4 Existing Conditions

Several of the background documents (i.e., mainly the NOCSS) that were reviewed in this study included fluvial geomorphic information and analytical results for the watercourses in the vicinity of Trafalgar Road between Highway 407 and Cornwall Road. Findings from the background documents are provided in this section, along with observations made during the reconnaissance level site investigation. The crossing locations are illustrated in **Appendix H**, **Figure 1.2** and photos are appended**.**

Tributaries of Joshua Creek – Crossings 1 and 2

The two headwater tributaries of Joshua Creek that are crossed by Trafalgar Road, were not characterized as defined reaches in the Subwatershed Study (Town of Oakville, 2006), since these were classified as swales. The NOCSS (Town of Oakville, 2006) report differentiated between swales and headwater channels as follows:

- Swales are vegetated depressions without well-defined channel bed and banks. Where these dominate the headwaters, it can be expected that discharge is rarely high enough to erode sediment. The swales observed within the North Oakville study area were noted to be vegetation stabilized (Town of Oakville, 2006) – the vegetation retards the flow and the root matrix enhances the sediment's resistance to erosion. These systems are sensitive to land use changes that remove vegetation or increase the amount or intensity of discharge and may lead to increased channel definition (Town of Oakville, 2006).
- Defined headwater channels tend to be erosive, supplying sediment to downstream channels (Town of Oakville, 2006). They also tend to have storm-driven, flashy discharge regimes. Although each headwater channel provides only a small amount of sediment and water to the overall basin, as they are numerous, changes in their throughput of sediment and water produces cumulative effects through the watershed (Town of Oakville, 2006).

Recent field investigations, however, suggest that Joshua Creek is well defined east of Crossing 1, within an agricultural field.

East Morrison Creek – East Tributary (Crossings 3, 4, 5 and 6)

In the NOCSS (Town of Oakville, 2006), two reaches were defined along the East tributary of East Morrison Creek. Reach MOC-6, which ends approximately 110m downstream of crossing C3, and Reach MOC-2 flows under Trafalgar Road at Crossings 4, 5 and 6 (**Appendix H**, **Figure 3.4**). The East Morrison Creek Subwatershed Study (Cosburn Patterson Wardman, 1995) indicates that this section of creek is intermittent and does not support permanent baseflow. It further indicates that the channel maintains a ditched profile in the study area.

A summary of baseline characteristics documented for reach MOC-2, which extends from the downstream confluence with East Morrison Creek to approximately 1.1 km upstream, is contained in **Exhibit 3.8**. Observations are based on field investigations undertaken between April and July 2002. Similar information was not documented for reach MOC-6.

Review of study area mapping revealed that the East Morrison Creek Tributary that flows between Crossings 4 and 6 is a first-order channel. Field observations confirmed that the general shape and function of the channel resembles that of a headwater channel and that the channel was confined to a ditch along the east end of Trafalgar Road. Five separate sub-reaches were defined using methods outlined in **Appendix H, Section 2.1.3**. Of the approximately 455 m length of channel that begins upstream of Crossing 4 and ends downstream of Crossing 6, approximately 253 m (i.e., 56%) of the channel is enclosed either through culverts or under the parking lot of the former Oak Park Pet Hospital.

Exhibit 3-8. Baseline Characteristics for Reach MOC-2 (Town of Oakville, 2006)

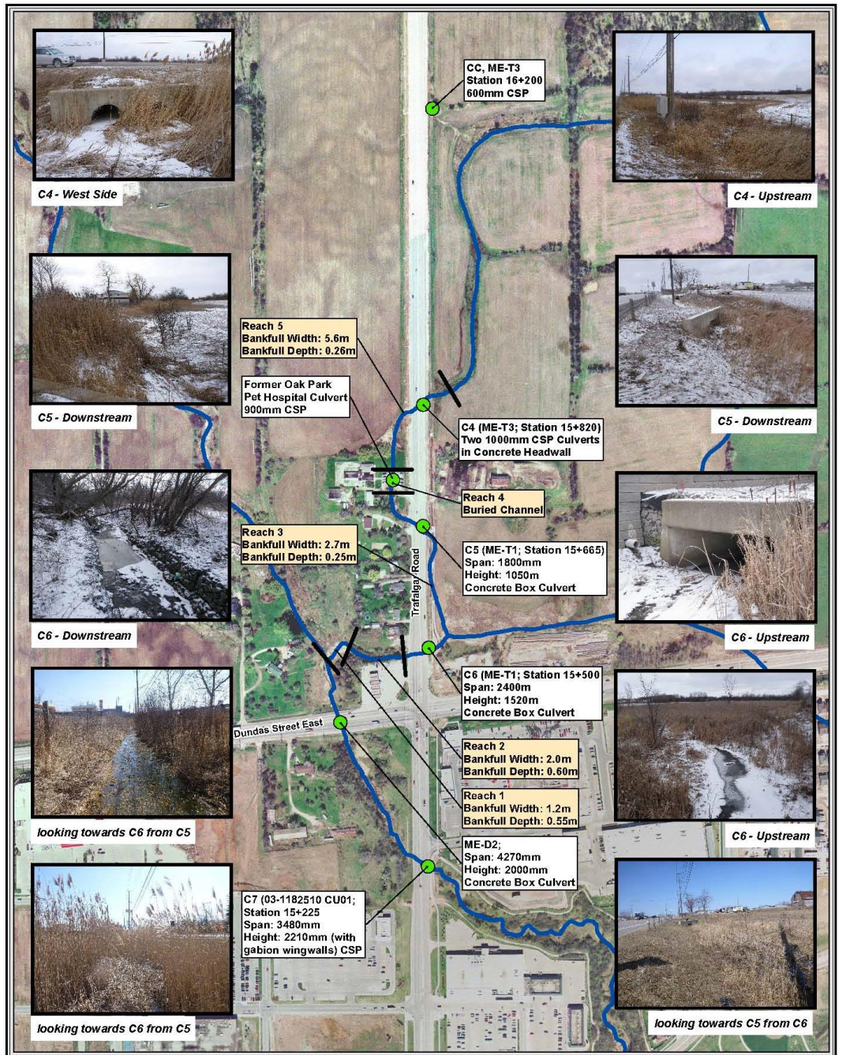
Parameter	Value
Length (m)	1119.6
Gradient (%)	0.8
Sinuosity	1.01
RGA **RSAT**	11 (in regime) 22 (moderate)
Substrate Characteristics	Silt, sand, some cobbles. Poor bed morphology.
Bank Vegetation	Grasses and herbs
Sediment Supply / Transport	Aggradation: siltation in pools, overbank deposits
Channel Disturbance	Channel constructed along road
Channel Sensitivity **Rehabilitation Potential**	Moderate Medium
Meander Belt (m)	40

A brief summary of the geomorphological characteristics of each reach gained from field observations is presented in **Exhibit 3.9**. **Exhibit 3.10** depicts the location and extents of each sub-reach.

Exhibit 3-9. Overview of Sub-Reach Characteristics

Sub- Reach	Length (m)	Description	Width	Depth	Water Depth
1	Confluence with East Morrison Creek (main branch) to base of ravine/valley				
	50 m	The channel flows within well-defined banks and meanders across the floodplain in the bottom of the valley. Vegetation consists of grasses that have a fine and dense rooting network which serves as a controlling influence on channel form. Some vegetation has become established within the channel. Riffles and pools occur along the profile; pools tend to contain soft, mucky sediment accumulations and riffles tended to have firmer sediment. Bank materials consisted of clayey silt with very fine sand.	1.2 m	0.55 m	0.25 m
2	Base of ravine/valley upstream to Trafalgar Road (behind Esso Station) Crossing 6				
	90 m	The creek enters this reach through a 2.4 m wide box culvert. The outlet of the culvert is oriented somewhat oblique to the channel, causing the flow trajectory to be directed into the gabion wall downstream of the outlet, rather than towards open-channel. The reach is relatively straight and lined with gabions along approximately 23 m of its upstream length; corrosion, bulging, and scour around the gabion baskets were observed. The channel has incised through the valley wall and flanks the northern property line of the Esso Station. Channel banks are vegetated with trees with coarse and medium sized roots. Banks (silty clay with very fine sand) are not vegetated and show evidence of movement as indicated by bent tree trunks and exposed tree roots; some trees had fallen over the creek. Fragments of Queenston shale were observed in the channel banks. The bed morphology was poorly defined; bed materials consisted of scattered gabion stone and soft silty sediment.	2 m	0.6 m	0.15 m
3	From Crossing 6 upstream to Oak Park Pet Hospital				
	220 m	The channel occupies a ditch along the east side of Trafalgar Road and is often choked with standing grasses/reeds. Cobbles were observed along the bank toe; however bed materials consisted of fine mucky sediment. Bed morphology is poorly defined. The channel is well connected to the corridor. Extensive and dense occurrences of watercress were observed in the channel along the entire reach. At the downstream end, the channel bed consisted of round stone which had likely been placed during previous works associated with the east culvert of Trafalgar Road and/or works associated with the adjacent commercial property.	2.4 – 2.7 m	0.25 m	0.16 m
4	Oak Park Pet Hospital parking lot				
	50 m	Channel is enclosed through a 0.90 m diameter CSP under the Oak Park Pet Hospital parking lot.	n/a	n/a	n/a
5	From Oak Park Pet Hospital upstream to upstream of Road Crossing 4				
	100 m	The channel is well defined and shows signs of historical straightening within the reach. Flow from the culvert is directed both through the linear roadside ditch and through a naturalized feature between the Pet Hospital culvert and the fence line near crossing 4. Bed materials consist of fine mucky sediment with isolated deposits of gravels and sand. Banks are vegetated with grasses, cattails and phragmites. Immediately upstream of Trafalgar Road, the channel was poorly defined and was generally choked by grasses and phragmites. The channel becomes situated within a well vegetated topographic depression upstream of the road right of way that was flanked by agricultural fields.	5.58 m	0.26 m	0.06 m

Exhibit 3-10. Reach Delineation



3.7.2 Meander Belt Assessment

Within the NOCSS report (Town of Oakville, 2006), an estimate of the meander belt for the reaches within the North Oakville Study area was quantified. Reach MOC-2 is in the direct area of interest along the East Morrison Creek – East Tributary. The meander belt was defined as 26 m within the NOCSS report (Table 5.1). The meander belt for Reach MOC-6 was defined as 42m within the NOCSS report (Table 5.1). Values reported in subwatershed studies are often completed on generalized data and thus should be re-examined during any Class EA Study.

The lack of information regarding the historic channel planform for Reach MOC-2 in the vicinity of subreaches 3 and 5 (Crossings 4 to 6) required that data from a reference/surrogate reach be obtained. No suitable surrogate reaches were identified through the airphoto review. Instead, a suite of empirical relations were used to obtain estimates of the meander belt within the study area, based on measured channel parameters. The average meander belt value from all results is 27.6 m.

3.8 Utilities

The Trafalgar Road corridor contains a significant amount of both underground and aerial utilities. South of Dundas Street, watermains and sewers have been installed including underground utilities such as telephone, TV and hydro services. A major utility pole line is located along the east side of Trafalgar Road which extends from the QEW northerly to Highway 407. Street lighting is provided along the corridor generally from Dundas Street south to Cornwall Road. Property at station 16+370 is owned by Oakville Hydro and leased to a telecommunications provider.

The following utilities are located within the Study Area:

- **Trans-Northern Pipelines**.
  A transmission pipeline crosses Trafalgar Road south of the QEW between the CN rail corridor and the Cross Avenue/South Service Road intersection.
- **Enbridge Gas**.
  Two 508 mm pipelines cross Trafalgar Road on the north side of Glenashton Drive.
- **TransCanada Pipelines**.
  A high pressure pipeline crosses Trafalgar Road between Glenashton Drive and Gatwick Drive.
- **Hydro One Transmission**.
  Transmission facilities are located on the south side of Glenashton Drive in the immediate vicinity of the Study Area.
- **Oakville Hydro**.
  A substation is situated at 3292 Trafalgar Road.

A technical memo containing drawings of the existing utilities is located in **Appendix I**.

3.9 Transportation

The existing and future traffic analyses assessment are discussed in **Section 2.4**., including details on the existing and planned road network, transit services and active transportation facilities.

This page is intentionally blank.

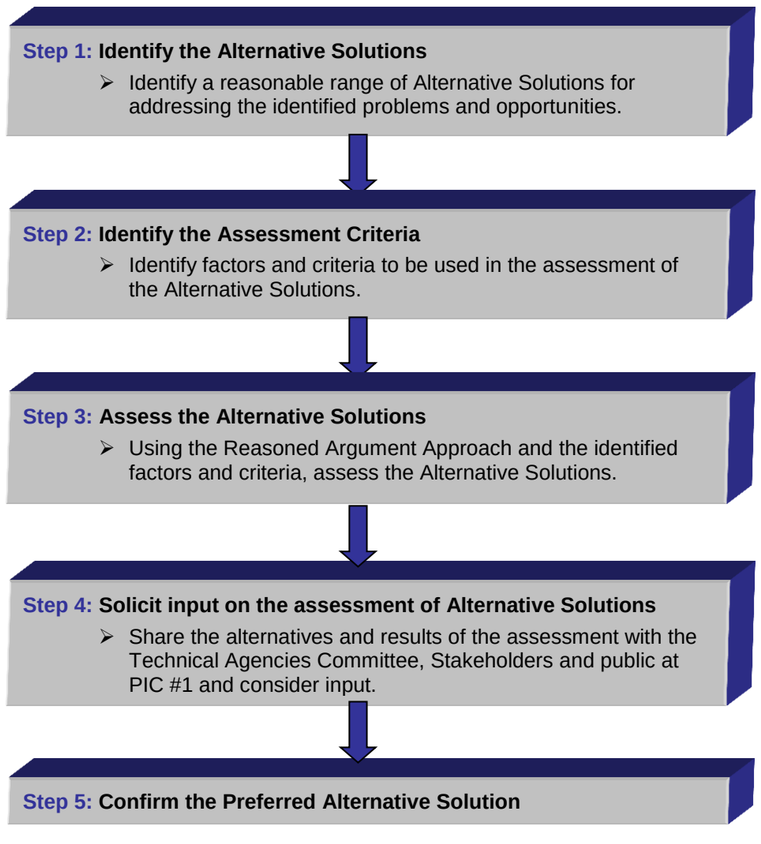
4. Alternative Solutions

The assessment of alternative solutions used a methodology called the "reasoned argument assessment" that is well established and endorsed by regulatory agencies and practitioners of the EA process. It features:

- An examination of the relative significance of impacts by factor and criteria;
- An assessment of the differences in net impacts associated with the alternative solutions. The differences define the advantages and disadvantages of each alternative solution; and
- A presentation of key trade-offs between the various assessment factors and criteria and the reasons why one alternative is preferred over the others.

Exhibit 4.1 illustrates the process that was undertaken to determine the preferred Alternative Solution.

Exhibit 4-1. Process for Assessing Alternative Solutions



4.1 Identifying a Range of Reasonable Alternative Solutions

The following list of alternative solutions was identified as having potential to address the problems and opportunities within the Study Area. Alternative solutions considered and presented at PIC #1 included:

- Do Nothing: No revisions are implemented within the Trafalgar Road Corridor
- Alternative 1: Implement Transportation System Management (TSM) and Transportation Demand Management (TDM) Measures
- Alternative 2: Upgrade other area roadways
- Alternatives 3 – 5: Widen to six lanes with different lane use options
- Alternatives 6 – 7: Widen to eight lanes with different lane use options

4.1.1 Do Nothing

In the Do-Nothing scenario, no corridor revisions are undertaken with respect to road widening, intersection improvements, transit or active transportation improvements. The existing lanes are maintained throughout the corridor. The Do-Nothing alternative is carried forward for comparison only to Alternatives 1 through 7, as it does not meet any of the technical needs of the existing or future study area corridor.

4.1.2 Alternative 1 – Implement Transportation System Management (TSM) and Transportation Demand Management (TDM) Measures

TSM optimizes existing operations through lower cost, non-expansion improvements (e.g., upgraded traffic signals or new/improved turning lanes). TDM reduces auto trips through improved transit service, carpooling, flexible working hours, etc.

4.1.3 Alternative 2 - Upgrade Other Area Roadways

Alternative 2 includes upgrades to other roads (e.g., Sixth Line, Eighth Line) such as new road connections and/or widening.

Upgrading other area roadways does not adequately address the identified capacity and operating deficiencies within the Trafalgar Road corridor because the potential diversion of traffic to other roadways is limited due to out of way travel distances. The nearest parallel roadways, Sixth Line and Eighth Line, do not interchange with the QEW or Highway 407 and are not directly connected to the GO Transit stations.

Upgrading other roadways may improve travel safety, emergency response times, transit services, etc. in those corridors but will not appreciably affect the Trafalgar Road corridor. This alternative solution does not address pedestrian and cyclists needs due to a discontinuity of sidewalk sections and no provision for bike-lanes. There would be a high potential for traffic infiltration to local streets due to capacity deficiencies and congestion on Trafalgar Road.

This alternative was therefore not carried forward for detailed assessment.

Improvements to other roadways have been identified as part of the Halton Region Transportation Master Plan and Oakville Transportation Master Plan. Although not carried forward for detailed assessment in this EA, these improvements are required as part of the overall transportation strategy in addition to improvements in the Trafalgar Road corridor and will be subject to separate studies. For example, through the Midtown EA, alternatives that included upgrades to new roadways were examined.

4.1.4 Alternatives 3 to 7 - Widen Trafalgar Road

These alternatives include three six-lane and two eight-lane options for consideration as shown in **Exhibit 4.2**.

Six-lane options include:

- Alternative 3 - Adding Two GPLs
- Alternative 4 - Adding Two HOV Lanes
- Alternative 5 - Adding Two BRT Lanes

Eight-lane options include:

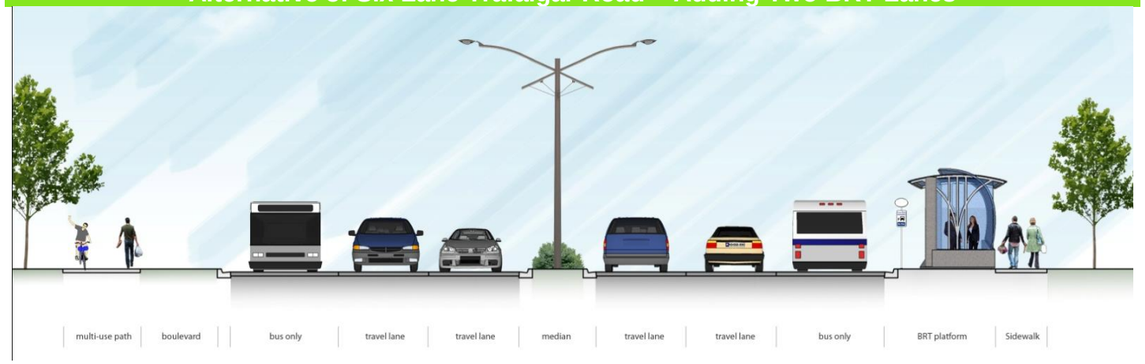
- Alternative 6 - Adding Two GPLs plus Two HOV Lanes
- Alternative 7 - Adding Two GPL plus Two BRT Lanes

Exhibit 4-2. Typical Cross-Sections of the Trafalgar Road Widening Alternative Solutions

Alternative 3: Six Lane Trafalgar Road – Adding Two GPL Lanes

Alternative 4: Six Lane Trafalgar Road – Adding Two HOV Lanes

Alternative 5: Six Lane Trafalgar Road – Adding Two BRT Lanes



Alternative 6: Eight Lane Trafalgar Road – Adding Two GPLs and Two HOV Lanes

Alternative 7: Eight Lane Trafalgar Road – Adding Two GPLs and Two BRT Lanes

A potential eight-lane alternative combining HOV with BRT was considered but eliminated on the basis that both of these types of solutions generally compete for the same travel market (transit riders, car pool riders). Given the level of investment required for BRT, it is considered ineffective to provide for such competing opportunities in the same corridor.

At PIC#1 held on June 16, 2010, it was noted that for the BRT alternatives, it is assumed that no additional widening of the Trafalgar Road corridor is feasible south of Leighland Avenue/Iroquois Shore Road, due to the significant changes required to existing infrastructure at the QEW interchange. Since that time the Town of Oakville has investigated transportation and transit solutions with improvements identified for the segment from south of White Oaks Boulevard South to Cornwall Road as documented in the *Midtown Oakville Class EA Environmental Study Report* and described in **Section 2.4.3.5**.

In addition to the transportation planning alternatives discussed above, a Do Nothing alternative was included to provide a benchmark for comparison of other alternatives. This alternative involves no physical and/or operational modifications to transportation infrastructure in the Study Area. This alternative would provide no improvements to traffic capacity and operations on Trafalgar Road.

4.2 Identification of Assessment Criteria for Alternative Solutions

The factors and criteria were identified through consultation with project team members, the TAC, the Stakeholders and by public attendees of PIC #1. The alternative solutions were assessed on the basis of five factor groups: Transportation, Natural Environment, Socio-Economic Environment, Cultural Environment and Engineering Environment. Within each factor group a number of criteria were used to screen out unsuitable alternative solutions. **Exhibit 4.3** provides a description of these criteria.

Exhibit 4-3. Evaluation Criteria

	Factor/Criteria	Description/Measure
Transportation	**Accommodation of Future Travel Demand**	– Potential to serve general purpose travel demand – Potential to serve HOV travel demand – Potential to serve transit travel demand
	Traffic Operations	– Potential to accommodate intersection turn lanes
	Safety	– Potential to improve traffic safety based on opportunity to reduce congestion and potential for collisions (qualitative)
	Emergency Service Vehicle Response Times	– Potential impact on emergency services due to changes in travel time
	Road Network Compatibility (with the TMP)	– Consistency with the goals and direction of the TMP
	Transit Operations	– Consistency with transit goals in TMP (i.e., A network of transit routes is required to effectively serve development in Halton Region. – Support for Metrolinx RTP which identifies Trafalgar Road as an Urban Corridor for Other Rapid Transit – Potential to support express (GO Transit/BRT) bus services – Potential to support local bus services – Potential to support transit oriented development (TOD) – Potential to convert to higher order transit
	Commercial Goods Movements	– Potential impact on goods movement (LOS and qualitative)
	Accommodation of Pedestrians/Cyclists	– Ability to address walking and cycling objectives in corridor (improved sidewalks, bike lanes, on-road routes, etc.)
	Community Access	– Ease of access to land uses served by the corridor
	Traffic Infiltration	– Potential to impact adjacent local roadways
Cultural	**Archaeological Resources**	– Potential to impact undisturbed lands
	Cultural Landscapes	– Potential to impact known Cultural Landscapes
	Built Heritage Resources	– Potential to impact known built heritage resources
Socio-Economic	**Compatibility with Existing Adjacent Land Uses**	– Potential to support and sustain existing land uses
	Compatibility with Proposed Development	– Potential to support re-development / development of lands served by the Trafalgar Road Corridor (e.g., Oakville Mid-Town Core, North Oakville East Secondary Plan (NOESP) and Trafalgar Urban Core Area
	Noise Impacts	– Potential to increase noise in Noise Sensitive Areas (NSAs) (e.g., residential properties)
	Property Impacts	– Potential for property impacts
	Aesthetics	– Potential to interfere with current views
	Accessibility to Adjacent Land Use	– Potential impacts to adjacent land use accessibility
	Air Quality**	– Potential impacts to air quality
Natural Environment	**Vegetation and Wildlife Habitat**	– Potential impact on vegetation communities
	Water Resources and Fisheries	– Potential impact on watercourses and groundwater
	Natural Hazards**	– Potential impact on flooding and erosion
Engineering Environment	**Major Services/Utility Impacts**	– Relocation requirements
	Impact on Water Quality and Quantity	– Increase in stormwater runoff. – Increase in pollutants to receiving watercourses.
	Construction Staging	– Impact to existing traffic operations during construction.
	Cost	– Potential capital costs. – Potential operational/maintenance costs.

*Note: ** Added from agency consultation*

4.3 Assessment of the Short List of Alternative Solutions

The alternatives were assessed using the reasoned argument method of evaluation. This method identifies and highlights the differences in net impacts associated with the various alternatives. The relative significance of the impacts is examined to provide a clear rationale for the selection of a preferred alternative.

An overview of the assessment and evaluation results for the Alternative Solutions is provided in **Exhibit 4.4**, with a recommendation provided for each alternative, which was subject to public review and comment. The detailed assessment table is included in **Exhibit 4.5**.

Exhibit 4-4. Overview of Alternative Solutions Assessment and Evaluation Results

Alternative Solutions	Potential to Address Problems and Opportunities	Recommendation
Do Nothing	Does not address needs	Carry forward for comparison only
TSM/TDM	Partially addresses needs	Part of Regional Transportation Master Plan; carry forward as part of the overall solution
Upgrade Other Roadways	Partially addresses needs	Part of Regional Transportation Master Plan; do not carry forward for this study
Widen Trafalgar Road	Greatest potential to address needs	Carry forward for further development and assessment

The following provides a brief summary of the assessment of alternative solutions.

Do Nothing

The Do-Nothing alternative was carried forward for comparison only to Alternatives 1 through 7, as it does not meet any of the technical needs of the existing or future study area corridor

Alternative 1 - Implement TSM and TDM Measures

TDM and TSM are consistent with the goals and objectives of the Region's TMP and are important components used to maximize effectiveness of the existing transportation infrastructure and help to reduce automobile dependency. However, TDM and TSM will not reduce traffic demand or provide sufficient capacity to accommodate the forecast travel demand in the corridor.

In the short term, some improvements in emergency response times may be achieved with TDM strategies and some improvements to traffic and transit operations. In the long term, these operations will worsen due to increased congestion on Trafalgar Road.

Alternative 2 - Upgrade Other Area Roadways

This alternative was eliminated from the detailed assessment, as discussed in **Section 4.1.2**.

Alternatives 3 to 7 - Widen Trafalgar Road

The review of each of the alternative solutions revealed that widening Trafalgar Road has the highest potential to support the transportation objectives and address the identified problems and opportunities in the Study Area. Widening has the highest potential to:

- support the various transit goals and objectives and meet the mode share targets in the TMP;
- improve transit travel time and reliability;
- improve commercial goods movement through the Trafalgar Road corridor;
- accommodate pedestrian and cyclists;
- serve access needs to adjacent land uses; and,
- reduce traffic infiltration onto local streets.

These alternatives offer the best potential to address mobility issues along the corridor, as well as provide improvements to the sidewalk and multi-use trail network to promote active transportation and accommodate cyclists and pedestrians. In addition these alternatives provide the opportunity to significantly improve transit facilities and transit operations through the corridor.

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** Implement TSM and TDM Measures	**Alternative 3** Adding Two GPLs	**Alternative 4** Adding Two HOV Lanes	**Alternative 5** Adding Two BRT Lanes	**Alternative 6** Adding Two GPLs + Two HOV Lanes	**Alternative 7** Adding Two GPLs + Two BRT Lanes
	Network Assumptions - Trafalgar Road at 4 GPL (Do Nothing) - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 HOV - 2021 road network improvements in place - Trend Transit (i.e., status quo)	**Network Assumptions** - Trafalgar Road at 4 GPL (Do Nothing) - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 HOV - 2021 road network improvements in place (including new crossing of QEW between Trafalgar Road and 8th Line) - Trend Transit - TDM and TSM improvements	**Network Assumptions** - Trafalgar Road: 6 GPL - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 HOV - 2021 road network improvements in place (including new crossing of QEW between Trafalgar Road and 8th Line) - Trend Transit	**Network Assumptions** - Trafalgar Road: 4 GPL + 2 HOV - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 HOV - 2021 road network improvements in place (including new crossing of QEW between Trafalgar Road and 8th Line) - Trend Transit	**Network Assumptions** - Trafalgar Road: 4 GPL + 2 BRT - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 BRT - 2021 road network improvements in place - (including new crossing of QEW between Trafalgar Road and 8th Line) - Enhanced Transit (20 percent Overall TMS) TMP	**Network Assumptions** - Trafalgar Road: 6 GPL + 2 HOV - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 HOV - 2021 road network improvements in place (including new crossing of QEW between Trafalgar Road and 8th Line) - Trend Transit	**Network Assumptions** - Trafalgar Road: 6 GPL + 2 BRT - Capacity on Trafalgar Road: 900 vphpl - Dundas Street: 4 GPL + 2 BRT - 2021 road network improvements in place (including new crossing of QEW between Trafalgar Road and 8th Line) - Enhanced Transit (20 percent Overall TMS) TMP
TRANSPORTATION							
Accommodation of Future Travel Demand *Potential to serve general purpose travel demand*	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2840 / 1800 / 1.58 **Dundas Street to Upper Middle Road**: 2160 / 1800 / 1.20 **Upper Middle Road to Iroquois Shore Road**: 2140 / 1800 / 1.19 **Iroquois Shore Road to QEW**: 2890 / 2700 / 1.07 **QEW to Cornwall Road**: 2110 / 2700 / 0.78 • Trafalgar Road will operate under recurring congestion during peak periods with severe congestion from Burnhamthorpe Road to the QEW.	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2700 / 1800 / 1.50 **Dundas Street to Upper Middle Road**: 2050 / 1800 / 1.14 **Upper Middle Road to Iroquois Shore Road**: 2030 / 1800 / 1.13 **Iroquois Shore Road to QEW**: 2750 / 2700 / 1.02 **QEW to Cornwall Road**: 2000 / 2700 / 0.74 • Trafalgar Road will operate under recurring congestion during peak periods with severe congestion from Burnhamthorpe Road to the QEW. • TDM and TSM are important components of Halton Region's TMP to maximize effectiveness of the existing transportation infrastructure and reduce automobile dependency. • TDM and TSM alone will not reduce traffic demand and provide sufficient capacity to accommodate forecast travel	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 3040 / 2700 / 1.13 **Dundas Street to Upper Middle Road**: 2470 / 2700 / 0.91 **Upper Middle Road to Iroquois Shore Road**: 2380 / 2700 / 0.88 **Iroquois Shore Road to QEW**: 3200 / 2700 / 1.19 **QEW to Cornwall Road**: 2110 / 2700 / 0.78 • Trafalgar Road will operate under recurring congestion during peak periods with severe congestion from Burnhamthorpe Road to Dundas Street and from Iroquois Shore Road to the QEW.	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2290 / 1800 / 1.27 **Dundas Street to Upper Middle Road**: 1770 / 1800 / 0.98 **Upper Middle Road to Iroquois Shore Road**: 1710 / 1800 / 0.95 **Iroquois Shore Road to QEW**: 2340 / 2700 / 0.87 **QEW to Cornwall Road**: 2130 / 2700 / 0.79 • Trafalgar Road will operate under recurring congestion during peak periods with severe congestion from Burnhamthorpe Road to Dundas Street.	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2300 / 1800 / 1.28 **Dundas Street to Upper Middle Road**: 1860 / 1800 / 1.03 **Upper Middle Road to Iroquois Shore Road**: 1920 / 1800 / 1.07 **Iroquois Shore Road to QEW**: 2570 / 2700 / 0.95 **QEW to Cornwall Road**: 1700 / 2700 / 0.63 • Trafalgar Road will operate under recurring congestion during peak periods with severe congestion from Burnhamthorpe Road to Iroquois Shore Road.	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2629 / 2700 / 0.97 **Dundas Street to Upper Middle Road**: 2140 / 2700 / 0.79 **Upper Middle Road to Iroquois Shore Road**: 2030 / 2700 / 0.75 **Iroquois Shore Road to QEW**: 2680 / 2700 / 0.99 **QEW to Cornwall Road**: 2140 / 2700 / 0.79 • Trafalgar Road will operate under low to moderate recurring congestion during peak periods.	• Peak Direction Forecast Volumes and V/C Ratios: **Link Volume / Total Capacity / V/C Ratio** **Burnhamthorpe Road to Dundas Street**: 2360 / 2700 / 0.87 **Dundas Street to Upper Middle Road**: 2090 / 2700 / 0.77 **Upper Middle Road to Iroquois Shore Road**: 2080 / 2700 / 0.77 **Iroquois Shore Road to QEW**: 2810 / 2700 / 1.04 **QEW to Cornwall Road**: 1720 / 2700 / 0.64 • Trafalgar Road will operate at an acceptable level of service during peak periods with the exception of severe congestion from Iroquois Shore Road to the QEW.

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** **Implement TSM and TDM Measures**	**Alternative 3** **Adding Two GPLs**	**Alternative 4** **Adding Two HOV Lanes**	**Alternative 5** **Adding Two BRT Lanes**	**Alternative 6** **Adding Two GPLs + Two HOV Lanes**	**Alternative 7** **Adding Two GPLs + Two BRT Lanes**
		• demand in the corridor. • Does not adequately address identified capacity and operating deficiencies along Trafalgar Road corridor.					
Potential to serve HOV travel demand	• No support for HOV. HOVs operate in mixed traffic.	• Minor intersection improvements. • No improvements to existing lane imbalance on Trafalgar Road.	• No support for HOV. HOVs operate in mixed traffic.	• 590 to 1060 HOVs (demand varies by section). • In longer term consider changing HOV eligibility from 2+ to 3+ to avoid congested operations.	• No support for HOV. HOVs operate in mixed traffic.	• 380 to 930 HOVs (demand varies by section). • In longer term consider changing HOV eligibility from 2+ to 3+ to avoid congested operations.	• No support for HOV. HOVs operate in mixed traffic.
Potential to serve transit travel demand	• Four percent transit mode share (maintains existing trend). • Low support for transit service as buses will operate in severe congestion during peak periods.	• Low support for transit service as buses will operate in severe congestion during peak periods.	• Four percent transit mode share for the corridor (maintains existing trend). • Low support for transit service as buses will operate in recurring congestion during peak periods.	• Four percent transit mode share for the corridor (maintains existing trend). • Moderate support for transit service as buses will operate in HOV lanes. • A "BRT light" system operating in the HOV lanes could improve the four percent share.	• 24 percent transit mode share for the corridor (assumes enhanced transit services and a System of BRT lanes). • High support for BRT service as buses will operate in dedicated lanes. • High support for local transit service as buses will operate in dedicated bus lanes.	• Four percent transit mode share for the corridor (maintains existing trend). • Moderate support for transit service as buses will operate in HOV lanes. • A "BRT light" system operating in the HOV lanes could improve the four percent share.	• 24 percent transit mode share for the corridor (assumes enhanced transit services and a System of BRT lanes). • High support for BRT service as buses will operate in dedicated lanes. • High support for local transit service as buses will operate in dedicated bus lanes.
Traffic Operations *Potential to accommodate intersection turn lanes*	• No support	• Minor intersection improvements.	• Six lane cross-section allows for turn lanes at major intersections.			• Eight lane cross-section may preclude opportunities for turning lanes at major intersections.	
Safety *Potential to improve traffic safety based on opportunity to reduce congestion and potential for collisions (qualitative)*	• No potential for improvement.	• Low potential to improve safety • TDM will reduce auto usage, with some improved operations and reduced exposure to risk. TSM will provide minor, short term improvements to traffic operations and may reduce potential for collisions.	• Low potential to improve safety over Do Nothing Alternative.	• Low potential to improve safety. • Traffic congestion will limit potential to reduce collisions.	• Moderate potential to improve safety. • Traffic congestion will limit potential to reduce collisions. • Narrower road cross-section (six lanes vs. eight lanes) may increase travel safety of pedestrians at intersections.	• Moderate to high potential to improve safety. • Reduced traffic congestion will result in improved travel safety and reduced potential for collisions. • Wider road cross-section may reduce travel safety of pedestrians at intersections.	
EMS Vehicle Response Times *Potential impact on emergency services due to changes in travel time*	• No potential for improvement.	• Low short term improvement in response times could be achieved with demand management and some improvements to traffic operations.	• Low potential for improvement to emergency response times with congested traffic operations.		• High potential for improvement to emergency response times with availability of BRT Lanes for Emergency Vehicle use.	• Moderate potential for improvement to emergency response times with improved traffic operations.	• High potential for improvement to emergency response times with availability of BRT Lanes for Emergency Vehicle use.
Road Network Compatibility (with the TMP) *Consistency with the goals and direction of the TMP*	• Not consistent with the goals and direction of the TMP	• Consistent with TDM and TSM goals and objectives of TMP, but inconsistent with objectives for improvements to support multiple modes of travel in the corridor.	• Inconsistent with the recommended role and function of Trafalgar Road in the TMP as a major arterial and transit priority corridor.		• Consistent with the recommended role and function of Trafalgar Road in the TMP as a transit priority corridor.	• Somewhat consistent with the recommended role and function of Trafalgar Road in the TMP as a major arterial and transit priority corridor.	• Consistent with the recommended role and function of Trafalgar Road in the TMP as a major arterial and transit priority corridor.

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** **Implement TSM and TDM Measures**	**Alternative 3** **Adding Two GPLs**	**Alternative 4** **Adding Two HOV Lanes**	**Alternative 5** **Adding Two BRT Lanes**	**Alternative 6** **Adding Two GPLs + Two HOV Lanes**	**Alternative 7** **Adding Two GPLs + Two BRT Lanes**
Transit Operations *Consistency with transit goals in TMP* *A network of transit routes is required to effectively serve development in Halton Region.*	• Not consistent with the goals and direction of the TMP	• Low potential to improve transit operations through reduction in auto use due to TDM strategies. • TSM will provide limited improvements to transit operations on a short term basis. • Transit operations (travel time and reliability) will worsen over time due to increased congestion on Trafalgar Road.	• Low potential to improve transit operations. Buses travelling in mixed traffic would have no improvement in travel times. • Not consistent with the goals and direction of the TMP	• Low to Moderate potential to improve transit operations. • Bus operations in the HOV lanes would benefit from bus turnouts to prevent impact to HOV flow. • Consistent with transit goals and objectives of TMP.	• High potential to improve transit operations with BRT. • Consistent with transit goals and objectives of TMP.	• Low potential to improve transit operations. • Bus operation in the HOV lanes would benefit from bus turnouts to prevent impact to HOV flow.	• High potential to improve transit operations with BRT. • Consistent with transit goals and objectives of TMP.
Support for Metrolinx Regional Transportation Plan (RTP) which identifies Trafalgar Road as an urban corridor for other rapid transit	• Does not support Metrolinx RTP		• Low potential to support Metrolinx RTP.		• High potential to support Metrolinx RTP.	• Moderate potential to support Metrolinx RTP.	• High potential to support Metrolinx RTP.
Potential to support express (GO Transit/BRT) bus services	• No potential to improve express bus service.	• Low potential to improve express bus service without dedicated bus lanes (BRT).		• Low to Moderate potential to improve express bus service with buses operating in HOV lanes.	• High potential to improve express bus service with dedicated bus lanes (BRT).	• Low to Moderate potential to improve express bus service with buses operating in HOV lanes.	• High potential to improve express bus service with dedicated bus lanes (BRT).
Potential to support local bus services	• Limited potential to support local bus services.	• Low potential to support local transit services with local buses operating in congested mixed traffic. • Travel times and service reliability of local bus services may improve compared to Do Nothing. • .		• Low to Moderate potential to support local transit services with buses operating in HOV lanes. • Travel times and service reliability of local bus services (including express runs such as #190) operating in HOV lanes.	• High potential to support local transit services with buses operating in BRT lanes. • Potential for express runs (such as #190) to use BRT lanes.	• Low to Moderate potential to support local transit services with buses operating in HOV lanes. • Travel times and service reliability of local bus services (including express runs such as #190) operating in HOV lanes.	• High potential to support local transit services with buses operating in BRT lanes. • Potential for express runs (such as #190) to use BRT lanes. • Transfers between local service and BRT would require crossing traffic lanes to another platform.
Potential to support transit oriented development (TOD)	• Low potential to support TOD.			• Low potential to support TOD with local bus service only. • Low to Moderate potential to support TOD with "BRT light" operating in HOV lanes.	• High potential to support TOD.	• Low potential to support TOD with local bus service only. • Low to Moderate potential to support TOD with "BRT light" operating in HOV lanes.	• High potential to support TOD.
Potential to convert to higher order transit	• Future potential to convert to higher order transit.	• Removal of GLP may be required to convert in future to BRT (or LRT).		• Potential to convert HOV to BRT	• BRT lanes could be converted to LRT, but maintaining transit ridership and TOD support challenging during conversion.	• Removal of GLP may be required to convert in future to BRT (or LRT). • Eight lanes may allow retention of HOV lanes.	• BRT lanes could be converted to LRT, but maintaining transit ridership and TOD support challenging during conversion. • Eight lanes may allow temporary BRT operation in the curb lane during conversion.
Commercial Goods Movements *Potential impact on goods movement (LOS and qualitative)*	• No support for goods movement due to severe recurring traffic congestion in Trafalgar Road corridor.	• Low potential to improve commercial goods movement through the Trafalgar Road corridor due to increasing congestion and delays.	• Low potential to improve commercial goods movement through the Trafalgar Road corridor due to recurring traffic congestion.			Moderate to High potential to improve commercial goods movement through the Trafalgar Road corridor due to reduced recurring congestion.	• High potential to improve commercial goods movement through the Trafalgar Road corridor due to reduced congestion and delays.

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** **Implement TSM and TDM Measures**	**Alternative 3** **Adding Two GPLs**	**Alternative 4** **Adding Two HOV Lanes**	**Alternative 5** **Adding Two BRT Lanes**	**Alternative 6** **Adding Two GPLs + Two HOV Lanes**	**Alternative 7** **Adding Two GPLs + Two BRT Lanes**
Accommodation of Pedestrians / Cyclists *Ability to address walking and cycling objectives in corridor (improved sidewalks, bike lanes, on-road routes, etc.)*	• No potential to improve pedestrians and cyclists objectives in Trafalgar Road corridor.	• Low potential to address pedestrian and cycling opportunities.	• High potential to address pedestrians and cyclists objectives in Trafalgar Road corridor.				
Community Access *Ease of access to land uses served by the corridor*	• No potential to improve access to land uses served by the corridor.	• Low potential to serve access needs to adjacent land uses as congestion worsens over time.				• Moderate to High potential to serve access needs to adjacent land uses due to improved transportation operations for multiple travel modes.	• High potential to serve access needs to adjacent land uses due to improved transportation operations for multiple travel modes.
Traffic Infiltration *Potential to impact adjacent local roadways*	• High potential for traffic infiltration due to severe recurring traffic congestion in Trafalgar Road corridor.	• High potential for traffic infiltration due to capacity deficiencies and congestion on Trafalgar Road.	• Moderate potential for traffic infiltration due to recurring traffic congestion in Trafalgar Road corridor.			Low to moderate potential for traffic infiltration due to improved traffic operations in Trafalgar Road corridor.	
SUMMARY OF TRANSPORTATION FACTORS	**Least Preferred**			**Moderately Preferred**	**Most Preferred**	**Moderately Preferred**	
CULTURAL							
Archaeological Resources *Potential to impact undisturbed lands*	• No Impact		• High potential to impact undisturbed lands beyond the existing Right-of-Way, along Trafalgar Road. • Additional Archaeological Assessment will be required.				
Cultural Landscapes *Potential to impact known Cultural Landscapes*	• No Impact		• Low potential to impact cultural landscapes adjacent to Trafalgar Road.				
Built Heritage *Resources Potential to impact known built heritage resources*	• No Impact		• Low potential to impact locally recognized built heritage resources adjacent to Trafalgar Road.				
SUMMARY CULTURAL ENVIRONMENT	**Most Preferred**		**Least Preferred**				
SOCIO-ECONOMIC							
Compatibility with Existing Adjacent Land Uses *Potential to support and sustain existing land uses*	• Low potential to support existing land uses due to capacity deficiencies and congestion on Trafalgar Road.		• Moderate potential to support existing land uses with capacity improvements to Trafalgar Road.	• Moderate to high potential to support existing land uses with capacity improvements and HOV or BRT lanes to Trafalgar Road.		• Moderate potential to support existing land uses through capacity improvements and HOV or BRT lanes. The eight lane cross-section may preclude opportunities for pedestrian crossings and turning lanes at major intersections.	
Compatibility with Proposed Development *Potential to support re-development / development of lands served by the Trafalgar Road Corridor (e.g., Oakville Mid-Town Core, North Oakville East Secondary Plan (NOESP) and Trafalgar Urban Core Area*	• Low potential to achieve the Regional Official Plan Amendment (ROPA) 38 objectives for future land use served by the Trafalgar Road Corridor. • Low potential to achieve the North Oakville East Secondary Plan (NOESP) objectives for developing a major arterial/transit corridor • Low potential to achieve the Draft Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • Low potential for re-development / development, due to capacity deficiencies and congestion on Trafalgar Road.		• Low to moderate potential to support policies in ROPA 38 which identifies Trafalgar Road as an Intensification Corridor and contributes to the objectives of an Intensification Area (e.g., cumulatively attract a significant portion of population and employment growth and support transit/ active transportation).	• Moderate potential to support policies in ROPA 38 which identifies Trafalgar Road as an Intensification Corridor and contributes to the objectives of an Intensification Area (e.g., cumulatively attract a significant portion of population and employment growth and support transit/ active transportation). • Partially achieves the NOESP	• High potential to support policies in ROPA 38 which identifies Trafalgar Road as an Intensification Corridor and contributes to the objectives of an Intensification Area (e.g., cumulatively attract a significant portion of population and employment growth and support transit /active transportation). • Achieves the NOESP	• Low potential to support policies in ROPA 38 which identifies Trafalgar Road as an Intensification Corridor and contributes to the objectives of an Intensification Area (e.g., cumulatively attract a significant portion of population and employment growth and support transit/ active transportation). • High potential to support the	• High potential to support policies in ROPA 38 which identifies Trafalgar Road as an Intensification Corridor and contributes to the objectives of an Intensification Area (e.g., cumulatively attract a significant portion of population and employment growth and support transit/active transportation). • High potential to support the objectives for developing a major arterial/transit corridor. • High potential to achieve the Draft

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** Implement TSM and TDM Measures	**Alternative 3** Adding Two GPLs	**Alternative 4** Adding Two HOV Lanes	**Alternative 5** Adding Two BRT Lanes	**Alternative 6** Adding Two GPLs + Two HOV Lanes	**Alternative 7** Adding Two GPLs + Two BRT Lanes
			• Does not achieve the NOESP objectives for developing a major arterial/transit corridor. • Low potential to achieve the Draft Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • Moderate potential to support re-development / development as a result of additional north-south arterial roadway capacity on the roadway.	objectives for developing a major arterial/transit corridor. • Low potential to achieve the Draft Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • Moderate potential to support re-development / development as a result of additional north-south arterial roadway capacity on the roadway.	objectives for developing a major arterial/transit corridor. • High potential to achieve the Draft Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • Moderate to high potential to support re-development / development as a result of additional north-south arterial roadway capacity on the roadway.	objectives for developing a major arterial/transit corridor. • High potential to achieve the Draft Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • High potential to support re-development / development as a result of additional north-south arterial roadway capacity on the roadway, providing better opportunities for property access.	Midtown Business and Development Plan's objectives for Trafalgar Road as a mobility hub. • High potential to support re-development / development as a result of additional north-south arterial roadway capacity on the roadway, providing better opportunities for property access.
Noise Impacts *Potential to increase noise in Noise Sensitive Areas (NSAs) (e.g., residential properties)*	• Increase in noise levels at adjacent properties will result from future increases in traffic volume on Trafalgar Road. • Potential to mitigate noise with noise barriers (walls). • Halton Region plans to install noise walls at two locations on Trafalgar Road in advance of planned corridor improvements.		• High potential for noise related impacts at adjacent properties associated with widening (roadway closer to noise receptors than Do Nothing) and increased traffic volume. • Potential to mitigate noise with noise barriers (walls). • Noise impacts during construction are temporary and can be mitigated. • Halton Region has installed noise walls at two locations on Trafalgar Road in advance of planned corridor improvements.			• Highest noise related impacts at adjacent properties associated with widening (roadway closer to noise receptors) and increased traffic volume than with six lane option. • Potential to mitigate noise with noise barriers (walls). • Noise impacts during construction are temporary and can be mitigated. • Halton Region has installed noise walls at two locations on Trafalgar Road in advance of planned corridor improvements.	
Property Impacts *Potential for property impacts*	• No Impact		• Property acquisition will be required with roadway widening from four to six lanes.			• Additional property acquisition will be required over four lane options with roadway widening to eight lanes.	
Aesthetics *Potential to interfere with current views*	• No Impact		• Potential for impact to existing views along Trafalgar Road as a result of road widening from four to six lanes. • Visual impacts can be mitigated through landscaping.			• Highest potential for impact to existing views along Trafalgar Road as a result of road widening from four to eight lanes. • Visual impacts can be mitigated through landscaping.	
Accessibility to Adjacent Land Use *Potential impacts to access of adjacent land use*	• High potential to impact access of adjacent land use as traffic demands as congestion increases in the Trafalgar Road corridor.		• Low potential to impact access to adjacent land use in the Trafalgar Road corridor. • Improvements to traffic operations may be offset by direct access restrictions (right in/right-out access only) and/or intersection turn restrictions associated with widening improvements.				
SUMMARY SOCIO-ECONOMIC ENVIRONMENT	**Least Preferred**		**Least Preferred**	**Moderately Preferred**	**Most Preferred**	**Least Preferred**	**Moderately Preferred**
NATURAL ENVIRONMENT							
Vegetation and Wildlife Habitat *Potential impact on vegetation communities*	• No Impact		• Potential to impact vegetation adjacent to Trafalgar Road including Morrison Valley Trail North and the woodland near Sheridan College.			High potential to impact vegetation adjacent to Trafalgar Road including Morrison Valley Trail North and the woodland near Sheridan College.	
Water Resources and Fisheries *Potential impact on watercourses and groundwater*	• No Impact		• Potential to impact watercourses and aquatic features adjacent to or crossing Trafalgar Road as a result of salt contaminated water entering the watercourse and increased impervious surfaces that decrease the amount of infiltration into wetland communities. • Watercourses potentially affected include East Morrison Creek, its tributaries and the channelized 16 Mile Creek Tributary • Low potential to impact groundwater – no significant changes to roadway profile planned; portion of study area fully serviced by municipal watermains/sewers; remainder of study area to be fully serviced in conjunction with planned development • Impacts can be mitigated through stormwater quality controls, and/or sediment control measures. • Impact to fisheries may require a compensation plan.			• High potential to impact watercourses and aquatic features adjacent to or crossing Trafalgar Road as a result of salt contaminated water entering the watercourse and increased impervious surfaces that decrease the amount of infiltration into wetland communities. • Watercourses potentially affected include East Morrison Creek, its tributaries and the channelized 16 Mile Creek Tributary • Low potential to impact groundwater – no significant changes to roadway profile planned; portion of study area fully serviced by municipal watermains/sewers; remainder of study area to be fully serviced in conjunction with planned development • Impacts can be mitigated through stormwater quality controls, and/or sediment control measures. • Impact to fisheries may require a compensation plan.	

Exhibit 4-5. Evaluation of Short List of Alternative Solutions

			Six Lane Widening Alternatives			Eight Lane Widening Alternatives	
	Do Nothing	**Alternative 1** Implement TSM and TDM Measures	**Alternative 3** Adding Two GPLs	**Alternative 4** Adding Two HOV Lanes	**Alternative 5** Adding Two BRT Lanes	**Alternative 6** Adding Two GPLs + Two HOV Lanes	**Alternative 7** Adding Two GPLs + Two BRT Lanes
Natural Hazards *Potential impact on flooding and erosion*	• No Impact		• Potential for erosion/deposition of soils/silt within the East Morrison Creek Wetland and aquatic communities due to grading and disturbance of soils.			• Potential for erosion/deposition of soils/silt within the East Morrison Creek Wetland and aquatic communities due to more expansive grading and greater disturbance of soils.	
SUMMARY NATURAL ENVIRONMENT	**Most Preferred**	**Most Preferred**	**Moderately Preferred**			**Least Preferred**	
ENGINEERING ENVIRONMENT							
Major Services/Utility Impacts *Relocation requirements*	• No impact		• Potential for conflicts with existing utilities.			• High potential for conflicts with existing utilities.	
Impact on Water Quality and Quantity *Increase in stormwater runoff. Increase in pollutants to receiving watercourses.*	• No impact		• Potential for impacts to stormwater runoff. • Potential for increase in pollutants to receiving watercourses. • Potential to mitigate both quantity and quality impacts.			• High potential for impacts to stormwater runoff. • High potential for increase in pollutants to receiving watercourses. • Potential to mitigate both quantity and quality impacts.	
Construction Staging *Impact to existing traffic operations during construction.*	• No impact		• Potential for impacts to traffic operations during construction. Will require detailed Traffic Management Plan.			• High potential for impacts to traffic operations during construction. Will require detailed Traffic Management Plan.	
Cost *Potential capital costs. Potential operational/maintenance costs.*	• Least capital costs. • Low operational / maintenance costs.		• Moderate capital costs. • Moderate operational / maintenance costs due to increased road width.		• Moderate capital costs. • Moderate to high operational / maintenance costs due to increased road width and BRT.	• High capital costs. • Moderate operational / maintenance costs due to increased road width.	• High capital costs. • Moderate to high operational / maintenance costs due to increased road width and BRT.
SUMMARY ENGINEERING ENVIRONMENT	**Most Preferred**	**Most Preferred**	**Moderately Preferred**			**Least Preferred**	

4.4 Input from Public, Stakeholders and Agencies

Consultation with the TAC, Stakeholder Group and the public through PIC #1 demonstrated that transit should be made the highest priority in this corridor to ensure a long-term sustainable transportation solution. The identification of a solution for Trafalgar Road was considered to be a high priority given the travel demand projected for the corridor. Provision of improved amenities for cyclists and pedestrians was identified, with consideration for using Sixth Line as a main route for cyclists. It was suggested that Halton Region consider a pedestrian crossing that is not at road level to allow students to get to and from Sheridan College.

Based on the assessment and input received through the consultation process, widening of Trafalgar Road to six lanes including four GLPs and two BRT lanes is recommended to be carried forward as the preferred solution to meet travel demand by 2031 on the basis of the following rationale:

Transportation Criteria

- Reduces traffic congestion and will result in improved travel safety and reduced potential for collisions
- High potential for improvement to emergency response times with improved traffic operations
- Moderate potential to improve commercial goods movement
- High potential to address pedestrians and cyclists objectives
- Moderate potential for traffic infiltration

Socio-Economic Environment Criteria

- Fewer impacts on most criteria
- Moderate to high potential to support existing land uses with capacity and transit supportive (BRT) improvements to Trafalgar Road
- Lower impacts to individual properties depending on the alignment when compared to the eight lane cross-section
- High potential to serve access needs to adjacent land uses
- Moderate to high potential to support re-development/development

Natural Environment

- Less overall impacts to natural environment features/systems when compared to the 8-lane cross-section

4.5 The Recommended Alternative Solution

The assessment of the alternative solutions resulted in the following recommendations:

- Widen the Trafalgar Road corridor to a six-lane cross-section, generally within a 50m right-of-way, including four general purpose lanes with the provision for two HOV / BRT lanes on the existing alignment.
- Implement TDM and TSM on a Region-wide basis as components of the overall transportation strategy in Halton Region's TMP.

This page is intentionally blank.

5. Alternative Design

5.1 Approach to Developing Alternative Design Concepts

Section 2 outlined the Need and Opportunity for improvements to the Trafalgar Road corridor to address existing and future travel demands, as well as planned developments. As noted in **Section 4.5**, the recommended alternative solution is the widening of Trafalgar Road to six lanes (with provision for four general purpose lanes and two dedicated BRT lanes by 2031), introduction of TDM and TSM, and other roadway upgrades that would meet the transportation improvements strategy of Halton Region's TMP.

Alternatives for curbside BRT versus median BRT between the Highway 407 westbound ramp junctions to the White Oaks Boulevard/ McCraney Street East intersection were developed in the planning process. However, it is also recognized that the widening project along Trafalgar Road will very likely take place in a number of different stages and phases over a period of several years.

After consultation with residents, local municipalities, transit agencies, technical agency committee and others, it is proposed that a phased approach towards the ultimate BRT implementation would benefit the progression of transportation corridor improvements. Interim conditions were then assessed to compare the benefits of a staged approach to the long-term BRT operation through introduction of HOV lanes, which can initially be used by both buses and HOVs. With the implementation of HOV lanes, a full BRT lane can be implemented when demand requires the transition. The timing for implementation of HOV/transit is to be determined in consultation with the Town of Oakville and Oakville Transit.

The preferred alternative was further refined through additional assessments, such as transit priority, intersection capacity, and potential geometric improvements. The following sections outline the development of the interim and long-term alternatives.

5.1.1 Right-of-Way and Cross-sections

The preliminary plan for the proposed widening of Trafalgar Road was developed based on a typical right-of-way of 50 m throughout the study area, although it is recognized that property conditions will require consideration of a mitigated ROW in constrained areas, particularly south of Dundas Street. For the area south of Leighland Avenue, no road widening is proposed as there is already a six-lane cross-section and no improvements have been identified for the QEW structure as part of this study. The north/south capacity improvements south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study.

North of Leighland Avenue, the Trafalgar Road cross-section will include six lanes (three per direction of travel). As noted in the following completed studies, other components are required within the corridor right-of-way, such as boulevards, and multi-use paths/sidewalks to accommodate active transportation uses.

Halton Transportation Master Plan – The Road to Change (2031)

Halton Region Transportation Master Plan "The Road to Change 2031" identified a 47 to 50 m right-of-way on Trafalgar Road with an urban cross-section including provision for pedestrians and cyclists on sidewalks and/or multi-use paths on both sides of the road[1]. The corridor is to initially be maintained as four general traffic lanes plus two lanes for Transit/HOV, transitioning to reserved transit lanes by 2031.[2]

Halton Region Active Transportation Master Plan

Halton Region is currently carrying out an Active Transportation Master Plan study to create a 20-year vision for active transportation in Halton Region. As part of the Trafalgar Road improvements, active transportation design features include multi-use paths / sidewalks for pedestrians and cyclists.

GO Transit Rail Parking and Station Access Plan (2013)

This Metrolinx report discusses the opportunities to enhance transit integration with GO Transit rail stations, including engaging local transit agencies, potential for new routes, and timetable integration. The report notes the impacts on local networks that result from increased ridership at GO Stations, particularly if riders continue to access the stations by single occupant vehicles (SOVs). The plan discusses anticipated reductions in parking rates per numbers of riders. The development of HOV and BRT corridors fits well with the policy directions of Metrolinx to promote multiple modes of accessing GO Stations and to encourage changes in travel behaviour.

5.1.2 Elements of Bus Rapid Transit (BRT)

The preferred alternative is for the widening of Trafalgar Road to a 6-lane cross-section including four general purpose lanes and provision for two BRT lanes. BRT is a system which creates a high-quality rapid transit experience using rubber-tired vehicles. The system operates in a dedicated exclusive or semi-exclusive road right-of-way, with on-line stations. The decreased travel time and other BRT components typically increase ridership by as much as 50%. BRT implementation is now underway throughout the GGH in multiple regional and local municipalities. It is recognized that BRT adopts the best elements of bus and rail services to create a higher order bus-based transit service; the components of a typical BRT system are reviewed briefly in the following subsections.

BRT system elements can be implemented in stages, allowing a community to make improvements as capital and operating funds become available, rather than having to secure large amounts of funds at one time. As additional elements are added, improvements come in the form of travel time, reliability, comfort, image and identity, safety and security, capacity, and accessibility. In turn, data suggests that ridership gains are significant, particularly in corridors with existing transit service.

A BRT running way in an urban street is developed within the limits of the roadway cross-section, either as part of new construction or by retrofitting an existing facility. Operation of BRT on an arterial street implies a much greater degree of interaction both with other elements of the transportation system (i.e., intersections, traffic signal, parking, etc.) and with other users of the transportation system (i.e., private vehicles, pedestrians, cyclists, etc.).

In some cities, buses may have a fully exclusive lane in the street but may have to interact with other vehicles at intersections. In these places, the exclusivity of the lane may be reinforced through fencing, a curb, or special pavement treatments. For some segments of a corridor, a municipality may consider restricting use of an entire street just to transit vehicles. If a municipality is concerned that exclusive lanes or entire streets will be underutilized, then they may consider allowing HOVs the same rights as buses.

1. *Halton Region Transportation Master Plan, The Road to Change 2031, Appendix E, Regional Right-of-Way Guidelines, July 2011*
2. *Halton Region Transportation Master Plan, The Road to Change 2031, September 2011, Figure 7.1*

The service headways for BRT are typically more frequent, operating at approximately 10-15 minutes during peak hours and 20 minutes during off-peak hours, with longer headways possible for late night service.

BRT services typically operate at a minimum of 15 hours per weekday and can be co-ordinated with other systems, for instance GO train departure and arrival times, to reduce the transfer time between different transit platforms. The high level of service provided by BRT may reduce the need for co-ordination between multiple transit services due to service frequency.

5.1.3 Transit Travel Time Improvement Strategies

To make BRT a high quality transit service, it needs to be reliable and offer travel time savings in congested circumstances. There are mainly three causes of bus delays, delay at intersections (typically due to signals), dwell time at stops/stations, and delay along the roadway (typically due to congestion).

One way to reduce the delay at intersections is to use Transit Signal Priority (TSP) measures which facilitate the movement of buses through signalized intersections. Upon the detection of buses from on-board signaling devices (such as the GPS locator used on the HealthLine system) or detection loops in the ground (such as that used by the EmX system), a traffic signal can be programmed to extend a green light so a bus does not have to wait for the next phase or cause a green light to start earlier so that the waiting time of a bus can be minimized or eliminated. TSP along the Trafalgar corridor and for BRT vehicles departing from the Oakville GO Station may be considered as one of the long-term strategies for service improvements.

In conjunction with traffic signal adjustments, transit priority at intersections can be facilitated by restricting certain traffic movements for cars. Doing so eliminates conflicting movements that may hinder bus movements or clears certain lanes for buses. There are also some municipalities that have used cameras or police presence to monitor intersections to ensure that drivers obey the signals and turning rules related to increasing bus speeds.

To reduce dwell time delays, there are a few strategies that can be considered. Total dwell time decreases with fewer station stops. Fewer stops between signals also allows vehicle to progress with the general traffic. Easy boarding design, such as level or near-level boarding, is faster, eliminating delay for strollers and most wheelchairs and eliminating delay in kneeling buses and/or stairs. Multiple door design can facilitate faster boarding and alighting times. An internal layout with fewer seats than that typically provided on local transit buses may also reduce the alighting time, providing more standing room by doors allowing for ease of movement for alighting.

Guideway design can affect the travel time saving along the roadway. In general, median BRT lanes provide for faster vehicle travel time, while curbside BRT lanes typically provide the best balance of travel time through the corridor for cars and BRT vehicles. Median BRT lanes can have greater impacts on left-turn movements (since the left turn is only allowed in a protected phase); curbside BRT lanes allow for both protected and permissive left–turn phases. Further discussion of Curbside BRT versus Median BRT running ways follows in **Section 5.2**.

5.2 BRT Operations on Trafalgar Road: Curbside BRT vs. Median BRT

Within the context of the Trafalgar Road EA Study, the BRT running way Alternatives were defined as below:

- **Alternative 1 – Designated (Reserved) Curb Bus Lanes:**
  Typically located on the outside of the arterial roadway (next to the curb), exclusively dedicated to bus operation except for being accessible to right-turning motorists at intersections and driveways / accesses along the road;
- **Alternative 2 – Median Dedicated Bus Lane (Median Bus-way):**
  A dedicated bus facility in the median area and sometimes physically separated from other forms of traffic with some form of transit priority at locations where it intersects with other traffic. These median bus-ways are widely used throughout South America and are or will be used for BRT systems in York Region (vivaNext) and Vancouver.

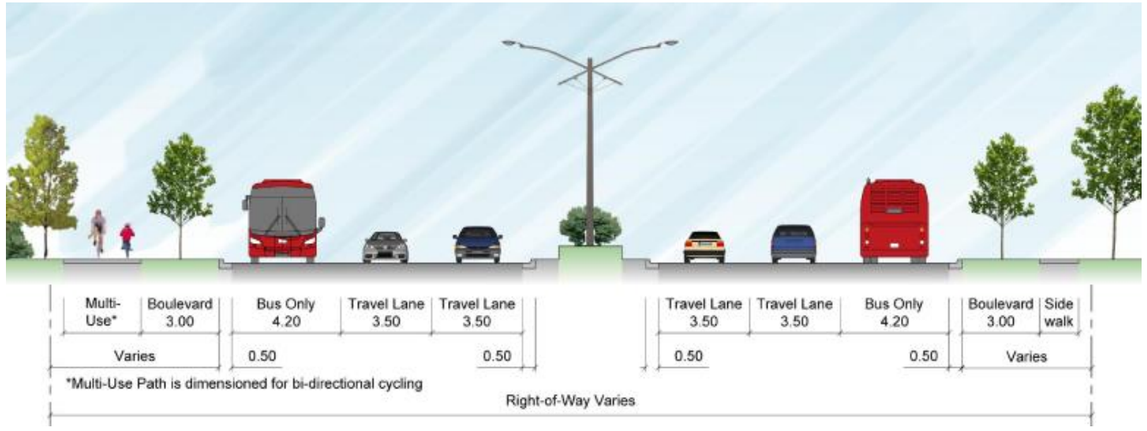
5.2.1 Curbside BRT

Typically, transit priority on arterial roadways is provided in curbside or right side bus lanes. This layout is common in locations around North America; the exclusive bus lane eliminates other vehicles from its use, and allows buses to avoid a variety of interference and conflicts.

A typical cross-section of curbside bus lanes, as they would generally be implemented on Trafalgar Road, is shown in **Exhibit 5.1**, which includes:

- Two 3.5 m general traffic lanes in each direction;
- One 4.2 m curb bus-only lane in each direction;
- One 3.0 m boulevard with multi-use path or side walk on each side of the road; and
- A raised centre median with landscaping and lighting opportunities.

Exhibit 5-1. Curbside Bus Lanes



The construction of a bus bay at a bus stop (not shown in **Exhibit 5.1**) provides an opportunity to give priority to express buses in the bus only lanes. While local buses will be allowed to stay within the bus bay, the express buses can bypass the stopped bus and avoid delays.

In order to reduce the potential conflict between the buses and general right-turn traffic at intersections, far-side bus stops are recommended. Emergency vehicles may also benefit from use of the dedicated bus lane to improve travel

time. To avoid underutilization of the exclusive bus-only lanes, the curb lanes could be shared with HOVs to encourage both transit and carpool use.

Parking and standing at the curb are not typically permitted (stopping/parking areas may be provided in designated locations). Signage and pavement markings as well as police enforcement are usually present to ensure the safety and reliability of the operation of the bus lanes.

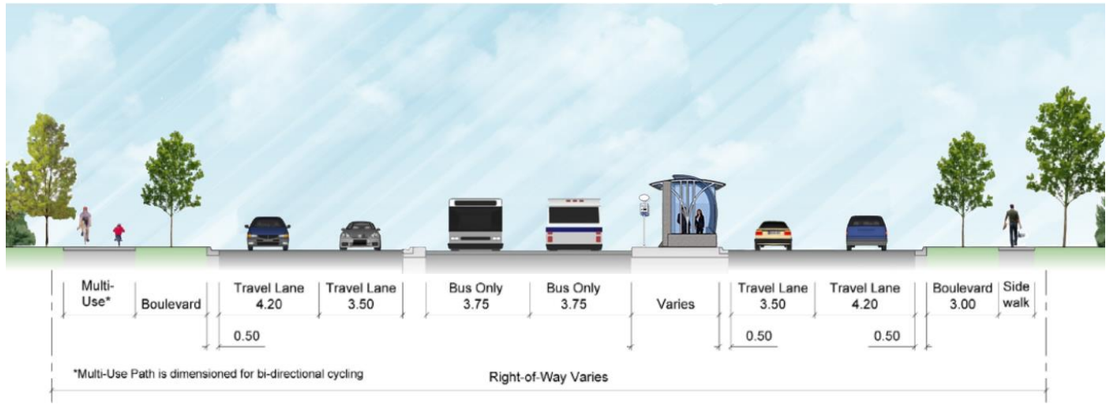
5.2.2 Median BRT

Median BRT operates in the middle of the roadway with general traffic lanes operating in the outside lanes. This option requires a change in the typical placement of stations from the sidewalk to the middle of the road. Raised medians create necessary separation between bus lanes and the adjacent general traffic lanes, and can be used to incorporate landscaping and other street features if enough width is available.

A typical cross-section of median bus lanes is shown in **Exhibit 5.2**, which includes:

- One 3.5 m (inside lane) and one 4.2 m (curb lane) general traffic lane in each direction;
- One 3.75 m median bus lane with a buffer between the bus lane and the general traffic lanes;
- One 3.0 m boulevard with multi-use path or side walk on each side of the road; and
- A raised centre median with landscaping opportunities.

Exhibit 5-2. Median Bus Lanes



No uncontrolled turns are allowed across the dedicated bus lanes, and for this reason there are fewer conflicts between buses and turning vehicles compared with curbside BRT.

Stations are usually located at a certain distance from intersections to avoid general traffic, pedestrian or transit delays. If BRT stations are located on the far side of the intersection, delays can result when passengers take a long time during boarding or alighting. If stations are located on the near-side of the intersection, signal timing can delay buses and prevent other buses from pulling in to the station. Due to the limited cross-section, typically there are no allowances for passing lanes, and for this reason, buses have to stop in sequence at stops.

Left-turning general purpose traffic that travels across the dedicated bus lanes have to be accommodated with protected left-turn only signal phases. Traffic signal priority can be provided through Intelligent Transportation Systems to improve the transit operations at intersections. Median bus lanes are usually more complex to operate compared to curbside bus lanes due to interference with left-turn traffic operations.

Though Median BRT can provide a more attractive appearance throughout the corridor and optimum bus operational performance, along with improved reliability, safety and security, it generally costs more than that of the curbside bus lanes due to the additional infrastructure and road width requirement. Median BRT is generally unsuitable for HOV use, but is applicable for emergency vehicle use.

5.2.3 Analysis and Evaluation of Curbside BRT vs. Median BRT

As presented in **Exhibit 5.3**, a number of criteria were used to evaluate the advantages and disadvantages of the Alternative Designs (i.e., curbside versus median BRT), including but not limited to:

- travel time;
- pedestrian crossing distance;
- impacts to turning vehicles;
- right of way and property impacts;
- consistency with other transit operations in Halton Region;
- impacts to cultural heritage, built heritage, natural environment, stormwater management;
- safety;
- maintenance; and
- cost.

A safety review was conducted to compare curbside BRT, median BRT, and HOV operation along Trafalgar Road (refer to **Section 5.3.4**). The results of the review show that in comparison with existing conditions, there is minimal difference between the safety performance of the three different operating scenarios.

Support for the analysis and evaluation of curbside BRT vs. median BRT includes a Paramics modelling assessment. A Paramics micro-simulation model was prepared to compare exclusive BRT median and curbside operation.

The travel time results indicate that BRT vehicles running southbound in the median lane would potentially experience shorter travel time (though very marginal) compared to BRT running in the curb lane; the reverse was found for northbound travel where curbside BRT potentially allows for shorter travel time than the median lane BRT travel time.

Exhibit 5-3. Curbside BRT vs. Median BRT

Factor	Curb-Running BRT	Median BRT
Travel Time		
Average BRT Travel Time (407 Park-and-Ride to Oakville GO Station)	28 minutes (including stops)	26 minutes (including stops)
Average BRT Travel Time (Uptown Core to Oakville GO Station)	20.5 minutes	18.5 minutes
Average Automobile Travel Time (Between 407 and Cornwall Road) projected for year 2031	34 minutes	38 minutes
Pedestrians		
Total Pedestrian Crossing Distance (Time using 1.10 m/sec pedestrian crossing speed)	27.65 m (25.1 sec)	32.85 m (29.9 sec, >60 sec if 2 phase)
Availability of Crossing Refuge	No*	Yes
Perceived Passenger Waiting Comfort	Better	Worse
Traffic		
Impacts to Left-Turning Vehicles	Protected and Permissive Phases	Protected Phase Only
U-Turns	Required	Required
Neighbourhood Cut-Through Issues	Potential	Potential
Right of Way and Property Impacts		
Required Right-of-Way Acquisition	Less ROW required	More ROW required
Conversion of Entrances to Right-In-Right-Out	Same for both options	Same for both options
Transit Integration		
Benefits to Local Bus Routes	Both options provide similar benefit	Both options provide similar benefit
Benefits to Express Bus Routes	Potential	Potential
Ease of Transfer between Systems	Ease depends on travel direction	Must cross to median platform
Consistency with planned Dundas Street Improvements	Consistent	Not Consistent
Other		
Roadside Safety – Proximity of Station Structure to Traffic	Station components typically outside of clear zone for 60 km/hr design speed	Barrier and/or impact attenuators typically required
Roadside Safety – Protection of Pedestrians near Stations	Riders (pedestrians) can stand away from road	Riders must cross lanes to reach platforms – riders may experience a lower level of comfort waiting in the center of the roadway
Enforcement Issues (Vehicles in BRT Lanes)	Typically more difficult to enforce	Design typically is “self enforcing”
Emergency Vehicle Benefits (Use of BRT Lanes)	Emergency vehicles can utilize lane but may experience interference from other vehicles	Emergency vehicles can utilize lanes and would typically experience less interference
Snow Removal	Procedures will need to address potential for throwing snow into stations	Procedures will need to address clearance of dedicated lanes and potential for throwing snow into stations
Active Transportation	Both options will accommodate Active Transportation	Both options will accommodate Active Transportation
AODA Accessibility	Fully accessible including ramps, visual messaging, and audible signals	Fully accessible including ramps, visual messaging, and audible signals**

**Refuge could be added into design standards for Trafalgar Road curb-running BRT.*
***Some agencies report that audible crosswalk signals for two stage crossings can be perceived as confusing.*

Factor	Curb-Running BRT	Median BRT
Transportation – Cost and Staging		
Staging	Better opportunities to build ridership prior to completion of the BRT project across the entire corridor	Less opportunity to build ridership prior to completion of the system
Capital Cost	Less Costly	More Costly
Socio-Economic		
Proximity of Stations to Station-Area/Transit-Oriented Development	Greater opportunity for integration	Less opportunity to directly integrate
Support of Urban Form and Livability Community Goals	Both Alternatives would support goals	
Required Right-of-Way Acquisition	Slightly less ROW required	Slightly more ROW required
Potential Impact to Businesses	Similar impact to adjacent businesses due to change in access (right-in/right-out or U-turns at intersections) Also similar benefits to adjacent businesses due to increase in transit and pedestrian traffic	
Streetscape Enhancement	Less opportunity for planting in the median	More opportunities for planting in the median
Cultural Environment		
Built Heritage	No impact	
Archaeological Resources	Limited impact Any potential impact is expected in undisturbed areas (north of Dundas Street) only	
Natural Environment		
Vegetation, Designated Features/Areas	Very limited impact and similar for both options	
Fish and Aquatic Habitat and Wildlife	Impacts are similar for both options Culvert extension (or replacement) requirements will consider impact to fish habitat where necessary	
Stormwater Management	Stormwater management facilities would be similar for both options	

Both options are similar with each alternative having some advantages and some disadvantages. Overall, BRT operation in a dedicated curb lane along Trafalgar Road is preferred and has been identified as the Technically Preferred Alternative.

Auto travel time is shorter for curb lane BRT compared to auto travel time with the use of median BRT lanes. One plausible explanation is that with BRT vehicles running in the curb lane, permitted left-turn signal phasing at intersections along Trafalgar Road result in less left-turn delay for autos. However, with BRT in the median lane, permitted phasing was not allowed; therefore, left-turning autos could only use the protected (green arrow) phase, increasing delay for auto travel. As a result, with BRT in the curb lanes, left-turn traffic would have more opportunity to clear intersections during the permitted phasing and experience lower levels of delay.

A review of future traffic conditions using Paramics micro-simulation modelling indicated that with the projected increase in traffic volumes, the majority of intersections will operate with longer delays and queues without road improvements for BRT service. The results of the modelling exercise for the two transit alternatives (BRT running in the median lane and BRT running in the curb lane) indicated that both scenarios might result in similar travel time for transit vehicles, however, for auto vehicles, BRT running in the curb lane might improve travel time compared to implementation of BRT in the median. **The results of the modelling exercise are that provision for curbside BRT is recommended to be carried forward for further development of the preferred alternative.**

As shown by the evaluation completed and summarized in Exhibit 5.3, both curbside and median options are similar, with each alternative having some advantages and some disadvantages. Overall, the BRT operation in a dedicated curb lane along Trafalgar Road is preferred and was identified as the Technically Preferred Alternative.

Curb bus lanes are preferred over median bus lanes, primarily due to left-turn operation, station environment (for passengers) and opportunities for integration with and proximity to the community. With respect to accommodation of turning vehicles, both curbside and median BRT have an impact on left- and right-turn lanes. With median BRT, left-turns are required to operate on a permitted left-turn phase only, which generally reduces the overall intersection operation compared to the permissive plus protected turn phases that are allowed with curbside BRT operation. Right-turning vehicles can have an impact on the curbside lane as the right-turning vehicles can slow through traffic movements.

While curbside BRT is recommended, the recommended (Technically Preferred) Trafalgar Road corridor right-of-way width of 50m could accommodate centre median transit operations in lieu of curbside transit operations at a future point in time (based on future study), although additional right-of-way may be required in some locations.

5.3 Analysis of BRT vs. HOV Operation on Trafalgar Road

The preferred alternative solution for the Trafalgar Road corridor is identified in **Section 4.5** as a six lane cross-section with four general purpose lanes and provisions for two BRT lanes. Halton Region identified a need to review the potential for a staged approach to BRT implementation. The assessment outlined in this section was completed to assess the potential to use the BRT lanes for HOV traffic instead of, or as a phased approach to, BRT operation. As the comparison for curbside BRT with median BRT lanes identified curbside operation as the preferred alternative, the BRT/HOV assessment considers only curbside operation.

5.3.1 Elements of High Occupancy Vehicle (HOV) Lanes

HOV Lane Description

HOV lanes are designed to help move more people through congested areas. HOV lanes offer users a faster, more reliable commute, while also easing congestion in regular lanes by encouraging carpooling with more people in fewer vehicles.

The HOV lanes are identified by signs and diamond symbols on the pavement. The HOV lane can be separated from the other general traffic lanes by a striped buffer zone. Vehicles carrying at least two people may enter and exit the HOV lane only at designated points, clearly identifiable by wide and closely spaced white broken lines and diamond symbol pavement markings. Other municipalities in the GTA operate HOV lanes as well, including the City of Toronto and the City of Vaughan.

HOV Lane Hours and Days of Week Operation

For a HOV lane to be effective, it should offer users advantages, providing faster and more reliable services compared to the general traffic conditions. Longer hour per day of operation designation will have the merit of consistency, minimizing motorist confusion and enhancing enforceability and flexibility through maximizing HOV use. A longer hour per day designation would also facilitate enforcement and instill a sense of permanence in the facility. Similarly, for the arterial HOV lanes in Halton Region, the Region may consider applying the restrictions 7-days/ week. The application of this restriction can reinforce the permanence of the facility, facilitate enforcement and minimize potential for misunderstanding associated with rules that change throughout the day/week.

Vehicle Occupancy and Type

The use of HOV lanes depends on the facility, which can vary by the owner or operator policies. HOV lanes on provincial highways are reserved for any of the following passenger vehicles carrying **at least two people**, often referred to as "2+":

- Car
- Commercial truck less than 6.5 m long
- Minivan
- Motorcycle
- Taxi or limousine

Based on the City of Toronto's website, the City operates five HOV corridors with specially designated lanes on an arterial road with use restricted to qualifying vehicles (typically buses, automobiles, and trucks carrying three or more occupants, motorcycles and scooters), and usually includes taxis and cyclists. A bus of any type can use an HOV lane, even without passengers. This helps buses keep schedules to provide reliable, efficient service. Emergency vehicles are permitted to use the HOV lanes at all times.

Benefits of HOV Lanes

HOV lanes are specifically for use by carpools and buses. The lanes provide fast, reliable travel for HOV users at any time of the day - particularly during peak travel periods when other lanes can be slow and congested. As noted on the MTO website (http://www.mto.gov.on.ca/english/traveller/hov/), HOV lanes provide the following benefits:

- **"Managing Congestion:**
  An HOV lane can handle a lot of growth in demand, whereas once a general traffic lane reaches capacity, it actually moves fewer vehicles due to congestion.
- **Better Use of Infrastructure:**
  One highway lane can carry 1,500-2,200 vehicles per hour. A lane full of buses and carpools moves many more people than a general traffic lane.
- **Transit Priority:**
  Buses and transit riders have priority - transit buses can carry the equivalent of up to 57 single occupant cars

- **Providing Choices:**
  HOV lanes will make carpooling and public transit more effective and reliable choices for Ontario commuters.
- **Supporting Mobility:**
  Taxicabs and airport limousines that use HOV lanes will be able return to duty faster after dropping off a fare or arrive sooner to pick up a fare.

5.3.2 Macro-Simulation Modelling – EMME3

Traffic analyses conducted in this study were based on the Halton Region's EMME model.

Halton Region's pre-existing EMME-based travel demand model was used to generate PM peak hour travel demands in support of this EA study's analysis of Trafalgar Road BRT and HOV operations. As the Halton Model is predominantly focused on simulating automobile travel with only basic transit modelling capabilities, the Trafalgar corridor traversal demand matrices were extracted from the Halton Regional Model and used as an input to the Paramics-based micro simulation model of the Trafalgar corridor (refer to **Section 5.3.3**). The Halton Model, which has been calibrated to a 2006 base year, is designed to provide forecasts of auto travel demands on the major roadway system within Halton. It has been recently used to support the most recent updates to Halton Region's "Transportation Master Plan (2031) – The Road to Change" and the Town of Oakville's "Switching Gears" Transportation Master Plan.

The Halton Model was used to test the following four scenarios in support of the Trafalgar EA study:

1. 2021 BRT
2. 2021 HOV
3. 2031 BRT
4. 2031 HOV

The scenarios assume either full build out of BRT or HOV lanes along Dundas Street (from Brant Street to 9th Line) and Trafalgar Road (from Highway 407 to Iroquois Shore Road). Both Dundas Street and Trafalgar Road are modelled with four general purpose lanes (GPL) that are available to all vehicle types and either two BRT or HOV lanes that are only available to buses or buses/ carpools respectively. The remainder of the 2021 and 2031 networks are consistent with the network phasing detailed in the Halton Region TMP.

The Halton Model makes use of land use forecasts that are consistent with Halton Region Best Planning Estimates (BPE), which were approved in July 2011. The BPE's population and employment numbers for 2021 and 2031 are used to generate travel demands for Halton Region and surrounding areas. The land use projections are used to determine how many trips are produced from and attracted to each of the model's traffic zones (i.e. in the PM peak hour, trips are produced from a person's place of work and attracted to a person's home).

Exhibit 5.4 summarizes the Halton Model's overall policy transit mode splits (TMS) for each network scenario (i.e. average values for all Halton trips).

Exhibit 5-4. Transit Model Splits (TMS) by Network Scenario

Scenario	Overall Halton TMS[3]	Internal Halton TMS
2021 BRT	10%	6%
2021 HOV	6%	3%
2031 BRT	20%	11%
2031 HOV	10%	6%

[3]. *Includes transit trips both within Halton and between Halton and other external locations (primarily regional travel via GO Transit).*

The Halton Model assigns higher than average mode splits to zones where transit improvements are planned for the future and lower than average mode splits to zones where there are limited opportunities for improved transit. Consequently, the Halton Model has higher than average transit mode splits in the vicinity of the Trafalgar BRT corridor[4] **(Exhibit 5.5)**.

Exhibit 5-5. Transit Mode Split (TMS) by Network Scenario

Scenario	All Corridor Trips[5]	Internal Corridor Trips[6]
2021 BRT	19%	9%
2021 HOV	14%	5%
2031 BRT	31%	21%
2031 HOV	18%	9%

The predicted local transit demand was compared between each scenario and the relative increase in demand over the existing base case was assigned to a new North-South bus service that was assumed to run the full length of the Trafalgar corridor. In order to accommodate the forecasted increase in transit demand, it was determined that the headway for the new North-South bus service was required to be 10 minutes in 2031 and 15 minutes in 2021.

5.3.3 Paramics Micro-Simulation Modelling – Curbside BRT vs. Curbside HOV

A Paramics micro-simulation model was prepared to evaluate future BRT and HOV operating alternatives, including a comparison of BRT and HOV network alternatives for the Trafalgar Road Corridor for interim and ultimate operation (i.e., horizon years 2021 and 2031, respectively). This assessment looked at the potential benefit to first implement HOV lanes as a staged approach to BRT implementation.

The modelling results indicate that most of the key intersections are expected to operate at overall LOS E or better under all scenarios. In the year 2021, BRT and HOV scenarios will operate at very similar LOS at all intersections. In addition, the analysis shows the average travel time for general traffic will be marginally shorter with the implementation of HOV in 2021, compared to the implementation of BRT in 2021. ***A six lane cross-section with four general purpose lanes and two curbside HOV lanes can be carried forward as the preferred option for Horizon Year 2021.***

The assessment results show that for Horizon Year 2031, the majority of key intersections along the Trafalgar Road corridor are expected to operate better under the BRT option. The average travel time for both general traffic and transit will be less with implementation of curbside BRT, compared to HOV lanes. This is based on the increased modal shift to transit being met and relative static growth in autos and attraction of additional HOV traffic to the study area. Relative to the forecast for 2031 versus 2021, the ***BRT option retains its attractiveness as the ultimate solution, and can be carried forward as the preferred option before Horizon Year 2031***.

5.3.4 Safety Review – Curbside BRT, Median BRT, Curbside HOV

An assessment of the impacts of each design alternative was undertaken. As per TCRP Report 90[7], the placement and design of bus lanes and median bus-ways on streets and roads should take into account the diverse needs of buses, motorists, delivery vehicles, pedestrians, and turning and crossing traffic. Based on findings from a literature search, and

[4]. *Defined as a zone within approximately 1km to the east or west of Trafalgar Road between Highway 407 in the north and Cornwall Road in the south.*
[5]. *Includes transit trips that start or end in the vicinity of the Trafalgar corridor.*
[6]. *Includes transit trips that start and end in the vicinity of the Trafalgar corridor.*
[7]. *TCRP Report 90 Bus Rapid Transit – Volume 1: Case Studies in Bus Rapid Transit*

with realistic assumptions, a road safety assessment of design alternatives was conducted. The assessment found that there is only a minimal difference between the safety performance of curbside BRT, median BRT and HOV. In other words, safety is not considered to be a deciding factor in selecting one alternative over the other.

5.4 Network Improvement Strategies

Several network improvement strategies were examined to determine possible options for improving network operations at intersections for both transit and general traffic where prior analysis identified operational issues. Either the Synchro software package or micro-simulation modelling techniques (Paramics) were applied depending on the complexity of the analysis scenario. This section outlines the details of the assessments, the assessment results, and the recommendations for implementing the proposed improvement. They included the following:

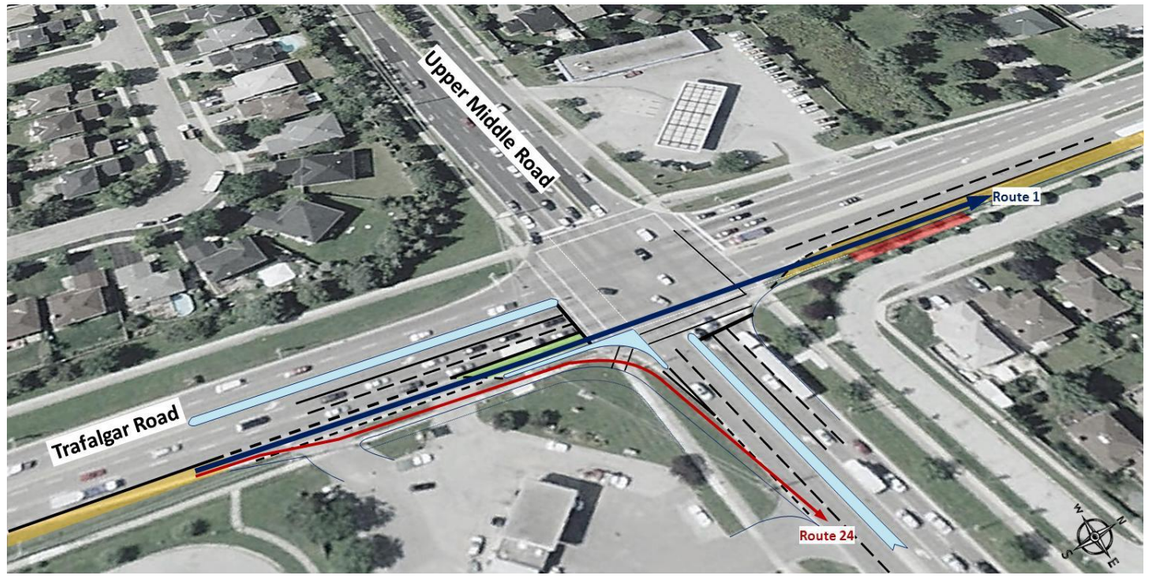
- channelized right-turns for transit priority;
- transit priority at Oak Park Boulevard and Dundas Street;
- transit priority southbound from Leighland Avenue to the Oakville GO Station;
- intersection improvements (Trafalgar Road/ Cornwall Road); and
- intersection improvements (Trafalgar Road / Dundas Street Intersection).

5.4.1 Channelized Right-Turns for Transit Priority

This option was tested at the Upper Middle Road/ Trafalgar Road intersection, for the northbound travel direction, to identify possible network benefits and determine whether this option should be examined at other intersections. An exclusive northbound right-turn was implemented as a separate channel to facilitate the northbound right-turn traffic. The northbound through lane next to the right-turn lane was dedicated only to buses and HOV vehicles. **Exhibit 5.6** illustrates a concept layout of the 'Channelized Right' arrangement overlaid on aerial mapping.

The assessment results compare travel times to the conventional 'Queue Jump' arrangement. The comparison of travel times demonstrates that although the buses will benefit from this channelized right-turn option, the northbound through traffic for other vehicle types will be adversely affected and the actual benefit arising from time saving for providing this solution may be minimal once factors such as direction of travel, mode of travel (i.e., buses), network optimization and ITS are taken into consideration. Through further sensitivity analysis on the exclusive northbound channelized right-turn option, the impacts are sufficient to remove this option (right-turn channelization) from further consideration at other intersections. The conventional "Queue Jump" is thus a preferred option.

Exhibit 5-6. Channelized Right-Turn Lane Conceptual General Arrangement



5.4.2 Transit Priority at Oak Park Boulevard and Dundas Street

Oakville Transit will continue to use Oak Park Boulevard to access the Uptown Core Station. As the delay observed for eastbound traffic along Dundas Street is significant, transit priority should be considered for buses travelling from eastbound to north bound (left-turn) at the Trafalgar Road/ Dundas Street East intersection.

5.4.3 Transit Priority Southbound from Leighland Avenue to the Oakville GO Station

Potential extension of the proposed southbound HOV lane from Leighland Avenue to Cross Avenue at the Oakville GO Station was assessed during the Alternative Methods phase of the study. For this alternative, roadway widening was not assumed; the existing lanes were assumed to accommodate the HOV lanes, due to the high cost to add additional lanes in this section. Micro-simulation modelling techniques (Paramics) were applied to evaluate the option.

As indicated in the **Exhibit 5.7**, the implementation of the HOV lane south of Leighland Avenue is expected to increase the travel time of the general traffic for the entire road section between Highway 407 eastbound off-ramp and Cornwall Road. The travel time increase mainly occurs between the section of Highway 407 eastbound off-ramp and Leighland Avenue. The HOV lane extension south to Cross Avenue was therefore not recommended for implementation, due to the significant adverse impact imposed on the general purpose southbound traffic travelling along the Trafalgar corridor. Other issues may also emerge should HOV lanes be extended south of Leighland Avenue, such as usage enforcement. In addition, the spacing between intersections and ramp terminals is also very limited constraining this section further. Therefore, it was identified that the HOV lane would need to terminate north of Leighland Avenue.

The initiation point for the HOV / transit lane north of Leighland Avenue will be determined and confirmed prior to implementation in consultation with the Town of Oakville and the Ministry of Transportation, and subject to additional traffic analysis to confirm acceptable traffic operations on Trafalgar Road.

Exhibit 5-7. Southbound HOV Lane Extension to Cross Avenue – Comparison of Average Travel Time (Scenario: Year 2031 HOV)

Section	2031 PM Peak Travel Time (seconds)		
	HOV (end at Leighland)	*HOV (end at Cross Avenue)*	*Percentage Increase after the Extension of HOV lane (From Leighland Ave. to Cross Ave.)*
SB *(Between Hwy 407 and Cornwall, entire section)*	1600	1900	+19%

As discussed in **Section 2.4.3.5**, the Midtown Oakville Class EA Study recommends that BRT will be routed to an alternate North-South crossing of the QEW, connecting to an extension of Cross Avenue, and then proceed to the Oakville GO Station on the east side of Trafalgar Road. In the interim period, transit priority at Leighland Avenue / Iroquois Shore Road is recommended to provide an opportunity for southbound transit vehicles to queue jump on Trafalgar Road. Under interim conditions, when southbound traffic has a green signal at the intersection, transit vehicles can remain in the curb lane and proceed through the intersection. In the red signal phase, transit vehicles can shift to the right-turn lane and proceed to the front of the queue as the right-turn traffic dissipates. The transit vehicle is then given the next separate green phase to complete the queue jump, just prior to the other southbound traffic being given a green indication.

Signal phasing and timing requirements will be determined during Detail Design in consultation with the Town of Oakville and the Ministry of Transportation to ensure acceptable operations are maintained on Trafalgar Road, particularly for the northbound travel lanes, where queues would have the potential to impact the QEW ramp terminals.

5.4.4 Intersection Improvements (Trafalgar Road/Cornwall Road)

The southwest corner of the Trafalgar Road/Cornwall Road intersection currently has a large channelized island. The island limits the ability for the Region to implement pedestrian crossing warning systems, such as those systems used by the visually impaired. As a result, the Region asked that a separate assessment be conducted to review the impacts to traffic operations should the channelized island be removed.

Turning movement counts and the signal timing plan obtained from the Region were used in the assessment. After the removal of right-turn islands, the signal timing split was adjusted while the cycle length was kept the same as the existing cycle length. The intersection operation was analyzed using Synchro v.7, which employs the analysis procedures from the Highway Capacity Manual 2000.

As indicated in the **Exhibit 5.8** below, which summarizes the Synchro assessment output, the average delay at this particular intersection, with the channelized island removed, is slightly increased by approximately 1 second during AM peak and 4 seconds during PM peak. The eastbound double left movement may experience longer delays; however, these incremental increases in delay are marginal compared to existing conditions. Therefore, removal of the right-turn channelization at this intersection will have negligible impacts on overall operating conditions, while providing for improved safety for pedestrian crossings.

Exhibit 5-8. Operational Assessment With and Without Right-Turn Channelized Island

Intersection	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Average Delay (s)	Overall V/C (LOS)	Critical Movement (V/C ≥0.85 or LOS≥D)	V/C	Delay (s)	LOS	Average Delay (s)	Overall V/C (LOS)	Critical Movement (V/C ≥0.85 or LOS≥D)	V/C	Delay (s)	LOS
Signalized Intersections												
Existing*	30	0.67 (C)	EBTR WBL WBT WBR	0.65 0.16 0.49 0.51	42 40 46 47	D D D D	33	0.71 (C)	EBTR WBL WBT WBR	0.43 0.25 0.59 0.80	35 35 44 59	D D D E
Existing** *(after removing the right-turn channel at NE and SW corner)*	31	0.70 (C)	EBLL EBTR WBL WBTR	0.81 0.61 0.15 0.74	43 40 36 50	D D D D	37	0.79 (D)	EBLL WBTR NBTR	0.90 0.89 0.53	55 55 37	E E D

Notes: **Based on existing signal timing plan*
*** Based on existing signal timing plan and adjusted signal split only*

In addition to reviewing the geometry of the southwest quadrant of the intersection, the geometry of northwest quadrant was reviewed to see whether the large island could be removed. This geometric change would result in the removal of the channelized right-turn that has free-flow movement to Trafalgar Road, and instead right-turn movements would be subject to a stop condition at the intersection stop bar. The primary reason for the review is the concern for pedestrian safety when crossing the channelized right-turn. Speeding issues have been identified for the westbound right-turn movements from Cornwall Road to Trafalgar Road, in part because of the large radius over the channelized right-turn lane that leads to its own lane on Trafalgar Road. There are no stop or yield signs to force traffic to slow, and the geometry of the turn does not require a significant drop in speed to complete the manoeuvre.

Although passenger vehicles could be accommodated with the removal of the island, the turn is made by large vehicles, buses and transport trucks which would not be accommodated by this geometric change. The assessment showed that the island is required to accommodate the turning movement for large vehicles, and this is due to the skew angle of the intersection, where the angle between the east approach of Cornwall Road and the north approach on Trafalgar Road is less than 90 degrees. To address pedestrian safety concerns, Halton Region will install raised painted strips in the right-turn lane on Cornwall Road, making the approach to the turn “rough”, indicating to vehicles they should slow as they approach to make the right turn. These raised painted strips are identified in Plate 1 of the preliminary design drawings at the end of **Section 7**.

In addition to the removal of the island, the Region plans to install audible pedestrian signals and detectable warning plates at the Trafalgar Road/Cornwall Road intersection. Audible pedestrian signals are also proposed to be installed at the Cornwall Road/ Reynolds Street intersection in consultation with the Town of Oakville. The audible pedestrian signals will assist the visually impaired with crossing at these intersections, as will the detectable warning plates, which identify to the pedestrian the direction of the crosswalk. Both intersection enhancements are identified in Plate 1 of the preliminary design plans at the end of **Section 7**.

5.4.5 Intersection Improvements (Trafalgar Road/Dundas Street Intersection)

Prior assessments of the Trafalgar Road/Dundas Street intersection indicated that the future intersection operation may require grade separation[8]. The model assumptions used in this analysis incorporated the current EMME results for the HOV scenarios in conjunction with updated micro-simulation network which considered the HOV lane scenario. For this reason an updated assessment of the Trafalgar Road/Dundas Street intersection was completed to assess required improvements.

Synchro software was used for the assessment of the critical PM peak hour for the following scenarios:

- Existing condition (2009 TMC Data and existing lane configurations),
- 2021 Do Nothing (existing lane configurations),
- 2021 HOV scenarios (additional EB left-turn, additional NB right-turn and additional EB/WB/SB/NB thru lanes for HOV),
- 2031 Do Nothing (existing lane configurations), and
- 2031 BRT scenarios (additional EB left-turn, additional NB right-turn and additional EB/WB/SB/NB thru lanes for BRT).

For the future Do Nothing scenarios, a growth rate averaging 2% per annum compounded annually was applied to the existing conditions to obtain the year 2021 and 2031 traffic volumes.

For the remaining future scenarios (2021 HOV and 2031 BRT), simulated traffic turning movement output from the Paramics micro-simulation modelling software were assumed to be representative of the projected future traffic volumes at the intersection.

Existing Traffic Conditions

As indicated in **Exhibit 5.9**, the existing traffic condition[9] is operating at poor LOS F exceeding capacity (v/c ratio>1).

Exhibit 5-9. Existing Traffic Operations

Scenario	Intersection	Movement	PM Peak Hour			
			Volume	*V/C*	*LOS*	*Delays*
Existing	Trafalgar Road/ Dundas Street	E	1367	-	E	75
		W	1737	-	F	98
		N	919	-	E	63
		S	1186	-	E	76
		Overall	**5209**	**1.29**	**F**	**81**

*Note: * Assessment used existing Halton Region signal timing plan*

It should be noted that improvements at this intersection are currently being implemented by Halton Region as part of the widening of Dundas Street to 6 lanes.

Year 2021 Traffic Conditions

For the year 2021 assessment, it was assumed that the signal timing split would be optimized to best fit demand, while the cycle length would remain the same for all scenarios. As noted previously, the Do Nothing Assessment does not include any intersection improvements.

For the two HOV scenarios the proposed intersection improvements included in the assessment are: additional EB left-turn (modify it into double EBL lane configurations), additional NB right-turn (modify it into an exclusive NB right-turn lane) and additional EB/WB/SB/NB through lanes.

Due to the limitations of the software in modelling HOV lanes, two extreme conditions were modelled to assess HOV operations:

1. HOV lane accommodates general purpose traffic. In this scenario the HOV lanes along both Trafalgar Road and Dundas Street are assumed to accommodate general traffic (i.e., the HOV lanes will accommodate every vehicle type with no restrictions on trucks, or vehicles with less than two passengers as would typically be restricted in an HOV lane); and
2. The HOV lane does not accommodate any traffic. HOV lanes along both Trafalgar Road and Dundas Street will not take any traffic and the HOV lanes are actually removed from the analysis (i.e., 2 through lanes along all approaches).

In the above two HOV scenarios the following intersection improvements are included at the Dundas Street and Trafalgar Road intersection: dual EBL and 2 NBT and 1 NBR. This is an improved intersection configuration in comparison with the Do Nothing scenario, which has a single EBL and 1 NBT, 1 shared NBTR. The actual expected 2021 operating conditions with HOV lanes in place is assumed to fall in between these two scenarios.

The traffic assessment work demonstrated that the 2021 HOV scenario would operate better in comparison with the 2021 Do Nothing Scenario. As indicated in **Exhibit 5.10**, the future 2021 Do-Nothing traffic conditions will continue to deteriorate and operate at a poor LOS F, exceeding capacity. Compared with the existing conditions, without any road improvements, this intersection will operate with longer delays and increased congestion. With introduction of the HOV lane and additional road improvements, the operation of the intersection will improve to between LOS D and E, with reduced delay.

8. Town of Oakville Growth Areas, Transportation Report, Town of Oakville, December 2009.
9 Data used in this Existing Conditions analysis was collected in 2009.

Exhibit 5-10. Year 2021 Traffic Operations

Scenario	Intersection	Movement	PM Peak Hour			
			Volume	*V/C*	*LOS*	*Delays*
2021 Do-Nothing	Trafalgar Road/ Dundas Street	E	1504	-	F	91
		W	1889	-	F	142
		N	1208	-	F	129
		S	1711	-	F	134
		Overall	**6312**	**1.44**	**F**	**125**
2021 HOV *(assuming HOV lanes open to general traffic)*	Trafalgar Road/ Dundas Street	E	1383	-	D	47
		W	1567	-	D	43
		N	1346	-	D	42
		S	1481	-	D	50
		Overall	**5777**	**0.92**	**D**	**46**
2021 HOV *(assuming HOV lanes takes **NO** traffic)*	Trafalgar Road/ Dundas Street	E	1383	-	E	61
		W	1567	-	E	76
		N	1346	-	F	87
		S	1481	-	E	80
		Overall	**5777**	**1.16**	**E**	**76**

Year 2031 Traffic Conditions

For the year 2031 assessment, it was assumed that the signal timing split would be optimized to best fit demand, while the cycle length would remain the same under all scenarios. As noted previously, the Do Nothing Assessment does not include any intersection improvements. For the BRT scenario, the proposed intersection improvements included in the assessment are: additional EB left-turn (modify it into double EBL lane configurations), additional NB right-turn (modify it into an exclusive NB right-turn lane) and additional EB/WB/SB/NB thru lane

As indicated in **Exhibit 5.11**, under the Do Nothing scenario, future 2031 traffic conditions will operate with very long delays and poor LOS, exceeding capacity. With the implementation of BRT lanes, which were assumed to allow buses only along the Trafalgar Road corridor, the intersection will operate with improved LOS D and a v/c ratio below 1.0 (below capacity).

Exhibit 5-11. Year 2031 Traffic Operations

Scenario	Intersection	Movement	PM Peak Hour			
			Volume	*V/C*	*LOS*	*Delays*
2031 Do-Nothing	Trafalgar Road/ Dundas Street	E	1629	-	F	135
		W	2026	-	F	217
		N	1516	-	F	212
		S	2322	-	F	222
		Overall	**7493**	**1.72**	**F**	**200**
2031 BRT	Trafalgar Road/ Dundas Street	E	1094	-	D	55
		W	1304	-	D	48
		N	910	-	D	43
		S	949	-	E	66
		Overall	**4257**	**0.97**	**D**	**53**

In conclusion, the intersection of Trafalgar Road/ Dundas Street under the Do Nothing scenario (without any road/transit improvements), will deteriorate and operate at poorer a LOS than that of the existing conditions. However, with the HOV lanes introduced in year 2021 and BRT lanes introduced in 2031, coupled with the noted road improvements, this intersection will operate better than that of the existing conditions in terms of improved LOS and v/c ratios.

5.4.6 Midtown Oakville Class EA Study Recommended Improvements

There was significant co-ordination between the Town of Oakville and Halton Region in conducting both the Town's Midtown Oakville Class EA Study and the Region's Trafalgar Road Study. Of greatest significance to the Trafalgar Road Study is that north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations, described below.

The study area has limited existing pedestrian and cycling infrastructure. Through discussions with MTO, a VISSIM microsimulation model was developed to assess the operations of the QEW mainline and ramp terminals at the interchange that provide access to Midtown Oakville – Trafalgar Road and Royal Windsor Drive.

The observed traffic in the Midtown Oakville area indicates capacity constraints and congestion at peak periods. The study showed that the existing municipal road network does not have enough reserve capacity to accommodate full build-out of Midtown Oakville, and that transit service on Trafalgar Road and Cross Avenue will be significantly impacted by traffic delays on the road network. As a result, transportation infrastructure improvements are required.

The preferred concept is comprised of various elements including:

- A new North-South Crossing of the QEW with designated transit lanes
- Improvements to the Trafalgar Road QEW interchange
- Cross Avenue extension
- Iroquois Shore Road widening
- Improvements to Royal Windsor Drive interchange and extension of Royal Windsor Drive
- New pedestrian / cycling connections and facilities
- Improvements to transit connections and new transit facilities

5.4.7 Grade-Separated Pedestrian Facilities

As identified in the Midtown Oakville Class EA Study, additional links for pedestrians and cyclists are provided by two grade-separated, active transportation crossings of the QEW – one west of Trafalgar Road and one east of Trafalgar Road. These crossings will meet required accessibility design standards and enhance the safety of those wishing to cross the QEW on foot or by bicycle. These active transportation crossings provide pedestrians and cyclists with alternatives for crossing the QEW and improved access to transit.

Other future grade-separated pedestrian crossings identified by the Town of Oakville in their Active Transportation Master Plan (2009) are proposed to be located near the following intersections with Trafalgar Road:

- Speers/Cornwall
- Go Rail Line (adjacent to the CN Rail Tracks)
- Leighland Avenue
- White Oaks Boulevard
- Glenashton Drive
- Dundas Street, both for crossing Trafalgar Road, and for crossing Dundas Street.

The general locations of these facilities are identified in **Plates 1 to 22** at the end of **Section 7**.

5.5 On-Street Parking North of Dundas Street

The North Oakville East Secondary Plan identifies on-street parking north of Dundas Street in compliment with centre median BRT operations. Halton Region has committed to protect right-of-way for the provision of on-street parking and centre median BRT north of Dundas Street. Opportunities to provide parking on adjacent streets and/or off-street parking will be explored as part of the planning review process for all land development proposals. On-street parking will be considered where appropriate and ultimately will be subject to Halton Region's review and approval.

5.6 The Recommended Alternative Design Concept

The assessment of the alternative designs concepts resulted in the following recommendations:

- A six lane cross-section with four general purpose lanes with provisions for two curbside HOV / BRT lanes;
- Other network improvement strategies including:
    - Provision of transit priority measures
    - Transit priority for transit vehicles travelling southbound on Trafalgar Road south of Leighland Avenue to the Oakville GO Station
    - Intersection improvements at Trafalgar Road/Cornwall Road including removal of the channelization island in the southwest corner, addition of raised painted strips in the westbound to northbound channelized right-turn lane, and addition of audible pedestrian signals

Several potential network improvement strategies were assessed, but were not recommended, including:

- channelized right-turns for transit priority
- removal of the channelization island in the northeast quadrant of Trafalgar Road/Cornwall Road

On-street parking lanes will be protected for north of Dundas Street, subject to Halton Region's review and approval during detailed design, as well as the long term provision to not preclude the opportunity for median BRT north of Dundas Street.

.

6. Project Consultation Process

6.1 Purpose and Objectives of the Consultation Process

The involvement of the community – residents, stakeholders and those who may be potentially affected by a project – is an integral part of the Class EA process. The purpose of the EA Study consultation process is to provide an opportunity for stakeholder groups and the public to gain an understanding of the study process; contribute to the process for development and selection of alternatives; and provide feedback and advice at important stages in the EA process. Specifically, the consultation efforts had the following objectives:

- Generate awareness of the project and provide opportunities for involvement throughout the planning process; and
- Facilitate constructive input from public and agency stakeholders at key points in the EA process, prior to decision-making.

6.2 Public Involvement

Public and stakeholder involvement is a key component in the development and completion of Class EAs. Local knowledge, issues, concerns and suggestions provide invaluable information for the process and ultimately the completion of this study with the best possible solution.

Three primary means for consulting public stakeholders were used throughout the study:

- PICs;
- Stakeholder meetings and individual meetings with specific property owners; and
- Notices and newsletters mailed to the individuals on project mailing list.

A summary of key points of contact is provided in **Exhibit 1.3**.

6.2.1 Stakeholder Mailing List

At the initiation of this study, a stakeholder mailing list was created from residents and businesses within the Study Area as well as interested agencies. Based on available municipal information, a list of 411 property owners with land adjacent to Trafalgar Road within the Study Area was compiled in August 2009. Throughout the study, this list was used to notify stakeholders of study milestones and upcoming public consultation events. The list was updated regularly.

6.2.2 Notice of Study Commencement

A Notice of Study Commencement was placed in the following newspapers:

- *Oakville Today* on Thursday, November 26, 2009 and Thursday, December 3, 2009
- *Oakville Beaver* on Friday, November 27, 2009 and Friday, December 4, 2009
- *Halton Compass* on Thursday, November 26, 2009 and Thursday, December 3, 2009

The Notice announced the Study Commencement, outlined the study purpose and rationale, solicited comments, and invited the public to participate in the study. Contact names were provided in the notice, from whom the public could obtain additional information if desired. See **Appendix A** for a copy of the notice.

6.2.2.1 Study Notification Letter & Newsletter #1

A Study Notification Letter and Newsletter were mailed to the adjacent property owners on November 20, 2009 informing them of the study and soliciting their comments and interest in participating in the Class EA process. In addition, adjacent property owners were invited to participate in the Class EA process as a member of the Stakeholder Group (see **Appendix A** for a copy of the letter). The purpose of the Stakeholder Group was to solicit comments from potentially affected property owners and special interest groups. Seventeen property owners/interest groups indicated an interest to participate as a member of the Stakeholders Group.

6.2.3 Public Information Centre (PIC) #1 – June 16, 2010

Public Information Centre (PIC) #1 was held on Wednesday, June 16, 2010 at the Town of Oakville – Town Hall, South Atrium (1225 Trafalgar Road, Oakville) from 6:30 p.m. until 9:00 p.m. A drop-in centre was held from 6:30 p.m. to 7:00 p.m. to allow the public time to view the information panels and ask questions of the project team. The presentation started at 7:00 p.m. followed by a question and answer period.

A notice advertising the PIC was published in the *Oakville Beaver* on June 3, 2010 and June 11, 2010. The notice was also posted on the Halton Region website and mailed to individuals on the project mailing list on May 31, 2010.

The purpose of the meeting was to review and obtain public input on the problem being addressed, background information and planning alternatives being considered.

Sign-in sheets, comment sheets and presentation materials were available at the PIC. 26 people signed the registrar and five comment sheets and one email were received by the requested submission date of June 30, 2010. Key issues raised by respondents at/following the PIC generally consisted of the following:

- Public and external agencies were generally supportive of the recommended solution to widen to allow four general purpose lanes (GPLs) and two BRT lanes.
- General consensus was that current congestion levels are frustrating for local residents and commuters
- The majority of questions related to understanding the study process.
- Concerns/questions raised included:
    - Property loss (values and impact)
    - Resolving the noise barrier wall issue (where and when the walls will be built)
    - Pedestrian and cyclist access (accommodating Sheridan College pedestrian access was a key concern)
    - Transit should be the highest priority
- Clear consensus on limiting widening to six lanes and keeping ROW footprint to a minimum with priority to improved transit

A detailed summary report of PIC#1 is contained in **Appendix A.**

6.2.4 Stakeholder Group Meeting

Halton Region established a Stakeholder Group comprised of representatives of local residents, businesses and ratepayers groups, etc., to provide input to the project team. On November 20, 2009, landowners along Trafalgar Road were invited to join the Stakeholder Group. The invitations were mailed to the property owners along Trafalgar Road within the Study Area. As previously noted, seventeen property owners/interest groups indicated an interest to participate as a member of the Stakeholder Group.

The first meeting was held June 3, 2010, and fourteen people attended. The purpose of the meeting was to provide an overview of the study, including: relevant planning documents, existing conditions in the study area, future population and employment growth, transportation conditions, problems and opportunities identified, and the alternative solutions considered for the study area. This information was provided in a presentation format, followed by a question/answer and discussion session. Following the first Stakeholder Group Meeting it was decided that individual meetings as required with affected property owners would replace future Stakeholder Group meetings.

The PIC#1 summary report located in **Appendix A** provides minutes of the Stakeholder Group Meeting.

6.2.5 PIC #2 – November 24, 2011 (joint meeting with Dundas Street Improvements EA)

PIC #2 was held on Thursday, November 24, 2011, jointly with the Dundas Street Class EA Study at the Halton Regional Centre – North/South Auditoriums (1151 Bronte Road, Oakville) from 6:30 p.m. until 9:00 p.m. A drop-in centre was held from 6:30 p.m. to 7:00 p.m. to allow the public time to view the information panels and ask questions of the project team. A presentation related to Dundas Street was held at 7:00 pm, following which a Trafalgar Road presentation was held at 7:30 p.m. and subsequent question and answer period.

A Notice advertising PIC#2 was posted on the Halton Region website and published in the following local newspapers:

- *Burlington Post*: Friday, November 11, 2011 and Friday, November 18, 2011
- *Oakville Beaver*: Friday, November 11, 2011 and Friday, November 18, 2011

The Notice was mailed to property owners within the Study Area, members of the public who had signed in at the previous PIC, individuals on the project contact list, technical agencies (federal, provincial and municipal) and utility companies identified at the onset of the study.

The purpose of this PIC was to provide an opportunity for residents, businesses, agencies and other interested individuals to review the preliminary preferred alternative (curb lane BRT), potential elements of BRT facilities and next steps.

Sign-in sheets, comment sheets and presentation materials were available at the PIC. Approximately 38 people signed in at the PIC (not including staff from technical agencies and councillors), and two comment sheets were collected.

Key issues raised by respondents at/following the PIC generally consisted of the following:

- Recommended Alternative was generally well received by the public.
- Concern with whether or not curb lanes would be HOV lanes as an interim before BRT routes fully develop.
- Comments/concerns included: BRT service should be cheaper than parking for the GO train service, implementation of an express bus to the GO Station, efficiency/frequency of service (i.e., evening service), traffic/gridlock at Oakville GO station.

A PIC#2 summary report containing the text panels is included in **Appendix A**.

6.2.6 Newsletter #2 (December 10, 2012)

A Newsletter was mailed on December 10, 2012 to property owners within the Study Area, members of the public who had signed in at the previous PIC, individuals on the project contact list, technical agencies (federal, provincial, municipal) and utility companies. The purpose of the newsletter was to provide an update on the study and the implementation of High Occupancy Vehicle (HOV) lanes in advance of BRT lanes as transit ridership builds in Oakville. A copy of the Newsletter is located in **Appendix A**.

6.2.7 Study Information Update Letter (February 20, 2013)

In February 2013, it was recommended that due to ongoing studies by the Town of Oakville and Metrolinx within the Study Area that PIC#3 should be deferred to the fall of 2013; recommendations from these studies would provide important input to the finalizing of recommended improvements in the south portion of the Trafalgar Road Corridor.

On February 20, 2013, Halton Region issued a letter to property owners, individuals on the project contact list, technical agencies and utility companies to notify them of the deferral of PIC#3 to the fall of 2013. The project website was also updated to reflect the change of the PIC date. A copy of the letter is located in **Appendix A**.

6.2.8 PIC #3 – December 4, 2013

PIC #3 was held on Wednesday, December 4, 2013 at the Town of Oakville – Town Hall, South Atrium (1225 Trafalgar Road, Oakville) from 6:30 p.m. until 8:30 p.m. The format was drop-in style to allow the public time to view the information panels and ask questions of the project team.

A notice advertising the PIC was published in the *Oakville Beaver* on November 22, 2013 and November 29, 2013. The notice was also posted on the Halton Region website and mailed on November 15, 2013 to property owners within the Study Area and members of the public who had signed in at the previous PIC, individuals on the project contact list, technical agencies (federal, provincial and municipal) and utility companies identified at the onset of the study.

The purpose of the third PIC was to provide an opportunity for residents, businesses, agencies and other interested individuals to view the preliminary design and the implementation strategy for improvements including the provision of four general purpose lanes allowing for transition to curb lane HOV/transit operations in the future, and the long-term transition to BRT.

Sign-in sheets, comment sheets and presentation materials were available at the PIC. Approximately twenty-five (25) people signed the registrar (not including Town of Oakville staff and councillors). Six comment sheets, one letter and one email were received by the requested submission date of December 20, 2013.

Key issues raised by respondents at/following the PIC generally consisted of the following:

- Would like all of the projects along Trafalgar Road to be consolidated into one plan
- Concerned that improvements will attract more traffic
- Concerned about the safety of HOV/Transit lane beside the curb
- Concerned about noise levels above 60 dBA along the corridor and would like noise walls to extend further along side streets
- Would like to see other regional roads widened
- Concerned about speed along Trafalgar Road
- Concerned about pedestrian and cyclist safety and whether the multi-use trail should serve as a sidewalk
- Concerned about signal timing for pedestrians and cyclists
- Interested in bike lanes south of the QEW
- Concerned about re-vegetation and removal of mature trees

A detailed summary report of PIC#3 is contained in **Appendix A**.

6.2.9 Meeting with Private Property Owners

A letter invitation to meet with Halton Region was issued on May 8, 2014, to property owners who are expected to be impacted by the project. It was noted that the purpose of the meeting was to review the preliminary design and discuss the potential impacts to their respective property.

Individual property owners with significant impacts were individually contacted to discuss the EA study process, the preliminary design details and associated potential impacts to their respective properties. Opportunities to mitigate potential impacts to the property owner's land were discussed, and were noted to be refined during detailed design. It was also noted that negotiations to purchase property would commence following detailed design of the project. Letters to property owners and meeting minutes are included in **Appendix A**.

6.3 Technical Agencies

The following external ministries, municipalities, agencies and authorities were contacted at the project initiation stage or through correspondence during the Study notifying them of the project commencement and requesting their comments and interest in participating in the Study. Relevant agency correspondence is included in **Appendix A**.

6.3.1 Agency Contact List

A list of external agencies thought to be possibly affected or interested in the project was compiled in August 2009, including regional and local municipal departments, provincial ministries, federal departments, the local conservation authority, and various utility companies. A list of agencies contacted is provided in **Exhibit 6.1**. This list was updated throughout the study to ensure that it remained current.

Exhibit 6-1. Agency Contact List

Provincial Agencies

- Ministry of Aboriginal Affairs
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Attorney General
- Ministry of Culture
- Ministry of Municipal Affairs and Housing
- Ministry of Health and Long Term Care
- Ministry of the Environment
- Ministry of Natural Resources
- Ministry of Transportation
- Ministry of Energy and Infrastructure
- Ontario Provincial Police
- Member of Provincial Parliament

Federal Agencies

- Canadian Environmental Assessment Agency
- Environment Canada
- Fisheries and Oceans Canada
- Indian and Northern Affairs Canada
- Member of Parliament
- Transport Canada, Marine Safety
- Canada Coast Guard
- Canadian Transportation Agency
- CN Rail

Municipal

- Halton Region, including:
  - Ambulance Services
  - Halton Agricultural Advisory Committee
  - Halton Ecological & Environmental Advisory Committee
  - Heritage Services
  - Police Services
- Town of Oakville, including:
  - Clerk
  - Engineering and Construction
  - Fire
  - Parks and Open Space
  - Planning Services
  - Oakville Transit
  - Ward 3, 5, 6 Councillors

Key Stakeholders

- 407 Express Toll Route (ETR)
- Conservation Halton
- GO Transit
- Metrolinx
- Halton Catholic District School Board
- Halton District School Board
- Halton Federation of Agriculture
- Ontario Realty Corporation
- Utilities, including:
  - Allstream
  - AT&T Canada
  - Bell Canada
  - Cogeco Cable Systems Inc.
  - Enbridge Pipelines Ltd.
  - Hydro One Networks Inc.
  - Microcell
  - Oakville Hydro
  - Telus
  - Trans Canada Pipelines
  - Trans-Northern Pipelines Inc.
  - Union Gas

6.3.2 Notice of Study Commencement

External agencies were contacted through a Study Notification Letter mailed on November 20, 2009 (see **Appendix A** for a copy of the letter). The purpose of the letter was to inform agencies of the study and invite them to participate in the Class EA study as a member of the Technical Agency Committee (TAC). The purpose of the TAC was to obtain constructive and informative feedback from the various agency representatives as it related to the project and their respective mandates. In total, 12 agency representatives indicated an interest to participate as a member of the TAC. The comments received in response to the study notification letter are provided in **Appendix A**.

6.3.3 Technical Agencies Committee (TAC) Meeting #1

The first TAC meeting was held on June 3, 2010 at 2:00 pm. The purpose of the meeting was to review and receive input on the problem and opportunities identified, existing conditions in the Study Area and the alternative solutions considered for the Study Area.

Representatives from the following technical agencies attended the meeting: Town of Oakville, Oakville Transit, Conservation Halton, Halton Region Police Services and Metrolinx/GO Transit. A copy of the meeting minutes are located in **Appendix A.**

6.3.4 Workshop #1 (March 3, 2011)

The first Technical Agencies Workshop was held on March 3, 2011, and was conducted as a joint meeting for the Trafalgar Road and Dundas Street Improvements Studies to discuss BRT principles and implementation, approach to ridership forecasting, constraints and opportunities analysis for BRT on Dundas Street and Trafalgar Road, development of alternatives and preliminary impact assessment. This session was facilitated by GLPi.

Technical agencies that attended the Workshop included: Ministry of Transportation, Town of Oakville, Oakville Transit, City of Mississauga, City of Burlington, Burlington Transit, Conservation Halton and Metrolinx. Meeting minutes are provided in **Appendix A**.

6.3.5 Workshop #2 (May 12, 2011)

The second Technical Agencies Workshop was held on May 12, 2011, and was conducted as a joint meeting for the Trafalgar Road and Dundas Street Improvement Studies. The purpose of the meeting was to discuss ridership forecasts, BRT curb versus median comparison factors and urban design. This session was facilitated by GLPi.

Technical agencies that attended the meeting included: Ministry of Transportation, Town of Oakville, Oakville Transit, City of Mississauga, Mississauga Transit, City of Burlington, Burlington Transit, 407 ETR, Conservation Halton and Metrolinx. Meeting minutes are provided in **Appendix A**.

6.3.6 Workshop #3 (November 16, 2011)

The third Technical Agencies Workshop was held on November 16, 2011, and was conducted as a joint meeting for the Trafalgar Road and Dundas Street Improvements Studies to discuss transit service concepts, outcomes of ridership forecasts, BRT evaluation, cost and staging, corridor development including station amenities and streetscape opportunities. This session was facilitated by GLPi.

Technical agencies that attended the Workshop included: Town of Oakville, Oakville Transit, City of Mississauga, Mississauga Transit, City of Burlington, Burlington Transit, 407 ETR, Conservation Halton and Metrolinx. Meeting minutes are provided in **Appendix A**.

6.3.7 Bus Shelter Design Meetings

Three co-ordination meetings were held with the Dundas Street EA project team to discuss bus shelter functional requirements and preliminary signage plans. These meetings were held on March 21, 2013, May 28, 2013, and November 6, 2013 and were attended by the Dundas Street project team, the Trafalgar Road project team, and Oakville Transit.

6.3.8 TAC Meeting #2

The second TAC meeting was held on November 14, 2013 at 9:30 a.m. with the Town of Oakville and 11:00 a.m. with Metrolinx, the Ministry of Transportation and the Town of Oakville. In addition, a separate meeting was held with Conservation Halton on November 19, 2013 at 10:00 a.m. The purpose of each meeting was to review and receive input on the preliminary design and implementation strategy for the Trafalgar Road Improvements. The minutes of each meeting are included in **Appendix A**.

6.3.9 Project Co-ordination Meetings with the Town of Oakville, Oakville Transit, Ministry of Transportation and Metrolinx

As part of the Study, the project team met with the Town of Oakville, Oakville Transit, Metrolinx and the Ministry of Transportation at regular intervals to maintain consistency with planning studies currently being completed by the Town and Metrolinx at the south end of the Study Area corridor.

Over the course of the study, eight (8) joint meetings were held. Meetings were held on: August 21, 2009; July 22, 2010; July 20, 2011; June 28, 2012; October 23, 2012; December 7, 2012; January 18, 2013; November 14, 2013; and May 30, 2014.

Meetings held in 2011 focused on the overall planning of the Trafalgar Road BRT, ridership assumptions, as well as proposed transit route and stop locations. Meetings held in 2012 and 2013 focused on input related to the preliminary design of the Trafalgar Road improvements, bus stop functional requirements, bus operations technology, stormwater management and active transportation. The Town of Oakville, Oakville Transit, Metrolinx and the Ministry of Transportation support the phased implementation approach of implementing interim HOV lanes with the long-term provision for curb BRT lanes. The meeting minutes are located in **Appendix A**.

There was significant co-ordination between the Town of Oakville and Halton Region in conducting both the Town's Midtown Oakville Class EA Study and the Region's Trafalgar Road Class EA Study. Of greatest significance to the Trafalgar Road Study is that north/south capacity improvements for the area south of Iroquois Shore Road/Leighland Avenue were addressed through the Midtown Oakville Class EA Study recommendations.

6.3.10 Conservation Halton

As part of the Study, the project team met with Conservation Halton at key phases in the study. Over the course of the study, six (6) meetings were held. Meetings were held on February 3, 2011, May 9, 2011, March 5, 2013, June 5, 2013, November 19, 2013 and September 8, 2014.

Meetings held in 2011 focused on the Phase 1 Existing Conditions Report provided to Conservation Halton for review in 2010. Meetings held in 2013 focused on the East Morrison Creek north of Dundas Street and stormwater management floodplain modelling. The September 2014 meeting focused on the Preferred Alternative and reviewed the recommended approach for accommodating East Morrison Creek. The meeting minutes are located in **Appendix A**.

6.3.11 Emergency Services

As part of the Study, the project team met with the Halton Region Police Services and Emergency Services at key phases in the study. Over the course of the study, two meetings were held: January 12, 2012, and February 27, 2013, in conjunction with the Dundas Street Class EA Study.

6.3.12 Sheridan College

On November 27, 2012, the Project Team met with both Sheridan College and Oakville Transit to review potential transit improvements on Trafalgar Road adjacent to Sheridan College, and transit access within the Sheridan College complex. A review was completed prior to the meeting to look at the following:

- Connectivity and links between the College and the future Trafalgar Road corridor BRT;
- Additional route to serve additional passengers in the northbound/southbound directions;
- A station platform for northbound traffic on Trafalgar Road.

During the meeting it was discussed that the preferred alternative would need to protect for increased ridership through service within the campus property that would accommodate both northbound and southbound transfers. It was also discussed that the preliminary design should include options to show signals at adjacent intersections that could be used to give priority to the buses to access the campus.

Pedestrian access to the campus being incorporated into the future development plans of the College property was also discussed at the meeting. However, it was noted that since this element is beyond the scope of this current EA study, the pedestrian access to the campus would be considered as part of the Sheridan College Master Plan. Detailed minutes are provided in **Appendix A**.

6.3.13 Oakville Hydro

A meeting with Oakville Hydro was held on October 7, 2014, to discuss expected construction schedule and the anticipated impacts to Oakville Hydro property.

A copy of the meeting minutes are provided in **Appendix A**.

6.4 Aboriginal Consultation

A Study Notification Letter was mailed to the Ministry of Aboriginal Affairs (MAA) and Aboriginal Affairs and Northern Development Canada (formerly Indian and Northern Affairs Canada) on November 20, 2009. The purpose of the letter was to inform each agency of the project and to solicit their respective input. In addition to the government contacts, AECOM carried out a desktop study to determine Aboriginal communities and organizations that may have an interest in the study. Based on the findings of the desktop study, notification of the study was issued to the Aboriginal communities and organizations listed in **Exhibit 6.2** on November 20, 2009:

Exhibit 6-2. Aboriginal Contact List

▶ Alderville First Nation	▶ Six Nations Haudenosaunee Confederacy Council
▶ Mississaugas of Scugog Island First Nation	▶ Mohawk Council of Akweasne
▶ Mississaugas of the New Credit First Nation	▶ Oneida Nation of the Thames
▶ Hiawatha First Nation	▶ The Mohawks of the Bay of Quinte (Tyendinaga) First Nation
▶ Curve Lake First Nation	▶ Wahta Mohawks First Nation.
▶ Huron-Wendat First Nation	▶ Hamilton/Wentworth Metis Council
▶ Kawartha-Nishnawbe First Nation	▶ Grand River Community Metis Council
▶ Six Nations of the Grand River First Nation	▶ Credit River Metis Council
▶ Six Nations Council	

A summary of the responses received from the Aboriginal communities and/or organizations contacted during the course of this study is provided in **Exhibit 6.3** below.

Exhibit 6-3. Summary of Aboriginal Consultation Activities

Community	Date	Comment	Response
Alderville First Nations	December 18, 2009 November 28, 2013 May 12, 2014	The project is deemed a level three by the Alderville First Nation Consultation Protocol, having minimal potential to impact Alderville's First Nations' rights. Keep Alderville apprised of archaeological findings, and/or any environmental impacts.	Comment noted. The Alderville First Nations will continue to be contacted as the study progresses.
Hiawatha First Nations	May 2, 2014	The project is situated outside of Hiawatha First Nations traditional and treaty territory, however the First Nation wishes to be contacted should there be any artifacts uncovered at the time of archaeological assessment activities. In addition, archaeological assessment reports are to be forwarded to the First Nation as they are completed.	Comment noted. Hiawatha First Nations will continue to be contacted as the study progresses.

A copy of the First Nations correspondence is provided in **Appendix A**.

6.5 Summary of Key Consultation Events

Exhibit 6.4 provides a chronological summary of the key points of contact with agencies and public stakeholders throughout the EA Study.

Exhibit 6-4. Summary of Key Consultation Events

Consultation Event	Date	Purpose of Consultation
TAC Meeting #1	June 3, 2010	Provide an overview of the study, including existing conditions in the Study Area, future population and employment growth, existing and future transportation conditions, problems and opportunities and the alternative solutions identified.
Stakeholder Group Meeting		
PIC #1	June 16, 2010	Introduce the study and provide interested and/or potentially affected stakeholders with an opportunity to participate in the planning process. Presented existing conditions, need and justification, recommended evaluation criteria, assessing alternatives, recommended alternative solution, and next steps.
Technical Agency Workshop #1 (Joint Workshop with Dundas Street BRT Planning Project)	March 3, 2011	Provide an overview of BRT Principles and Implementation and previous studies leading to both studies. Discuss/review approaches to ridership forecasting, constraints and opportunities analysis, development of BRT alternatives, and impact assessment.
Technical Agency Workshop #2 (Joint Workshop with Dundas Street BRT Planning Project)	May 12, 2011	Reiterate BRT Principles and Implementation, discuss approach to ridership forecasting, compare BRT Curb vs. Median alternatives, discuss approach to urban design.
Technical Agency Workshop #3 (Joint Workshop with Dundas Street BRT Planning Project)	November 16, 2011	Present the Regional Transit Service Concept, provide overview of ridership forecasting, evaluate alternatives and select preferred BRT alternative. Further discussion of costs and staging, roadway operation, corridor development, streetscaping opportunities, and next step(s).
PIC #2	November 24, 2011	Provide an opportunity for residents, businesses, agencies and other interested individuals to review the preferred (curb) BRT alternative, potential elements of BRT facilities and next step(s).
TAC Meeting #2	November 14, 2013	Provide the Town of Oakville an opportunity to review key areas of interest in the preliminary design and implementation strategy and next steps.
	November 14, 2013	Provide Metrolinx, MTO and Town of Oakville an opportunity to review key areas of interest in the preliminary design and implementation strategy and next steps.
	November 19, 2013	Provide Conservation Halton an opportunity to review key areas of interest in the preliminary design and implementation strategy and next steps.
PIC #3	December 4, 2013	Provide an opportunity for residents, businesses, agencies and other interested individuals to review the preferred HOV/BRT Alternative and the recommended alignment and next steps.

6.6 Notice of Study Completion/Filing of the ESR

This ESR has been filed in the public record for 30-calendar days, commencing on April 16, 2015. The public has been notified by means of newspaper advertisements, a Halton Region website posting, and mailings to agencies, interested individuals and adjacent property owners.

The Class EA process contains a provision that allows for changing the status of a project from a Class EA to an Individual Environmental Assessment (IEA). This is called a 'Part II Order'. Members of the public, interest groups, government agencies and others may request that an IEA be prepared for a specific project if they feel their concerns have not been addressed through the Class EA planning process. The Ministry of the Environment determines whether or not this is necessary and the decision in this regard is final. If the 'Part II Order' is granted, the project cannot proceed unless an IEA is prepared. The IEA is subject to a formal government review and approval process and may result in a formal public hearing. Anyone wishing to request a 'Part II Order' of the Trafalgar Road (Regional Road 3) Corridor Improvements Class EA Study must submit a written request by the end of the 30 calendar day review period to the Minister of the Environment at the following address, with a copy sent to Halton Region:

Ministry of the Environment address:	Halton Region address:
Honorable Glen R. Murray Minister of the Environment and Climate Change Ferguson Block 11th Floor 77 Wellesley Street West Toronto ON M7A 2T5	Regional Municipality of Halton Attn: Matt Krusto Project Manager, Halton Region 1151 Bronte Road Oakville, ON L6M 3L1

7. Project Description

The major features for the proposed roadway, HOV/transit, and active transportation improvements on Trafalgar Road between Cornwall Road and Highway 407 are described in **Section 7.1**, and the major features of the transit station / stops along this section of the Trafalgar Road corridor are described in **Section 7.2**. The preliminary plan is presented in **Plates 1** to **22** provided at the end of this section. The project limits are from immediately south of Cornwall Road to south of Highway 407.

While refinements may occur during detailed design, any changes should not alter the intent of the recommended undertaking or its components.

The recommended undertaking of Trafalgar Road between Cornwall Road and Highway 407 includes the following:

- Widen the Trafalgar Road corridor to a six-lane cross-section. This six-lane cross section begins north of Leighland Avenue and continues to south of Highway 407, with an urban cross-section planned throughout. A 6-lane cross-section currently exists south of White Oaks Boulevard.
- 50m right-of-way from north of Dundas Street; the ROW varies south of Dundas Street where constrained by existing development and locally near intersections, and is 55m at intersections where transit station/stop facilities are located.
- Posted speed limit on Trafalgar Road of 60km/h throughout the corridor.
- As a major arterial road, Trafalgar Road will include left and right-turn lanes at most signalized intersections. It should be noted that during detailed design, the Region will be considering implementation of an adaptive “real-time” traffic control system to further improve traffic operations within the corridor as traffic volumes fluctuate throughout the course of the day.
- Raised median which varies in width, narrowing near intersections to accommodate left-turn lanes and in areas where property is constrained. With raised medians through the corridor, left turns are only permitted at intersections, not mid-block. While existing accesses will be maintained, several accesses/driveways to properties will become right-in/right-out only. As a permanent condition, U-turns at signalized intersections are not planned to be prohibited (on the green phase only to avoid conflicts with the pedestrian walk phase).
- Upgrades at the Cornwall Road / Trafalgar Road intersection, including removal of the island on the southwest corner, and addition of audible pedestrian signals and painted raised strips to encourage lower vehicle speeds on the approach to the channelized right turn in the northeast quadrant.
- Provision for enhanced bus stops at signalized intersections. Bus stops will be located curbside on the far-side of most signalized intersections. Bus bays (5 m wide x 50m long) are provided to allow the curb lane to remain clear and for express bus service to bypass a stopped bus.
- Potential to implement transit priority measures at Dundas Street, Sheridan College, and Leighland Avenue, and other key intersections as required.
- Active transportation facilities through the corridor. North of Glenashton Drive to south of Highway 407, multi-use pathways are located on both sides of the corridor, except in constrained areas adjacent to heritage properties immediately north of Dundas Street. South of Glenashton Drive to Leighland Avenue/Iroquois Shore Road, sidewalks are provided on the east side of the roadway and multi-use pathways are located on the west side of the roadway with sidewalks in the remaining constrained areas.
- Full illumination north of Dundas Street.

The widening of Trafalgar Road through the Town of Oakville will take a number of years to complete. The improvements will be implemented through a phased approach for providing incremental transportation improvements. Phase 1 is anticipated to occur in 2017, followed by Phase 2 in 2018, and Phase 3 in 2019. The limits for each phase are as follows:

- Phase 1: Leighland Avenue to Upper Middle Road;
- Phase 2: Upper Middle Road to Dundas Street;
- Phase 3: Dundas Street to Highway 407.

Each of the three phases will initially be built as a 6 lane urban cross-section with multi-use trails and/or sidewalks, transit facilities and transit priority measures. Upon completion of the widening of Trafalgar Road to 6 lanes throughout the project limits (i.e. all three segments), there is future opportunity to consider the introduction of High Occupancy Vehicle (HOV) curb lanes allowing a mix of transit and private vehicles with two or more occupants. As transit ridership builds, there is the opportunity to convert the HOV lanes into dedicated bus lanes in the future. The limits or extent of operations for HOV/transit would need to be confirmed in consultation with the Town of Oakville and Oakville Transit. Conversion from curbside HOV/ Transit lanes to curbside BRT lanes would not require reconstruction of the roadway. Much of the transition would be related to changes in signage and pavement markings.

While refinements may occur during detailed design, any changes should not alter the intent of the recommended undertaking or its components. During detailed design, there will be further consultation with technical agencies, including, but not limited to, Conservation Halton, the Ministry of Natural Resources, the Ministry of the Environment and Climate Change, the Town of Oakville, Oakville Transit, Metrolinx / GO Transit, the Ministry of Transportation, utilities and affected property owners.

In addition to the proposed improvements documented in this Environmental Study Report, improvements are planned along the Trafalgar Road corridor in the section north of Cornwall Road and south of White Oaks Boulevard South, as documented in the Midtown Oakville Class EA Environmental Study Report and described in **Section 2.4.3.5**.

7.1 Roadway Major Features

7.1.1 Design Criteria

Currently Trafalgar Road is generally posted at 60km/h to Dundas Street and 80km/h north of Dundas Street. Once the improvements have been implemented and as the section north of Dundas Street is urbanized, the posted speed limit on Trafalgar Road will be reduced to 60km/h throughout the corridor; this is consistent with the transformation to a pedestrian and cyclist-friendly Regional arterial road. The geometric details are listed in **Exhibit 7.1**.

The widening of Trafalgar Road through the Town of Oakville will take a number of years to complete. The improvements will be implemented through a phased approach for providing incremental transportation improvements. By incorporating HOV lanes that can be used by both transit and qualified vehicles, the Region will be able to promote transit usage while optimizing the use of the widened road. As transit ridership builds, there is the opportunity to convert the HOV lanes into dedicated bus lanes in the future. The limits or extent of operations for HOV/transit would need to be confirmed in consultation with the Town of Oakville and Oakville Transit.

The design of the curb lanes (4.2 m width) would accommodate the function of HOV/Transit lanes in the interim and dedicated BRT lanes in the future. The transition from HOV/ Transit lanes to BRT lanes would not require reconstruction of the roadway. Much of the transition would be related to changes in signage, pavement markings, and requirements identified by the local transit authority (i.e. Oakville Transit).

Exhibit 7-1. Trafalgar Road Design Criteria, from Cornwall Road to Highway 407

CRITERIA	REFERENCE/ NOTES	DESIGN STANDARDS	PROPOSED STANDARDS	COMMENTS
Classification	TAC[10] Pg. 1.3.2.2 Table 1.3.2.1	UAU80	UAU80	80km/h design speed for future road section: urban arterial; undivided.
Design Speed	TAC	80 km/h (future)	80 km/h (future)	
Posted Speed		60km/h (future)	60km/h (future)	Existing posted speed varies from 60km/h south of Dundas Street to 80km/h north of Dundas Street.
Minimum Radius	TAC Pg. 2.1.2.12 Table 2.1.2.5.	280 m (min) 15m	1000 m (min) 15m	At intersections
Minimum "K" Value	**CREST** TAC Section 2.1.3.3, Pg. 2.1.3.6, Table 2.1.3.2	80 km/h = 24 to 36	K = 24	Provides Stopping Sight Distance No change in the profile from the existing
	SAG TAC Section 2.1.3.3, Pg. 2.1.3.9, Table 2.1.3.4	80 km/h = 12 to 16	K = 16	Provides Stopping Sight Distance (Comfort Control); No change in the profile from the existing
	Headlight Control TAC Section 2.1.3.3, Pg. 2.1.3.9, Table 2.1.3.4	80 km/h = 25 to 32	K = 24	Comfort Control K Values to be used. No change in the profile from the existing
	Comfort Control TAC Section 2.1.3.3, Pg 2.1.3.9, Table 2.1.3.4	80 km/h = 12 to 16	K = 16	No change in the profile from the existing
Min. Stopping Sight Distance	TAC Pg. 1.2.5.4, Table 1.2.5.3	80 km/h = 115 to 140 m	115 m	
Grades – Max. Min.	TAC Pg. 2.1.3.2 Table 2.1.3.1 Halton Region	5.0% (max)	5.0% (max)	No change in the profile from the existing
Right of Way Width		50 m/55m	50 m	The typical ROW is 50 m. Additional temporary ROW will be required for Grading, and 55m is required at intersections for transit station / stop facilities.
Road Width F.O.C. to F.O.C.		27.4 m	27.4 m	6 lanes = 27.4m (HOV 2*4.2 + 4*3.5 = 22.4m; plus 5m Two Way Left Turn Lane (TWLTL) / centre median)
Lane Width -Through Lanes	TAC Pg. 2.2.2.2, Table 2.2.2.3	3.5-3.7m (Minor Arterial)	3.5m	TWLTL width = 5m
Bicycle Lane or Path Width	TAC Section 3.4.6, Pg. 3.4.6.1, Table 3.4.6.1	Two-way, shared with pedestrians = 3.0 to 4.0 m	3.0 m multi-use path 1.5m Sidewalk	Sidewalk on east side = 1.5m; Multi-use path on west side and partially on east side (where ROW is sufficient).

[10] *"Geometric Design Guide for Canadian Roads", Transportation Association of Canada (TAC), 1999 Edition, Part 1.*

7.1.2 Typical Cross-Section

Exhibits 7.3 and **7.4** illustrate the typical proposed cross-sections for the Trafalgar Road corridor improvements between Cornwall Road and Highway 407. The following summarizes the basic features of the cross-sections within the study area:

- 50m right-of-way north of Dundas Street; ROW varies south of Dundas Street where constrained by existing development and locally near intersections
- Six lanes, three lanes in each direction – two general purpose lanes at 3.5 m and one curb lane at 4.2 m for potential HOV/Transit use in the interim, converted to dedicated BRT lanes in the future, as well as right turn lanes where required
- Bus stops will be located curbside / farside at most signalized intersections
- Raised median varies in width, narrowing near intersections to accommodate left-turn lanes and in areas where property is constrained; left-turns are only accommodated at intersections
- Accommodates pedestrian and cycling facilities with multi-use trail along both sides of the roadway north of Glenashton Drive, except in constrained areas adjacent to heritage properties immediately north of Dundas Street. South of Glenashton Drive to Leighland Avenue/Iroquois Shore Road, multi-use pathways are located on the west side of the roadway with sidewalks in the remaining constrained areas.

In areas where there are constraints, for example, heritage properties on the west side of the Trafaglar Road corridor, immediately north of Dundas Street, the cross section has been modified to minimize impact to these features; this will be subject to further review and modification during detailed design.

7.1.3 Alignment and Grade

Trafalgar Road will be widened to both sides of the existing roadway, generally maintaining the existing centreline. Where there are significant constraints, the alignment has been shifted to minimize potential impacts to existing properties, or the cross-section and/or transit facilities have been modified to fit within the right-of-way where it was not feasible to shift the alignment or provide the full transit station stop facilities.

The vertical profile is proposed to generally follow that of the existing Trafalgar Road profile in order to minimize property requirements and construction costs. Exceptions in the area south of Highway 407 result in adjustment to the vertical profile to accommodate the William Halton Parkway alignment.

A geotechnical investigation was carried out by Terraprobe to determine and report the condition and make-up of the existing pavement and subsurface conditions. Cost-effective pavement improvement strategies were developed and recommendations provided for the widening pavement design and design of the storm sewer. A copy of the geotechnical report is provided in **Appendix J**.

7.1.4 Pedestrian and Cyclist Facilities

Halton Region is planning to implement an active transportation network in the Region to make it easier for people to walk and bike around Halton, as outlined in the Halton Region Active Transportation Master Plan Study (ongoing). Consistent with the Active Transportation Master Plan, a multi-use path is located on both sides of the road, where space exists, to facilitate and encourage walking and cycling as alternate modes of transportation along the Trafalgar Road

corridor. Elsewhere sidewalks are provided. The width of the multi-use path is 3m. In constrained areas, the width of the multi-use path has been reduced.

Exhibit 7.2 summarizes the pedestrian and off-road cyclist facilities along the Trafalgar Road corridor from Cornwall Road to the Highway 407 ETR ramps. Sidewalks implemented as part of the recommended design will comply with AODA requirements.

Exhibit 7-2. Trafalgar Road Corridor Pedestrian and Off-Road Cyclist Facilities

Road Section			Proposed Pedestrian Facilities	
From	**To**	**Length (m)**	**East Side**	**West Side**
Cornwall Road	Station 11+730: North of Leighland Avenue (Iroquois Shore Road)	1000 (estimated)	Sidewalks on both sides	
Station 11+730: North of Leighland Avenue (Iroquois Shore Road)	Station 14+340: North of Glenashton Drive	2610	Sidewalk	3.0m wide multi-use path
Station 14+340: North of Glenashton Drive	Station 15+420: Dundas Street	1080	3.0m wide multi-use paths on both sides	
Station 15+430: Dundas Street	Station 15+680: North of Dundas Street	250	3.0m wide multi-use path	Sidewalk
Station 15+680: North of Dundas Street	Station 18+240: North of Burnhamthorpe Road	2560	3.0m wide multi-use path on both sides	

As identified in the Midtown Oakville Class EA Study, additional links for pedestrians and cyclists are provided by two grade-separated, active transportation crossings of the QEW – one west of Trafalgar Road and one east of Trafalgar Road. These crossings will meet required accessibility design standards and enhance the safety of those wishing to cross the QEW on foot or by bicycle. These active transportation crossings provide pedestrians and cyclists with alternatives for crossing the QEW and improved access to transit.

Other future grade-separated pedestrian crossings identified by the Town of Oakville are proposed to be located near the following intersections with Trafalgar Road:

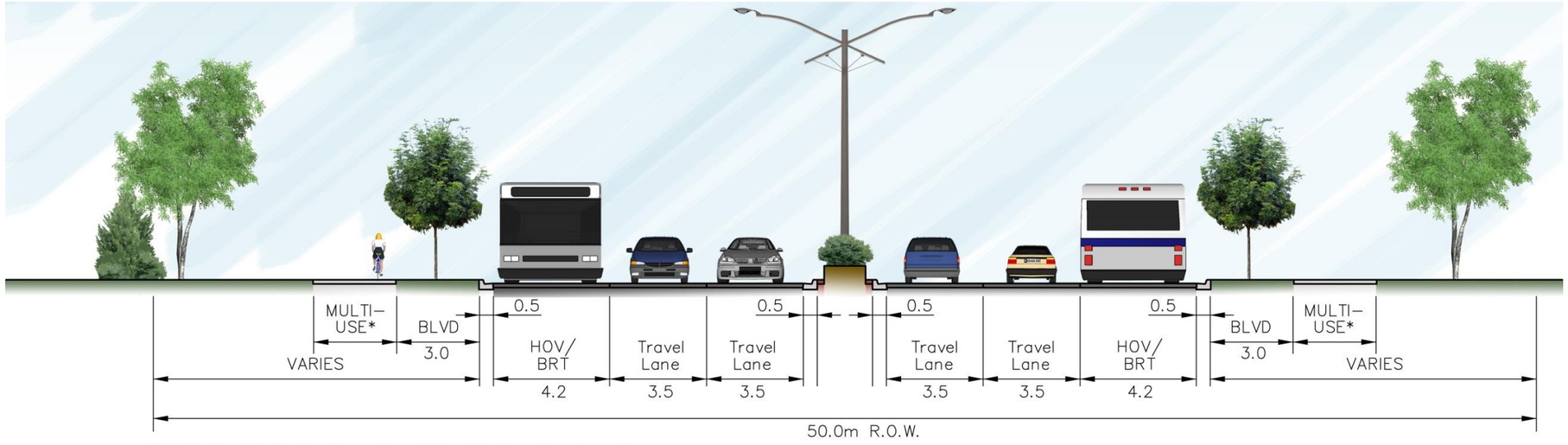
- Speers/Cornwall
- Go Rail Line (adjacent to the CN Rail Tracks)
- Leighland Avenue
- White Oaks Boulevard
- Glenashton Drive
- Dundas Street, both for crossing Trafalgar Road, and for crossing Dundas Street.

The general locations of these facilities are identified in **Plates 1 to 22** at the end of **Section 7**.

Note that rehabilitation work is scheduled to commence on the bridge over the QEW in Summer 2015.

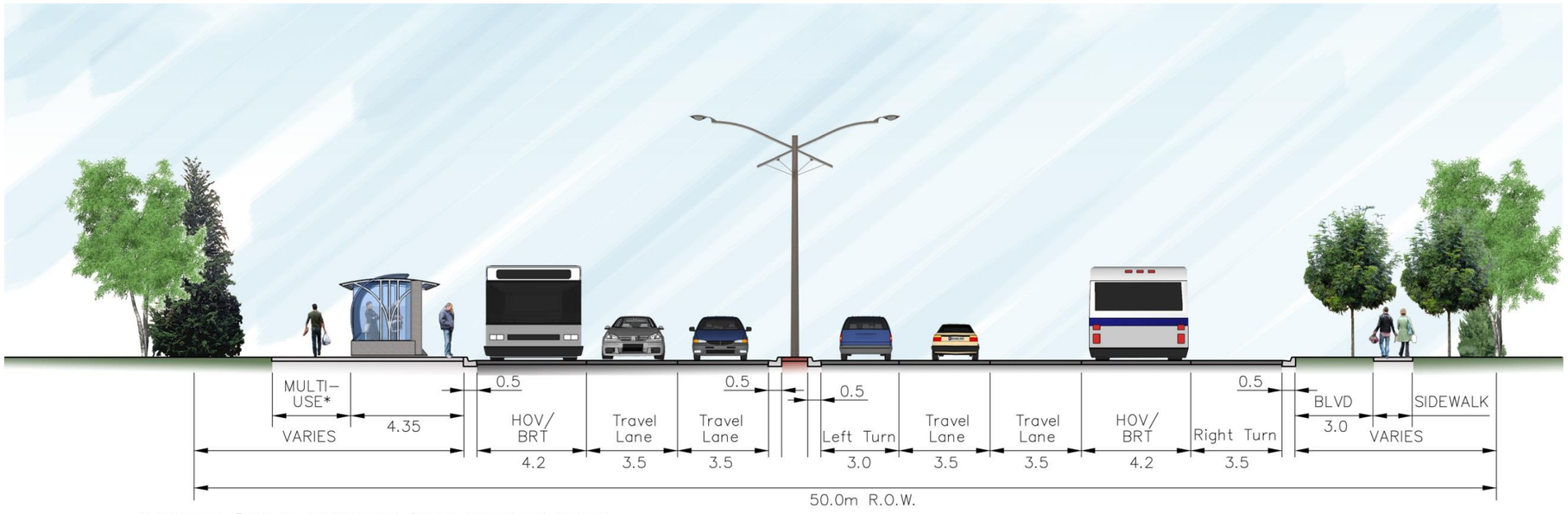
Ladder-type pedestrian crosswalks are planned at the controlled intersections that are under Halton Region's jurisdiction, as shown in **Plates 1 to 22 (Section 7)**. At the two signalized QEW off-ramp terminal intersections, the provision of ladder-type pedestrian crosswalks will be subject to MTO review and approval during Detail Design.

Exhibit 7-3. Typical Mid-Block Cross-Section



*Multi–Use Path is dimensioned for bi–directional cycling

Exhibit 7-4. Typical Intersection Cross-Section with Right-Turn and Left-Turn Lanes



*Multi–Use Path is dimensioned for bi–directional cycling

7.1.6 Intersections and Access

As a major arterial road, Trafalgar Road will include left and right-turn lanes at most signalized intersections. Left turns could proceed during the protected signal phase and the permissive signal phase (when safe to do so). Right turns would be made from the right-most intersection turn lane. Vehicles are permitted to cross through an HOV lane to make a right-turn from a separate right-turn lane, or to make a right-turn from the HOV lane, according to the proposed posted signs and pavement markings. **Exhibit 7.5** lists the existing and future signalized intersections from south to north in the study area.

Exhibit 7-5. Existing and Future Signalized Intersections

Existing and Future Signalized Intersections	Future NEW Signalized Intersections
Cornwall Road	Rosegate Way
Cross Avenue	Un-named Future Intersection @ ~15+820
WB QEW Off-Ramp	Un-named Future Intersection @ ~16+120
North Service Road East	Un-named Future Intersection @ ~16+700
Leighland Avenue/Iroquois Shore Road	Un-named Future Intersection @ ~17+100
McCraney Street East	William Halton Parkway
Marlborough Court	
Ceremonial Road	
Sheridan College/White Oaks Boulevard North	
Upper Middle Road East	
River Oaks Boulevard East/Briarhall Gate	
Glenashton Drive	
Oak Park Boulevard/Postridge Drive	
Hays Boulevard	
Dundas Street	
Burnhamthorpe Road	
Access to Oakville GO Transit Station Parking Lot	

As Trafalgar Road is widened from four to six lanes, a raised concrete median will be provided to separate southbound and northbound traffic for both operational and safety purposes. While existing accesses will be maintained, access to and from Trafalgar Road will become right-in/right-out only. As a permanent condition, U-turns at signalized intersections are not planned to be prohibited (on the green phase only to avoid conflicts with the pedestrian walk phase) and will provide the private residences and affected businesses with an alternate way to replace left-turn access.

It should be noted that access locations will be subject to review and approval should any of the above-listed properties or currently vacant properties with no direct access to Trafalgar Road make applications for development/redevelopment.

7.1.7 Drainage and Stormwater Management Requirements

The Preferred Design includes the widening of Trafalgar Road from the Morrison-Wedgewood Diversion Channel, situated north of the QEW, northerly to Highway 407. No widening of the roadway platform is proposed south of the Diversion Channel. As such, the stormwater management analysis and recommendations pertain to the segment of Trafalgar Road north of the Diversion Channel.

The widening of Trafalgar Road has the potential to impact drainage through the Study Area. The widened roadway will generate more runoff from storm events, potentially impacting the quantity and quality of runoff delivered to the receiving drainage systems. Further, widening of the roadway platform will require culvert extensions / replacements and watercourse realignments. Hydrologic modelling, hydraulic analysis, and design calculations were undertaken to determine the preliminary stormwater management recommendations for the Trafalgar Road corridor. A brief description of the potential impacts of the roadway improvements and the recommended stormwater management strategy is provided below. Further details are provided in the Stormwater Management Report provided in **Appendix G**.

7.1.7.1 Adjacent Development Proposals

Several proposed development projects located adjacent to Trafalgar Road were underway simultaneous to the completion of this EA study and were relevant from a stormwater management perspective, including the following:

- Dunpar Developments Inc. townhouse subdivision southwest of Glenashton Drive and Trafalgar Road
- Green Ginger Inc., Mattamy, and Argo subdivisions northwest of Dundas Street and Trafalgar Road (West Branch EIR/FSS)
- Minto Communities - Dundas Trafalgar Inc. - 3075 Trafalgar Road Dundas-Trafalgar Inc. (Minto) and Shieldbay Inc. subdivision northeast of Dundas Street and Trafalgar Road (East Branch EIR/FSS). Subdivision with medium & high density residential development, park, school, stormwater management pond, natural area and commercial uses
- Star Oak Developments Limited - Part of Lots 14 & 15 on Con. 2, North of Dundas Street. Zoning by-law amendment and plan of subdivision for 217.5 dwelling units in single detached and townhouse buildings and about 34.5 hectares of Employment Lands supported by a private driveway, village square and storm water facility
- Reconstruction of Dundas Street between Oak Park Boulevard to Highway 403
- New North Oakville Transportation Corridor and Crossing of Sixteen Mile Creek Class EA Study

Multiple reports and assessments by other parties, and a series of potential options were reviewed during the preparation of this study to identify opportunities to proceed with and without integration and/or coordination of the management of runoff with adjacent development (refer to list of reports in **Appendix G, Section 1.2**). Opportunities included the SWM ponds proposed in the East and Main Branch EIR/FSS reports which were evaluated to identify surplus storage and the feasibility of using it to control runoff from the ROW. The feasibility of these options are further discussed in **Appendix G**, Section 3.4 and in the technical memos appended to the Stormwater Management Report provided in **Appendix G**.

The realignment of the east branch of East Morrison Creek was another opportunity proposed by Minto. The realignment of the east branch of East Morrison Creek was proposed by Minto as a means to accommodate runoff. The EIR/FSS reports documenting Minto's proposed creek realignment design and associated impacts were reviewed in relation to the Trafalgar Road ROW, and included as part of this assessment.

Regulatory authorities are currently working towards coordinating the hydrologic and hydraulic models of East Morrison Creek prepared for the EIR/FSS and Dundas Street reconstruction reports. Relevant excerpts from the reports are provided in **Appendix G** of this ESR (Stormwater Management Report Appendices D, E, and F).

7.1.7.2 Recommended Stormwater Management Plan

The widening of Trafalgar Road from the Morrison-Wedgewood Diversion Channel to Highway 407 results in an increase in impervious area from approximately 50% to 80% within the right-of-way (ROW) which has the potential to impact water quality, erosion and flooding in the receiving watercourses and downstream storm sewer systems.

The proposed SWM measures must control peak flows from the ROW under proposed conditions to existing levels and provide an enhanced level of water quality treatment in accordance with the design criteria. The storage required to provide an Enhanced Level of treatment (i.e., 80% TSS removal) for runoff generated from the Trafalgar Road ROW was calculated using Table 3.2 of the MOECC SWM Planning and Design Manual. The quantity of runoff from the Trafalgar Road ROW under proposed conditions must also be controlled to existing conditions peak flow rates. The storage volume required for quantity control of peak flows was estimated by running a number of different duration storms and increasing the time of concentration. The detailed calculations are provided in the SWM Report in **Appendix G**.

Source control, conveyance, and end-of-pipe SWM alternatives were evaluated to provide quality and quantity control. The preliminary recommended SWM measures in the Study Area are as follows:

- Throughout the study corridor, runoff generated from the Trafalgar Road ROW will be collected in a curb and gutter system and catchbasins within the proposed urban cross section and conveyed in a storm sewer system within the Trafalgar Road ROW. The quantity and quality of runoff will be controlled in accordance with applicable design criteria and will ultimately outlet to the creek systems in the Study Area, consistent with existing conditions at existing outlet locations.

  Storm sewer system design for flow conveyance within the Trafalgar Road ROW will be developed during detailed design in accordance with applicable design standards and criteria. The capacity and level of service of the existing storm sewer systems within the Trafalgar Road ROW under existing and proposed conditions will be assessed, with the existing systems replaced / relocated / upgraded as appropriate to suit to the revised roadway cross section and ultimate runoff quantity and quality requirements.

- From Highway 407 southerly to Dundas Street, runoff collection for the Trafalgar Road ROW will be integrated into the design of future SWM ponds for adjacent developments, where possible, with super pipe storage to control peak flows with oil grit separator (OGS) units for water quality treatment provided elsewhere. Pre-treatment of flows controlled by super pipes is recommended to prevent sediment accumulation within the super pipes.

  Realignment of a segment of the east branch of East Morrison Creek in the area of the existing culverts identified in NOCSS as ME-T1, ME-T2, and ME-T3 is required to accommodate the road widening. East Morrison Creek will be directed to the west side of Trafalgar Road via the culvert at Station 5+820 (ME-T3), as developed by Minto. The creek will remain on the west side of Trafalgar Road until south of Dundas Street, eliminating the need for the culvert at Station 5+665 (ME-T2) and for the watercourse to pass through the 900 mm CSP upstream of ME-T2 and through the culvert at Station 5+500 (ME-T1). This option is referred to as the Combination Option in the Stormwater Management Report. It should be noted that while the culvert at Station 5+500 (ME-T1) is not required to convey the East Morrison Creek Tributary, it will continue to be required to provide conveyance of the remnant portion of the East Morrison Creek Tributary and to serve as an outlet to the proposed stormwater management facility within the Minto (Dundas – Trafalgar lands). At this time, it is anticipated that this remnant reach, including crossing ME-T1, will remain regulated by Conservation Halton, even after the diversion occurs.

  The preliminary culvert sizing for the culvert at Station 5+820 (ME-T3) by Minto consists of a 7.32m crossing span which is sufficient to accommodate both the active bankfull channel (1.75m), as well as a functional floodplain. This floodplain extent functions as an erosion allowance, providing approximately 2.8m on either side of the channel to account for long-term adjustments in channel form. East Morrison Creek will also pass through the culvert at Station 5+225 as it does under existing conditions. The proposed culvert width at this location will be increased to accommodate 3x bankfull channel width. The final culvert sizing will be confirmed during detailed design in coordination with Conservation Halton. Further details on the crossing culverts are provided in **Section 7.1.7.3**.

  In the unlikely event that development of the adjacent properties does not proceed, East Morrison Creek will be realigned on the east side of Trafalgar Road from ME-T3 southerly to ME-T1, eliminating the need for the crossing culverts at ME-T3 and ME-T2. A meandering creek form would be provided from upstream of the culvert at ME-T3 to upstream of the culvert at ME-T1 to mitigate channel length loss as well as improve aquatic habitat and channel morphology. Further, the realigned channel would be positioned to ensure the road is not located within the erosion and flooding hazard limits and associated regulated allowances. The Region will undertake the necessary hydraulic and fluvial geomorphology analyses at detailed design to demonstrate the final design meets Conservation Halton's regulatory requirements (i.e. NOCSS "Blue Stream" requirements).

- From Dundas Street southerly to the Morrison-Wedgewood Diversion Channel, OGS units in conjunction with super pipes are recommended to manage runoff from the Trafalgar Road ROW due to limited space within the proposed ROW. Pre-treatment of flows controlled by super pipes is recommended to prevent sediment accumulation within the super pipes. Consideration should be given during detailed design to a treatment train approach to provide for 80% TSS removal in the event that OGS are found to be insufficient and only able to provide 50% TSS removal.

In accordance with the NOCSS, detailed consideration of the feasibility of infiltration facilities, such as Low Impact Development (LID) measures (i.e. bioswales and other source controls), should be made during detailed design using site specific information, best-management practices from current guidance documents, and recognition that modifications to facilities may be required to account for local soil conditions. Application of these options may reduce the size of the recommended SWM facilities required to adequately control runoff.

The SWM plan will be finalized during detailed design based on more detailed analysis in coordination with adjacent development and reconstruction projects.

7.1.7.3 Mainline Crossing Culverts

Within the Study Area, Trafalgar Road crosses tributaries of Joshua's Creek at four locations and East Morrison Creek at six locations from just south of Dundas Street northerly to Highway 407, resulting in ten mainline crossing culverts as shown in Exhibit 7.6. From south of Dundas Street southerly to the Morrison-Wedgewood Diversion Channel situated just north of the QEW, there are no mainline crossing culverts as East Morrison Creek is situated east of Trafalgar Road.

Analyses were completed for the existing ten crossing culverts to assess the impacts associated with the expanded roadway footprint and provide recommendations for replacements and / or extensions due to condition, hydraulic requirements, and / or fisheries requirements. Four of the existing crossing culverts are to be replaced with larger, extended concrete box structures with open footings to allow for fish passage, as follows:

- a 7000 x 2430 mm concrete box (or equivalent) at Station 5+225
- a 5000 x 1800 mm concrete box (or equivalent) at Station 5+500 (ME-T1)
- a 7320 x 1250 mm concrete box (or equivalent) at Station 5+820 (ME-T3) as proposed by Minto
- a 3600 x 1200 mm concrete box (or equivalent) at Station 6+725 (ME-T5)

The culvert at Station 5+665 (ME-T2) will be removed since it is no longer required due to the realignment of the east branch of the East Morrison Creek to the west side of Trafalgar Road, connecting to the main branch of East Morrison Creek.

Adjacent development is expected to abandon the remaining crossings and replace them with fully piped storm sewer systems. In the unlikely event that development of the adjacent properties does not proceed, two of the existing crossing culverts are to be replaced due to the poor condition of the existing structure as follows:

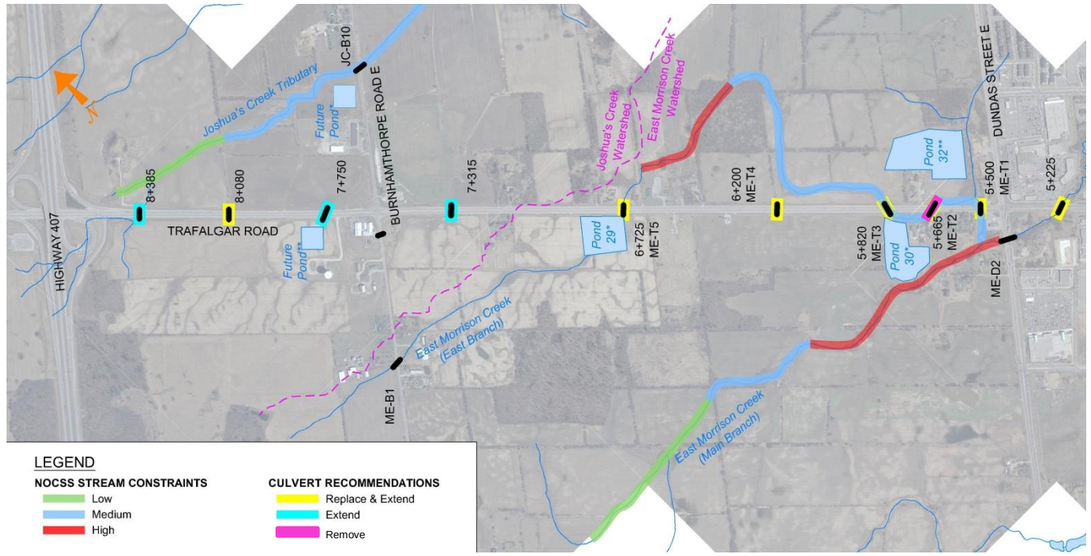
- a twin 675 mm circular CSP, or equivalent, at Station 6+200 (ME-T4)
- a 1400 mm circular CSP, or equivalent, at Station 8+080

The remaining three existing culverts would require extension to accommodate road widening:

- a twin 1390 x 970 mm CSP arch at Station 7+315
- a 1400 mm circular CSP at Station 7+750
- an 800 mm circular CSP at Station 8+385

The three culverts requiring temporary extensions are highlighted in cyan in Exhibit 7.6 while the one culvert to be removed and the remaining six culverts requiring replacement and extension are highlighted in magenta and yellow respectively.

Exhibit 7-6. Recommended Culvert Replacements, Extensions and Removals



Overall, extending the mainline crossing culverts at stations 6+200, 7+750, and 8+080 would cause minor increases in the headwater elevations during the Regional storm, ranging from 0.02 m to 0.06 m, which would need to be addressed in the unlikely event that development of the adjacent properties does not proceed.

The low road profile at station 5+665 (ME-T2) relative to the elevation of the creek bed is a limitation that leads to insufficient freeboard for this culvert. This issue is addressed with the proposed realignment of East Morrison Creek to the west side of Trafalgar Road via the culvert at Station 5+820 (ME-T3), by Minto, as this culvert will be removed. In the unlikely event that development of the adjacent properties does not proceed, consideration for raising the elevation of the road profile along with further investigation into the impacts of downstream conveyance infrastructure and associated backwater effects should be reviewed during detailed design.

The remaining five proposed culverts in the Study Area meet the hydraulic requirements under proposed conditions.

The preliminary sizing of the proposed culverts is summarized in Exhibit 7.7, including the minimum required hydraulic opening to achieve design criteria and the closest standard culvert dimensions.

Exhibit 7-7. Summary of Proposed Culvert Properties

Station	NOCSS ID	Recommendations	Length (m)	Minimum Required Hydraulic Dimensions	Recommended Standard Culvert Dimensions
5+225		Replacement & Extension	58.0	5200 x 2700 mm CONC. box (open footing)	7000 x 2430 mm Precast CONC box
n/a	ME-D2	Existing	61.8	4270 x 2000 mm CONC. box	Same as existing
5+500	ME-T1	Replacement & Extension	49.4	5000 x 1500 mm CONC. box (open footing)	5000 x 1800 mm Precast CONC box
5+665	ME-T2	Removal	n/a	n/a	n/a
5+820	ME-T3	Replacement & Extension	97.0	2100 x 1100 mm CONC. box (open footing)	7320 x 1250 mm CONC box (proposed by Minto)
6+200	ME-T4	Temporary Replacement & Extension	64.1	Twin 675 mm circular CSP	Twin 675 mm circular CSP
6+725	ME-T5	Replacement & Extension	62.3	3500 x 1000 mm CONC. box (open footing)	3600 x 1200 mm Precast CONC box
7+315		Temporary Extension	59.7 (South Cell) 59.8 (North Cell)	Twin 1390 x 970 mm CSP arch	Same as existing
7+750		Temporary Extension	72.2	1400 mm circular CSP	Same as existing
8+080		Temporary Replacement & Extension	58.6	1400 mm circular CSP	1400 mm circular CSP
8+385		Temporary Extension	48.0	800 mm circular CSP	Same as existing

Note: Culvert sizing will be confirmed during detailed design to accommodate the final fluvial geomorphology requirements, dependent on the outcome of adjacent development approvals.

As previously discussed, the results of the hydraulic models are subject to changes during detailed design of the Trafalgar Road Improvements due to coordination with other development and reconstruction projects. The proposed conditions hydraulic modelling will be updated during detailed design in coordination with Conservation Halton to confirm the final culvert sizing, with culverts designed to meet both hydrologic and fluvial geomorphology requirements as well as fish passage where appropriate.

7.1.8 Utilities and Services

The Trafalgar Road corridor contains a significant amount of both underground and aerial utilities. South of Dundas Street, watermains and sewers have been installed including underground utilities such as telephone, TV and hydro services. A major utility pole line is located along the east side of Trafalgar Road which extends from the QEW northerly to Highway 407. Street lighting is provided along the corridor generally from Dundas Street south to Cornwall Road. Property at station 16+370 is owned by Oakville Hydro and leased to a telecommunications provider.

The Oakville Hydro pole line on the east side of Trafalgar Road will have to be relocated as a result of the proposed widening of Trafalgar Road. This will be pursued during detailed design in consultation with Oakville Hydro. Although property impacts are identified at the Oakville Hydro site located at station 16+370, there are no expected impacts to the existing on-site plant (to be confirmed in detailed design). Other utilities such as Bell, Cogeco and gas may also be impacted as a result of the widening of Trafalgar Road. These utilities will be contacted during detailed design to confirm the conflicts and the extent of relocation/protection required.

Other utilities located within the Study Area, include:

- **Trans-Northern Pipelines**.
  A transmission pipeline crosses Trafalgar Road south of the QEW between the CN rail corridor and the Cross Avenue/South Service Road intersection.
- **Enbridge Gas**.
  Two 508 mm pipelines cross Trafalgar Road on the north side of Glenashton Drive.
- **TransCanada Pipelines**.
  A high pressure pipeline crosses Trafalgar Road between Glenashton Drive and Gatwick Drive.
- **Hydro One Transmission**.
  Transmission facilities are located on the south side of Glenashton Drive in the immediate vicinity of the Study Area.

A technical memo containing drawings of the existing utilities is located in **Appendix I**.

Halton Region met with Oakville Hydro to discuss property impacts. Property acquisition or easement will be determined at the detailed design phase.

7.1.9 Illumination and Traffic Signals

Illumination

Trafalgar Road is presently fully illuminated from Leighland Avenue to Dundas Street. The Lighting system is two sided and consists of independent concrete poles located on the west side of the road and HPS luminaires and brackets installed on the existing wood hydro poles on the east side of the road. Partial illumination is present at the signalized intersections and is associated with the existing traffic signal installations. There is no full illumination north of Dundas Street and only partial illumination is in place at the intersections of Burnhamthorpe Road and the entrance to the commuter parking lot just south of Highway 407.

The existing independent lighting and hydro pole locations will be affected by the proposed reconstruction and road widening, and will be in conflict with the widening. A new two sided full illumination system will be required to replace the existing lighting between Leighland Avenue and Dundas Street. Full illumination should be considered for the section north of Dundas Street upon implementation of the new residential developments and HOV lanes/bus bays.

It was determined that a two sided staggered or opposite lighting system will be required to illuminate Trafalgar Road in accordance with the requirements of Halton Region standards and RP-8-00 ANSI/IESNA Practice for Roadway Lighting. The new system will consist of independent lighting poles placed on the west side of Trafalgar Road and luminaires and brackets installed on relocated hydro poles on the east side of the road. In order to provide an adequate illuminance, luminance and uniformity levels for a six lane cross-section, special consideration should be given to luminaire mounting height on both conventional and hydro poles. Discussions with Oakville Hydro should be initiated early during the design process to allow sufficient time for preparation of hydro pole relocation layouts that would suit the illumination needs. During the detail design phase of this project, implementation of LED modules should be considered to replace HPS luminaires and meet Halton Region standards.

Traffic Signals

The majority of intersections south of Dundas Street and two intersections in the northern section of the project are presently signalized, including pedestrian actuation, and provided with partial illumination. The traffic signal installations will be affected by the road widening and modifications to the existing traffic signals will be required. Depending on the extent of the new construction impact, partial and/or full temporary traffic signals shall be considered and provided for each stage of construction. Also, slight realignment of crosswalks and modifications to the turning radius at the SW quadrant of Cornwall Road intersection will necessitate relocations of pedestrian facilities at this location.

There are several proposed intersections along Trafalgar Road north of Dundas Street and the need for new traffic signals or provisional underground duct/handhole system at these locations will be reviewed in detailed design. The traffic signal design shall be compliant with Halton Region requirements.

During detailed design, the Region will be considering an adaptive “real-time” traffic control system. This system has not been included in the preliminary cost estimates discussed in **Section 7.1.11**.

7.1.10 Property Requirements

The nominal proposed right-of-way for Trafalgar Road is 50m except where significant constraints exist. The Region will be acquiring suitable property where land has not been previously acquired. Additional property is required for the proposed plan in the order of approximately 4.7ha. The proposed property line is shown on **Plates 1** to **22**.

Property requirements, as shown by the red dashed line on Plates 1 to 22, are preliminary only and subject to further review and confirmation during detailed design. Property acquisition is anticipated from the properties listed in **Exhibit 7.8**. Affected property owners will be consulted individually during detailed design to address mitigation measures, property negotiation and to discuss project details. Property as required will be acquired at fair market value.

Exhibit 7-8. Preliminary Property Requirements

Location	Preliminary Property Requirements (ha)
Southwest quadrant of McCraney St E/White Oaks Blvd S/Trafalgar Rd	0.0050
Southeast quadrant of McCraney St E/White Oaks Blvd S/Trafalgar Rd	0.0090
Sheridan College adjacent to bus platform south of Ceremonial Rd	0.0030
#303 Upper Middle Road East	0.0029
#2038 Trafalgar Road	0.0322
At 14+050, on west side of Trafalgar Road	0.1371
#2200 Trafalgar Road	0.0221
Southwest quadrant of Glenashton Drive	0.0039
#2250 Trafalgar Road	0.0224
#2264 Trafalgar Road	0.3445
#2325 Trafalgar Road	0.0382
Northwest quadrant of Oak Park Boulevard/Postridge Drive/Trafalgar Rd	0.1009
Northeast quadrant of Oak Park Blvd/Postridge Dr/Trafalgar Rd	0.0072
#201 Hays Boulevard	0.0294
#2466 Trafalgar Road	0.0746
#278 Dundas Street	0.0545
#305 Dundas Street	0.0728 (FOR FUTURE PROP. LINE)
#3024 Trafalgar Road	0.0233
#3030 Trafalgar Road	0.0114
#3040 Trafalgar Road	0.0225
#3048 Trafalgar Road	0.0102
#3064 Trafalgar Road	0.0468
#3070 Trafalgar Road	0.0472
#3075 Trafalgar Road	0.7740
#271 Trafalgar Road	0.4147
Cell Tower lot at 16+375, west side of Trafalgar Road	0.0166
#3275 Trafalgar Road	0.0698
#3292 Trafalgar Road	0.0623
At 16+610, west side of Trafalgar Road	0.0436
#3301 Trafalgar Road	0.0700
At 16+800, west side of Trafalgar Road	0.1750
#3371 Trafalgar Road	0.3408
At 16+950, west side of Trafalgar Road	0.0272
At 17+050, west side of Trafalgar Road	0.1298
#340 Trafalgar Road	0.1972
#3437 Trafalgar Road	0.1224
#3444 Trafalgar Road	0.0816
At 17+250, west side of Trafalgar Road	0.0572
At 17+350, west side of Trafalgar Road	0.0680
At 17+450, west side of Trafalgar Road	0.0889
#3555 Trafalgar Road	0.0045
#3558 Trafalgar Road	0.0227
#4002 Trafalgar Road	0.0039
#273 Trafalgar Road	0.0073
At 17+700, east side of Trafalgar Road	0.2528
At 17+950, east side of Trafalgar Road	0.2310
At 17+950, west side of Trafalgar Road	0.1917
At 18+300, east side of Trafalgar Road	0.1175
Oakville GO Station parking lot	0.0044

7.1.11 Preliminary Cost Estimate

A preliminary construction cost estimate for the preferred design (based on 2014 dollars) was prepared as part of this Class EA Study. The estimated roadway construction cost (excluding property cost) is $ 67.1 Million broken down by phase as follows:

- Phase 1, Leighland Avenue to Upper Middle Road - $16.2 Million
- Phase 2, Upper Middle Road to Dundas Street - $19.4 Million
- Phase 3, Dundas Street to Highway 407 - $31.5 Million

These costs include 15% miscellaneous, 15% contingency and 15% engineering (detailed design and contract administration) costs. A breakdown of the cost estimate for each phase is provided in **Exhibits 7.10** through **7.12**. The costs are preliminary; a detailed cost estimate will be prepared during detailed design.

As noted above, property cost is not included in the preliminary cost estimate. Affected property owners (refer to **Section 7.1.10**) were contacted individually during the Class EA process to discuss project details and potential mitigation measures. Further discussion and negotiation will be required during the detailed design phase. Property will be acquired by the Region at fair market value.

Within the study limits, bus stops will be located in both directions at:

- McCraney Street East/White Oaks Boulevard
- Ceremonial Road
- Upper Middle Road (northbound platform is constrained)
- River Oaks Boulevard East/Briarhall Gate (northbound platform is constrained)
- Glenashton Drive (northbound platform is constrained)
- Oak Park Boulevard/Post Ridge Drive
- Dundas Street
- Future Signalized Intersection at ~ 15+825
- Future Signalized Intersection at ~ 16+125
- Future Signalized Intersection at ~ 16+700
- Future Signalized Intersection at ~ 17+080
- Burnhamthorpe Road
- William Halton Parkway

The cost estimates[11] for bus stops within the study limits are shown in **Exhibit 7.9**. These costs are also included in the Preliminary Cost Estimates shown in **Exhibits 7.10** through **7.12**.

Exhibit 7-9. Preliminary Cost Estimate – Transit Stops*

Station Type	Cost Estimate (Millions)
Minor Stop $130,000 each (26 locations)**	$3.4M
Notes: * Includes works above platform level ** Costs for constrained stops estimated at the same as minor stops	

[11] *Cost estimates taken from Dundas Street Class EA Study Bronte Road to Proudfoot Trail, December 2012, Table 6-6, pg. 6-40.*

Exhibit 7-10. Preliminary Cost Estimate – Roadway Construction (Phase 1 – Leighland Avenue to Upper Middle Road)

	Item Description	Quantity	Unit	Estimated Price	Total
1.	Earth Excavation	12,700	m^3	$13	$165,000
2.	Earth Borrow	9,700	m^3	$5	$48,500
3.	Hot Mix HL1 (50mm depth)	1,400	t	$115	$161,000
4.	Hot Mix HDBC (100mm depth)	4,700	t	$95	$446,500
5.	Granular A (150mm depth)	4,600	t	$25	$115,000
6.	Granular B (600mm depth)	17,000	t	$20	$240,000
7.	Rehabilitation of Existing Pavement (50mm HL1; 50 mm HDBC)	9,900	t	$105	$1,039,500
8.	Concrete Bus Bay	900	m^2	$130	$117,000
10.	Concrete Curb and Gutter (all types)	6,300	m	$55	$346,500
11.	Concrete Sidewalk/Median/Platform	4,000	m^2	$55	$220,000
12.	Concrete Strip	1,300	m^2	$60	$78,000
13.	Asphalt Pathway	4,300	m^2	$26	$112,000
14.	Storm Sewer		L.S.		$2,000,000
15.	SWM Facilities/Oil Grit Separator		L.S.		$500,000
16.	Concrete Culvert	N/A	m	N/A	N/A
17.	Retaining Walls	N/A	m^2	N/A	N/A
18.	Topsoil and Sod	24,000	m^2	$8	$192,000
19.	Mill Existing Pavement (100 mm depth)	45,600	m^2	$3	$137,000
20.	Removal of Curb and Gutter	9,000	m	$15	$135,000
21.	Clearing and Grubbing		L.S.		$100,000
22.	Landscaping		L.S.		$500,000
23.	Illumination		L.S.		$750,000
24.	Noise Walls	610	m	$1,000	$610,000
25.	Traffic Signals				
	– New traffic signals	N/A	each	N/A	N/A
	– Modification to existing traffic signals	6	each	$120,000	$720,000
26.	Maintenance of Traffic				
	– Traffic Control		L.S.		$500,000
	– Temporary Widening/Staging		L.S.		$250,000
27.	Miscellaneous (15%)		.		$1,520,000
	Subtotal (Construction)				$11,653,000
	Utility Relocation (lump sum estimate)				$1,000,000
	Contingency (15%)				$1,748,000
	Engineering (Detailed Design & CA) (15%)				$1,748,000
	Total (Excluding HST)				$16,149,000

Exhibit 7-11. Preliminary Cost Estimate – Roadway Construction (Phase 2 – Upper Middle Road to Dundas Street)

	Item Description	Quantity	Unit	Estimated Price	Total
1.	Earth Excavation	19,500	m^3	$13	$253,500
2.	Earth Borrow	14,800	m^3	$5	$74,000
3.	Hot Mix HL1 (50mm depth)	2,100	t	$115	$241,500
4.	Hot Mix HDBC (100mm depth)	7,300	t	$95	$693,500
5.	Granular A (150mm depth)	7,200	t	$25	$180,000
6.	Granular B (600mm depth)	26,200	t	$20	$524,000
7.	Rehabilitation of Existing Pavement (50mm HL1; 50 mm HDBC)	11,550	t	$105	$1,212,750
8.	Concrete Bus Bay	1,400	m^2	$130	$182,000
10.	Concrete Curb and Gutter (all types)	7,700	m	$55	$423,500
11.	Concrete Sidewalk/Median/Platform	5,100	m^2	$55	$280,000
12.	Concrete Strip	1,560	m^2	$60	$93,600
13.	Asphalt Pathway	10,300	m^2	$26	$267,800
14.	Storm Sewer		L.S.		$2,110,000
15.	SWM Facilities/Oil Grit Separator		L.S.		$500,000
16.	Concrete Culvert	58	m	$10,000	$580,000
17.	Retaining Walls	N/A	m^2	N/A	N/A
18.	Topsoil and Sod	24,000	m^2	$8	$192,000
19.	Mill Existing Pavement (100 mm depth)	45,600	m^2	$3	$136,800
20.	Removal of Curb and Gutter	9,000	m	$15	$135,000
21.	Clearing and Grubbing		L.S.		$100,000
22.	Landscaping		L.S.		$500,000
23.	Illumination		L.S.		$750,000
24.	Noise Walls	307	m	$1,000	$307,000
25.	Traffic Signals				
	– New traffic signals	1	each	$200,000	$200,000
	– Modification to existing traffic signals	5	each	$120,000	$600,000
26.	Maintenance of Traffic				
	– Traffic Control		L.S.		$500,000
	– Temporary Widening/Staging		L.S.		$250,000
27.	Miscellaneous (15%)				$1,849,000
	Subtotal (Construction)				$14,179,000
	Utility Relocation (lump sum estimate)				$1,000,000
	Contingency (15%)				$2,127,000
	Engineering (Detailed Design & CA) (15%)				$2,127,000
	Total (Excluding HST)				$19,433,000

Exhibit 7-12. Preliminary Cost Estimate – Roadway Construction (Phase 3 – Dundas Street to Highway 407)

	Item Description	Quantity	Unit	Estimated Price	Total
1.	Earth Excavation	49,200	m^3	$13	$639,600
2.	Earth Borrow	37,200	m^3	$5	$186,000
3.	Hot Mix HL1 (50mm depth)	5,300	t	$115	$609,500
4.	Hot Mix HDBC (100mm depth)	18,700	t	$95	$1,776,500
5.	Granular A (150mm depth)	15,400	t	$25	$385,000
6.	Granular B (600mm depth)	64,000	t	$20	$1,280,000
7.	Rehabilitation of Existing Pavement (50mm HL1; 50 mm HDBC)	11,550	t	$105	$1,212,750
8.	Concrete Bus Bay	3,000	m^2	$130	$390,000
10.	Concrete Curb and Gutter (all types)	11,700	m	$55	$643,500
11.	Concrete Sidewalk/Median/Platform	7,800	m^2	$55	$429,000
12.	Concrete Strip	2,340	m^2	$60	$140,400
13.	Asphalt Pathway	17,100	m^2	$26	$449,600
14.	Storm Sewer		L.S.		$3,165,000
15.	SWM Facilities/Oil Grit Separator		L.S.		$2,000,000
16.	Concrete Culvert		L.S.		$1.500,000
17.	Retaining Walls	23	m^2	$800	$18,400
18.	Topsoil and Sod	96,000	m^2	$8	$384,000
19.	Mill Existing Pavement (100 mm depth)	152,000	m^2	$3	$182,400
20.	Removal of Curb and Gutter	N/A	m	N/A	N/A
21.	Clearing and Grubbing		L.S.		$100,000
22.	Landscaping		L.S.		$500,000
23.	Illumination		L.S.		$1,000,000
24.	Noise Walls	N/A	m	N/A	N/A
25.	Traffic Signals				
	– New traffic signals	4	each	$200,000	$800,000
	– Modification to existing traffic signals	2	each	$120,000	$240,000
	– New traffic controller	4	each	$50,000	$200,000
26.	Maintenance of Traffic				
	– Traffic Control		L.S.		$250,000
	– Temporary Widening/Staging		L.S.		$250,000
27.	Miscellaneous (15%)				$3,063,000
	Subtotal (Construction)				$23,485,000
	Utility Relocation (lump sum estimate)				$1,000,000
	Contingency (15%)				$3,503,000
	Engineering (Detailed Design & CA) (15%)				$3,503,000
	Total (Excluding HST)				$31,491,000

7.2 Transit Major Features

7.2.1 Transit Stops

7.2.1.1 Functional Design

Transit stops along the Trafalgar Road corridor will operate consistent with the curbside bus stops being implemented along Dundas Street, as described in the Dundas Street Class EA Study – Bronte Road to Proudfoot Trail (Dundas Street EA). Depending on the size of platform (varies in some restricted spaces along the corridor), the typical platform supports a passenger shelter, bicycle storage, landscaping/streetscaping elements, and passenger information systems. Passenger shelters are set-back from the curb face by approximately 2.5m to allow sufficient space for passenger circulation and for manoeuvering of mobility-assistive devices. The design of the passenger platform should match the typical design that will be used for transit stations construction on Dundas Street, as determined through the Dundas Street EA. The passenger platform is typically a reinforced concrete pad, approximately 25 m long x 2.5 m wide.

Transit stops are generally located on the far-side of the signalized intersection, with some specific location exceptions. Bus bays are provided to allow the HOV lane to remain clear and to allow for express bus service to bypass a stopped bus when the system transitions to curb-lane BRT. The bus bay incorporates a taper to accommodate acceleration for merging back in to the travel lane. The bay is long enough to accommodate two typical 12 m buses at the platform, or one 18 m articulated bus and one 12 m bus within the bay

The multi-use pathway continues through the station area, behind the passenger waiting area to limit conflicts between through traffic on the pathway and circulating traffic within the station area.

7.2.1.2 Transit Stop Locations

In Halton Region, transit stops are designated as either Major or Minor stops, with the type of amenities provided at the stop differing between the two designations. The amenities to be included at each station will be determined in detailed design, but in general Major stops have larger shelters, and more passenger activity, than Minor stops.

Plates 1 to **22** show the passenger platforms, and **Exhibit 7.13** summarizes the stop locations and designations for the proposed stops on Trafalgar Road between Cross Avenue and Highway 407. Several platforms have been modified to avoid property impacts, and these are identified in **Exhibit 7.13**.

Exhibit 7-13. Trafalgar Road Bus Stop Locations – Cross Avenue to South of Highway 407

Location	Direction	Designation
McCraney Street East/White Oaks Boulevard	NB	Minor Stop
	SB	Minor Stop
Ceremonial Road	NB	Minor Stop
	SB	Minor Stop
Upper Middle Road	NB	Minor Stop*
	SB	Minor Stop
River Oaks Boulevard East/Briarhall Gate	NB	Minor Stop*
	SB	Minor Stop
Glenashton Drive	NB	Minor Stop*
	SB	Minor Stop
Oak Park Boulevard/Post Ridge Drive	NB	Minor Stop
	SB	Minor Stop
Dundas Street	NB	Minor Stop
	SB	Minor Stop
Future Signalized Intersection at ~ 15+825	NB	Minor Stop
	SB	Minor Stop
Future Signalized Intersection at ~ 16+125	NB	Minor Stop
	SB	Minor Stop
Future Signalized Intersection at ~ 16+700	NB	Minor Stop
	SB	Minor Stop
Future Signalized Intersection at ~ 17+080	NB	Minor Stop
	SB	Minor Stop
Burnhamthorpe Road	NB	Minor Stop
	SB	Minor Stop
William Halton Parkway	NB	Minor Stop
	SB	Minor Stop
**Footprint of the northbound platforms at Upper Middle Road, River Oaks Boulevard East/Briarhall Gate, and Glenashton Drive have been modified to avoid property impacts or impacts to existing local roadways*		

7.2.1.3 Passenger Amenities

The transit stops along Trafalgar Road will be fully accessible, consistent with the Dundas Street corridor. The passenger shelters will be of modular design, allowing future increases in capacity as passenger demand dictates (as space allows). Bus shelters will feature unique architectural amenities, such as:

- Enhanced accessibility features
  - Tactile strip at platform edge
  - Audible and visual passenger information
  - Seating
- Enhanced security features:
  - Enhanced lighting
  - High visibility
  - Multiple shelter access/egress points
- Real-time passenger information
- Bicycle racks
- Trash and recycling bins

The specific layout of the stop elements will be determined in detailed design through consultation with Oakville Transit/Town of Oakville.

7.2.1.4 Support Corridors

The Trafalgar Road corridor will form a major north-south transit corridor in the Region, connecting with other east-west transit corridors, including Dundas Street (a future HOV/BRT corridor) and the William Halton Parkway. The Trafalgar Road corridor forms a key link between the existing QEW Corridor (HOV) and the Oakville GO Station at the south end of the study area and the Highway 407 toll road at the north end of the Study Area.

7.3 Operations of HOV / Transit Lanes and BRT Lanes

7.3.1 HOV Eligibility

This section includes a discussion of the key operational guidelines related to potential HOV use. Recommendations are consistent with the recommendations made in the Dundas Street EA.[12]

7.3.1.1 Vehicle Occupancy

HOV lanes are reserved for vehicles carrying at least two people, often referred to as "2+". The HOV 2+ eligibility criterion should be applied in the Trafalgar Road corridor as it is consistent with other HOV networks in the vicinity, including the future Dundas Street HOV corridor, the Queen Elizabeth Way (QEW) freeway through the Town of Oakville and City of Burlington, and the Highway 403 corridor through the City of Mississauga.

7.3.1.2 Vehicle Type

Permitted Use

The HOV 2+ criterion typically applies to general purpose vehicles, and there are some special rules surrounding other vehicles types. Vehicles which may legally use the HOV/Transit lanes (i.e. prior to future BRT only operation) include:

- Private vehicles with two or more occupants
- Taxis (with 2+ occupants)
- Buses
- Emergency vehicles (police, ambulance and fire, regardless of occupancy; tow trucks only if operating with lights flashing in response to an incident)
- Carpools and Vanpools with two or more occupants

Not Permitted

- Heavy Trucks, even with two or more occupants, should not be allowed to use the HOV lanes as the acceleration/deceleration characteristics of these vehicles do not match the other vehicles within the HOV

[12] *Dundas Street Class EA Study, Bronte Road to Proudfoot Trail, Dec. 2012, Section 6.3, pg. 6-44.*

lane, posing safety and operations concerns for other facility users. This excludes all vehicles with more than two axles.

7.3.1.3 Hours and Days of Week Operation

The HOV/Transit lanes would operate 24 hours per day, 7 days per week. This will have the merit of consistency, minimizing motorist confusion and potential misunderstanding of the rules, enhancing enforceability. The application of the continuous restriction can reinforce the permanence of the facility.

7.3.1.4 Transit Priority at Signalized Intersections

It is recommended that Transit priority signals be provided at several intersections, including Leighland Avenue for southbound buses, Dundas Street for eastbound to northbound left-turning transit vehicles, as well as for northbound transit vehicles accessing Sheridan College at Ceremonial Drive. This may be provided through a separate signal phase given when a transit vehicle is detected at the stop bar in the right turn curb lane.

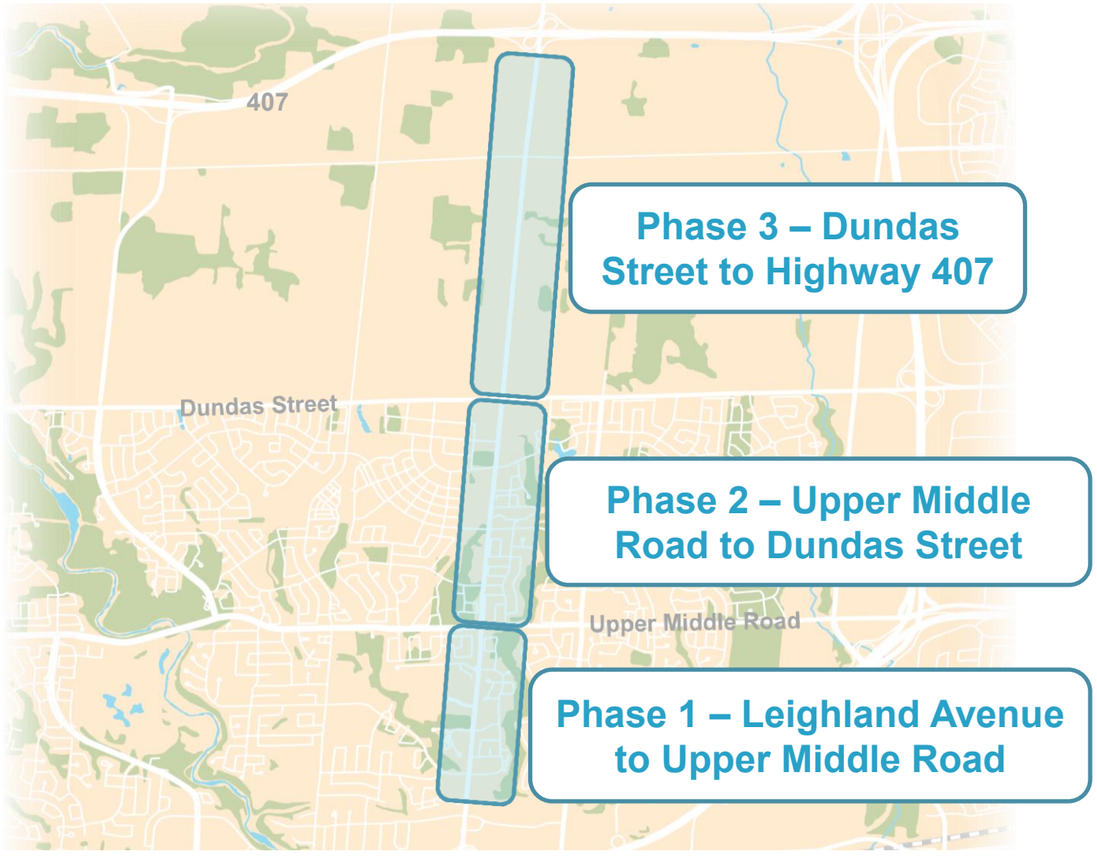
7.3.2 Implementation Approach

Each of the three phases will initially be built as a 6-lane urban cross-section with multi-use trails and/or sidewalks, transit facilities and transit priority measures. Upon completion of the widening of Trafalgar Road to 6 lanes throughout the project limits (i.e. all three segments), there is future opportunity to consider the introduction of High Occupancy Vehicle (HOV) curb lanes allowing a mix of transit and private vehicles with two or more occupants. As transit ridership builds, there is the opportunity to convert the HOV lanes into dedicated bus lanes in the future. The limits or extent of operations for HOV/transit would need to be confirmed in consultation with the Town of Oakville and Oakville Transit. Conversion from curbside HOV/ Transit lanes to curbside BRT lanes would not require reconstruction of the roadway. Much of the transition would be related to changes in signage and pavement markings.

7.4 Construction Implementation

Construction of the proposed Trafalgar Road improvements is to take place in three phases, as shown in **Exhibit 7.14**. Phase 1 is anticipated to occur in 2017, followed by Phase 2 in 2018, and Phase 3 in 2019.

Exhibit 7-14. Construction Phases



8. Potential Environmental Effects, Mitigation Measures and Commitments to Future Work

8.1 Anticipated Impacts and Proposed Mitigation Measures

Many of the environmental impacts and concerns related to the project have been minimized or mitigated through the process by which the recommended preliminary design was refined. The remaining anticipated impacts to the natural, social and cultural environments and the proposed mitigation measures for the Recommended Design are described in the following sections.

8.1.1 Natural Environment

Impacts have been divided into potential short-term and long-term environmental impacts which are those impacts anticipated based on the proposed work related to the Trafalgar Road improvements.

There are two key stages in development during which potential environmental impacts may occur: (1) construction stage and (2) post-construction stage. The majority of short-term impacts will be related to the construction stage of the Trafalgar Road improvements. Generally, these impacts will be temporary in nature and can be prevented or minimized through proper construction practices and site inspection. Long-term impacts are prevented and mitigated through site design, buffer implementation, best management practices, and environmentally sensitive maintenance.

8.1.1.1 Short-term Impacts

The potential short-term environmental effects associated with a proposed widening typically relate primarily to construction activities. Many of the potential short-term impacts are common to various types of infrastructure construction and, therefore, have associated standard mitigation measures. Potential construction-related impacts that were considered as potentially relevant to the proposed project consist of the following:

Terrestrial

Disturbance to vegetation: During construction heavy machinery may damage trees and shrubs within affected areas.

Removal of trees: Tree removal may be required to accommodate the widening.

Impact to tree rooting zones: During grading and construction in areas immediately adjacent to natural heritage features and planted trees, roots may be impacted by machinery and soils may be compacted, thereby affecting the trees' ability to grow and absorb nutrients and water.

Disturbance of birds and other wildlife: Construction activities within the subject lands have the potential to disturb breeding birds and other resident wildlife within the study area.

Aquatic

Modifications at Watercourse Crossings: East Morrison Creek supports fish habitat. Four of the ten existing crossings of East Morrison Creek are proposed to be replaced with larger, extended concrete box structures with open footings to allow for fish passage and one culvert will be removed as follows:

- Culvert C9, 03-1182340BR01 – A 7000 mm wide x 2430 mm high x 58 m long concrete box culvert (or equivalent) is being recommended to replace the existing 3480 mm wide x 2210 mm high x 36.8 m long corrugated steel pipe (CSP) arch culvert situated at Station 5+225.
- Culvert C6, ME-T1, 03-118253CU02 – A 5000 x 1800 mm x 49.4 m long (or equivalent) concrete box is being recommended to replace the existing 2440 mm wide x 1520 mm high x 31.4 m long concrete box culvert situated at Station 5+500. The existing gabion structures shall also be removed when the culvert is replaced.
- Culvert C5, ME-T2, 03-1182530CU01 – The existing 1800 mm wide x 1050 mm high x 37.1 m long concrete box culvert situated at Station 5+665 will be removed.
- Culvert C4, ME-T3 – A 7320 x 1250 mm x 97.0 m long concrete box (or equivalent) is proposed by Development to replace the existing twin 1000 mm diameter x 41.4 m long CSP culvert situated at Station 5+820.
- Culvert C3, ME-T5 – A 3600 mm wide x 1200 mm high x 62.3 m long concrete box culvert is being recommended to replace the existing 1880 mm wide x 1260 mm high x 33.0 m long CSP arch culvert crossing at East Morrison Creek (East Branch) (i.e., Station 6+725).

It should be noted that the proposed design and associated anticipated impacts are preliminary in nature and will be further refined during detailed design.

Disturbance of Fish Habitat: Construction activities have the potential to introduce sediment and increase turbidity within the watercourse.

Fill and Sediment Deposition within Watercourses: Fill and sediment run-off from the active construction area may enter the watercourses.

Short term, Isolated Dewatering: Dewatering of the work area may be necessary during the construction phase. Details of this will be determined at the Detailed Design stage of the project.

8.1.1.2 Long-term Impacts

Direct long-term environmental impacts are defined as those impacts that result in the immediate loss of features. Potential impacts to be considered for any project of this type include:

Terrestrial

- Loss or Potential Disturbance to Vegetation
- Damage to Peripheral Vegetation
- Introduction of Non-Native Species
- Potential Disruption to Resident Wildlife through Noise
- Potential Disruption to Wildlife through Lighting
- Potential Increase of Wildlife Road Mortality
- Potential Disturbance to Significant Woodlands

8.1.1.3 Net Effects

Through the use of appropriate mitigation measures it is not anticipated for the widening of Trafalgar Road to have a significant impact on the natural features within the study area. A detailed assessment of the net effects of the project is included in the Natural Environment report provided in **Appendix A** of this ESR.

8.1.1.4 Mitigation Measures

During construction, heavy equipment could damage peripheral vegetation from contact, excavation and/or soil compaction. Dust coated vegetation can reduce photosynthesis, increase susceptibility to disease and lead to death. It is anticipated that perimeter plants would be most susceptible to such effects. The following recommendations are made to mitigate these potential impacts.

Vegetation

Peripheral Vegetation Protection: Prior to heavy machinery working adjacent to woodlands, a fence barrier for tree protection should be installed outside the drip-line of the significant features to protect any vegetation that is to be retained and is in the vicinity of exposure to damage by machinery. In order to address root damage, it will be necessary to prune roots of adjacent trees during grading and excavation. To avoid compaction of soils, root zones around trees within natural heritage features will need to be fenced. Most areas will be avoided by restricting construction to areas outside the features.

Dust Suppressant Treatment: Dust suppressants during dry periods should be applied to those areas which generate large amounts of dust. Earth movement shall be restricted to immediately adjacent to woodlands during periods of high dust generation. Construction vehicle access should be limited to areas adjacent to woodlands to prevent soil compaction and/or the initiation of soil erosion events. Construction vehicle re-fueling stations should be centralized away from natural areas and watercourses. Vehicle washing should be prohibited in areas adjacent to the woodlands.

Controlled Construction Vehicle Access: Construction vehicle access should be limited to existing roadways and construction paths (i.e., away from the identified Natural Areas and their recommended buffers). For areas immediately adjacent to woodland boundaries, periodic supervision of the construction is recommended.

Construction Vehicle Re-fueling Stations: Re-fueling stations should be located within a centralized location on-site away from woodlands, watercourses and their recommended buffers. Re-fueling stations should be constructed in a manner to prevent soil and/or surface and groundwater contamination from any leaks or spills. An emergency response kit should be made available at each re-fueling station in case of a spill. In addition, on-site crew members operating construction vehicles should be appropriately trained in handling a potential spill and have WHMIS Training. Any chemical transfer/maintenance should be conducted within the refueling station areas.

Damage to Rooting Zones during Removals: During grading and construction in areas immediately adjacent to woodlands and planted trees, roots may be damaged by machinery and soils may be compacted, thereby affecting the trees' ability to grow and absorb nutrients and water. In order to address root damage, it will be necessary to prune roots of adjacent trees during grading and excavation. To avoid compaction of soils, root zones around trees within natural heritage features will need to be fenced. Most areas will be avoided by restricting construction to areas outside the features.

Tree Canopy

Impacts to trees within the study area are expected to be limited to landscaped and/or streetscaped areas. It should be noted that for any canopy replacement resulting from the removal of tree or forest cover on Regionally owned lands as a result of the proposed Trafalgar Road widening, adherence to the Tree Canopy Replacement Policy (Council Report LPS31-08) will apply. Through Halton's Official Plan, the Region has expressed its desire to implement a tree replacement policy on Regionally owned lands. This is to:

- To protect significant tree-covered areas as a natural resource and promote the enhancement of woodland coverage in Halton. (Official Plan Policy 146(6));
- Promote the conservation and wise economic use of trees consistent with the ecological and environmental goals, objectives and policies of the Official Plan (Official Plan Policy146(7));
- Recognize and protect trees as a renewable resource essential to the health and welfare of Halton residents, wildlife and rural setting and to this end: Support the Local Municipalities in requiring that development proposals, to the maximum degree possible, preserve existing trees and plant additional trees in accordance with good forestry management practice.
- Retain treescapes along major transportation corridors, replace trees cut down for public works and, wherever possible, develop new treescapes consistent with safe and aesthetically pleasing road or corridor design (Official Plan Policy 147(6) b)).

Through detailed design for Trafalgar Road the Tree Canopy Replacement Policy Canopy Replacement Schedule will be utilized in consultation with the Regional Forester. Further, a permit will be required from Conservation Halton prior to any tree removal activities within the Conservation Halton Regulatory Limit.

Wildlife

Construction activities within the study area have the potential to disturb resident wildlife within the identified Candidate Significant Woodlands. A certain degree of disturbance can be avoided by the proper scheduling of construction periods. The following mitigation measures are recommended to minimize impacts to wildlife.

During the detailed design phase, a more detailed wildlife observation protocol will be drafted to ensure the appropriate mitigation measures are followed for encounters with wildlife. Upon the first encounter of any wildlife including SAR (Endangered, Threatened or Special Concern) the following steps will be taken:

- Work in the immediate vicinity of the observation is to come to a stop;
- Should an Ecologist/Biologist not be on-site, one should be contacted immediately;
- Ecologist/Biologist will notify the District MNRF Biologist immediately of any observation of Endangered and Threatened species and/or immediately for any species going to a wildlife custodian;

Breeding Birds

Construction activities within the study area have the potential to disturb breeding birds. Removal of vegetation within the study areas can occur between the months of September to April, which is outside of the typical breeding bird period (May 1st to July 31st) within southern Ontario. If removal of vegetation is to occur during the breeding bird window, the area will be searched by a qualified ecologist for the presence of nesting birds to avoid contravening the Migratory Birds Convention Act. Clearing shall only be undertaken if the ecologist is satisfied there are no breeding/nesting pairs within the affected areas. If vegetation clearing is required during the breeding bird season, Canadian Wildlife Services (CWS) will also be consulted.

Species at Risk

Species at Risk (SAR) identified as potentially occurring within the study area shall be surveyed for during detailed design prior to the initiation of construction. A qualified ecologist/biologist or ecologists shall conduct a survey of the project work area and areas immediately adjacent to the work areas (10 m - 30 m) for Species at Risk. Where Species at Risk are found, appropriate transplanting (for vegetation species) and relocation (for reptiles and amphibians) will be undertaken by a qualified professional, where possible. If Butternut is confirmed within the project work area or within 25 meters of the work area, the MNRF will be contacted for further advice on how to proceed.

Fish and Fish Habitat

Potential impacts to fish and fish habitat can be prevented through appropriate mitigation measures, including but not limited to, the implementation of a proper erosion and sediment control plan and by careful construction techniques. A Fisheries Act Authorization may be required and a fish rescue is anticipated.

All of the identified watercourses within the vicinity of the proposed works are classified as warm-water, and as such, any in-water construction activities must adhere to watercourse specific timing windows set out by the MNRF to avoid critical spawning/migration periods. The restricted activity timing window for the spring spawning period is from July 1 to March 31. In general, construction activities near water or in-water should take place within the low flow period in the late summer months as to avoid or minimize impacts.

Temporary flow passage measures will be developed and implemented in accordance with relevant permits as required (e.g. Permits To Take Water) to isolate the temporary instream construction zones and maintain clean flow downstream.

The permanent removal and temporary disturbance of riparian vegetation is anticipated in association with culvert replacement activities. Any removal of riparian and woody vegetation will be minimized, to the extent possible.

Sediment control fencing shall be implemented to avoid fill and sediment runoff from the active construction area entering East Morrison Creek, West Morrison Creek and/or the Morrison Wedgewood Diversion Channel.

The use of Best Management Practices (BMPs) will be implemented during construction to avoid impacts to in stream aquatic habitat, loss of geomorphological functioning, degradation to water quality and impacts to water flows. Stockpile areas will be placed greater than 30 m away from any watercourse and will be property designated to reduce the impact on the surface water runoff. Geotextile will be used at the discharge points to prevent scouring and erosion of the banks.

Mitigation measures will be refined during detailed design, in consultation with Conservation Halton. In addition, site specific and design-related mitigation measures will be further refined in consultation with Conservation Halton (and MNRF as appropriate), once the details of the design and associated work requirements and potential impacts at each crossing will be finalized during detailed design.

8.1.1.5 Fluvial Geomorphology

For approximately 455 m of channel length of East Morrison Creek, from upstream of Crossing 4 to downstream of Crossing 6, a total of approximately 170 m of channel is currently enclosed within road or parking lot culverts. The proposed widening of Trafalgar Road and required extension of the culverts for flood conveyance will require additional enclosure of the study area watercourses. The road widening will also encroach on the channel which is now mostly contained within a linear feature parallel to the road.

Realignment of a segment of the east branch of East Morrison Creek in the area of the existing culverts identified in NOCSS as ME-T1, ME-T2, and ME-T3 is required to accommodate the road widening. East Morrison Creek will be directed to the west side of Trafalgar Road via the culvert at Station 5+820 (ME-T3), as developed by Minto (i.e. the Combination Option). The creek will remain on the west side of Trafalgar Road until south of Dundas Street, eliminating the need for the culvert at Station 5+665 (ME-T2) and for the watercourse to pass through the 900 mm CSP upstream of ME-T2 and through the culvert at Station 5+500 (ME-T1).

The recommended stormwater management plan reduces the overall length of channel enclosure for East Morrison Creek. Further, the realigned channel will maintain the form and function of the watercourse as required by NOCSS and will allow for improved aquatic habitat and channel morphology through natural channel design. Channel designs will be prepared by appropriate technical experts during detailed design in consultation with Conservation Halton.

In the unlikely event the Combination Option is not implemented prior to the widening of Trafalgar Road or for the ultimate condition, detailed hydraulic analysis will be undertaken for the revised Solo Option which realigns East Morrison Creek along the east side of Trafalgar Road north of Dundas Street to demonstrate the final design meets Conservation Halton's regulatory requirements.

8.1.1.6 Groundwater

Construction activities for the roadway could result in the need for dewatering during construction. As per the requirements of the Ontario Water Resources Act, the diversion of surface water or the extraction of groundwater in excess of 50,000 litres per day requires a Permit to Take Water from the Ministry of the Environment and Climate Change. A Permit to Take Water may be required for some components of the work. Permit to Take Water requirements will be confirmed at the detailed design stage.

8.1.2 Social Environment

The anticipated impacts to the social environment and the proposed mitigation measures are as follows:

8.1.2.1 Land Use

The recommended alternative supports future development/redevelopment plans and is consistent with the North Oakville East Secondary Plan, Provincial planning policies and the regional and local official plans. The undertaking supports future land uses north of Dundas Street and proposed redevelopment south of Dundas Street.

Existing land uses will also be impacted by the proposed new corridor. Potential impacts and mitigation measures are detailed below.

8.1.2.2 Pedestrian and Cycling Facilities

Pedestrian and cyclists will be accommodated along the corridor through a multi-use path and sidewalk, and formalized crossings at intersections.

8.1.2.3 Buildings and Properties Adjacent to the Alignment

Approximately 4.7ha of property are expected to be required for implementation of this project. Property acquisition, in accordance with Regional procedures, will occur in advance of construction and following the completion of this Environmental Assessment at detail design.

Part of this project is in the vicinity of agricultural lands. Since there is the potential for intercepting tile drains during construction work, a survey should be completed to identify such a possibility during detailed design.

8.1.2.4 Private and Commercial/Business Entrances

The proposed widening will require adjustments to private and commercial/business entrances to accommodate the new road plan. Adjustments will primarily involve restrictions to existing turning movements with the addition of a raised median through the corridor. To mitigate the restricted turning movements, U-turns are not planned to be prohibited at signalized intersections (on the green phase only to avoid conflict with pedestrian movements). Other adjustments may include shortening of driveways or changes in driveway profiles. Driveway profiles will be surveyed in detail design to determine precise requirements.

8.1.2.5 Noise

The predicted noise levels for 2021 (HOV lanes), south of Dundas Street, with the undertaking range from 61 dBA to 73 dBA. The change in noise level ranges from 0 dBA to 4 dBA; no sensitive noise receptors will see an increase of 5 dBA or greater. For the year 2031 (BRT lanes) with the undertaking, the predicted noise levels range from 60 dBA to 70 dBA. The change in noise level ranges from -2 dBA to 4 dBA.

Under the provisions of the MTO/MOECC Noise Protocol and Environmental Guide for Noise (MTO 2006), mitigation should be considered for the receiver locations with a greater than 5 dBA increase. Although the 12 sensitive receptors along the corridor do not exceed the 5 dBA increase, the Region will be replacing existing noise walls that were not part of the 2012 Noise Mitigation Initiative. Further, the Region will be providing noise walls for identified existing residences along Trafalgar Road that do not currently have a noise wall. This will provide an opportunity for the Region to mitigate the noise levels that exceed 60dBA along the corridor.

Construction of the noise walls will be incorporated into the contract documents. This is consistent with the requirements of the MTO/MOECC Noise Protocol. Any construction activities throughout the project should conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment, keeping idling of construction equipment to a minimum and maintaining equipment in good working order to reduce noise from the construction activities.

8.1.2.6 Air Quality

An Air Quality Assessment was carried out as part of this study to predict the potential air quality impacts as they relate to the long-term provision for BRT by 2031 within the Study Area. Local air quality impacts were assessed by estimating contaminant concentrations at representative sensitive receptors within the Study Area and comparing them to applicable regulatory limits. Background contaminant concentration levels were compared against the anticipated contaminant concentration levels resulting from the project, including future traffic volumes.

Regional air quality impacts were also assessed by estimating and comparing the differences in air pollutant emissions from the total transportation mix for the year 2031 based on the 'future no-build' and 'future-build' scenarios. The study assessed impacts from transportation emissions such as Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Sulphur Dioxide (SO_2) and Particulate Matter (PM). Select Volatile Organic Compound (VOC/VOCs) emissions were also assessed as directed by the MOECC, including acetaldehyde, acrolein, benzene, 1,3-butadiene, and formaldehyde. Emission and dispersion models were used in the assessment.

Based on the findings of the assessment, it is expected that the overall impacts of targeted contaminants will decrease. From an air quality perspective, the implementation of the preferred design results in reductions of regional air quality impacts while minimizing local impacts.

Air emissions generated during construction activities will result in the creation and inhalation of vapours and PM, both by construction workers and the surrounding community. Potential "air-impacting" activities include, but are not limited to:

- material removal (cutting, chiseling, grinding, etc.);
- materials processing and handling;
- transportation operation and maintenance;
- construction machinery operation and maintenance;
- material replacement (concrete pouring and patching, paving, etc.);
- soil excavation; and,
- soil transport and stockpiling.

Construction activities would predominantly affect residential areas. The predominant wind directions are somewhat aligned with Trafalgar Road itself. Factors that will affect construction-related air quality impacts include a person's proximity to the construction activity, the number of machines operating at that location and the meteorological conditions at the time those activities occur. Air quality impacts can be effectively mitigated during the planning, staging, and scheduling of construction activities through the application of best management practices, ensuring that:

- Construction activities are scheduled to avoid overlapping construction activities in any one area; and,
- The number of machines operating in any one area is minimized.

Other means of mitigating exposure to construction related emissions can include:

- Ensuring the use of heavy equipment in good condition of maintenance and compliant with applicable federal regulations for off-road diesel engines;
- Ensuring machinery is maintained and operated in accordance with the manufacturers specifications;
- Using equipment sized for the particular job and operating equipment at optimum rated loads;
- Minimizing idling time and posting signage to this effect around the construction site;
- Locating stationary equipment (e.g., generators, compressors etc.) as far away from sensitive receptors as practical; and,
- Implementing those measures specified in the Dust Control Plan (to be developed during the Detailed Design Phase) to minimize the generation of dust via materials handling, vehicle movement and wind erosion.

Finally, for any road widening works, it is recommended that the areas potentially impacted by particulate levels are further vegetated where required. Planting coniferous trees should be considered in these areas.

8.1.2.7 Aesthetics

Areas requiring enhanced landscape treatment for aesthetic and other considerations will be identified through the development of a Landscape Plan during detail design in consultation with the Town of Oakville.

8.1.3 Cultural Environment

8.1.3.1 Built Heritage Resources and Cultural Heritage Landscapes

No direct impacts, i.e., demolition removal, were identified as part of the proposed widening.

The proposed design will introduce new physical, visual, audible or atmospheric elements including urban design elements such as sidewalks, curbs, bus platforms, and passenger platforms that are not in keeping with the existing rural character and/or setting, of the identified cultural heritage resources along Trafalgar Road north of Dundas Street. There are eight identified disruptions associated with the project, including:

- #4233 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – changes to the entrance drive and property frontage
- #3437 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – introduction of bus bay and passenger platform
- #3444 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – future signalized intersection will be immediately east of the residence and the ROW will require acquisition along frontage and side yard for sidewalk and widening
- #3371 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – changes to the entrance drive and property frontage
- Hamlet of Trafalgar – disruption of remaining character due to a reduction in property frontage
- #3048 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – reduction in property frontage as a result of the widening and introduction of sidewalk
- #3040 Trafalgar Road (included on the Town of Oakville Heritage Register, Appendix D) – reduction in property frontage as a result of widening and introduction of sidewalk
- #3030 Trafalgar Road - reduction in property frontage as a result of widening and introduction of sidewalk

8.1.3.2 Archaeology

There is high potential for the recovery of both Aboriginal and Euro-Canadian remains within the areas of open space adjacent to Trafalgar Road between Upper Middle Road and Highway 407 during construction. A Stage 2 Archaeological Assessment will be completed in undisturbed areas identified in **Appendix F**, during the detailed design phase. Subsequent stages will be identified as part of the Stage 2 Assessment.

8.2 Mitigation Measures and Detailed Design Requirements

Many of the environmental concerns related to this project have been mitigated through the process by which the recommended design was selected, as described in this ESR. The potential impacts and mitigation measures are described in **Section 8.1**. This section provides a detailed list of specific commitments to be carried forward to Phase 5 of the Municipal Class EA process, Implementation.

It is recommended that these commitments be incorporated into the construction contract packages so that contractors are aware of these requirements when preparing their tender submission. Monitoring of construction activities must ensure that the environmental standards and commitments for construction are met.

Environmental monitoring will be combined with construction supervision to include periodic site visits and inspections throughout the course of the work (e.g., confirm the proper placement and maintenance of erosion and sediment control measures).

Exhibit 8-1. Mitigation Measures and Commitments to Future Work

ID#	Mitigation Measures and Commitments to Future Work
VEGETATION	
1.	A landscape plan will be developed in consultation with the Town of Oakville during detailed design.
2.	A fence barrier for tree protection shall be installed outside the drip-line of the significant features to protect any vegetation that is to be retained and is in the vicinity of exposure to damage by machinery, prior to heavy machinery working adjacent to woodlands.
3.	For any canopy replacement resulting from the removal of tree or forest cover on Regionally owned lands, adherence to the Tree Canopy Replacement Policy (Council Report LPS31-08) will apply.
4.	A permit will be obtained from Conservation Halton prior to any tree removal activities within the Conservation Halton Regulatory Limit. Re-vegetation activities will be completed in accordance with the CH's Landscape and Tree Preservation Guidelines. Any new vegetation planted during or post construction shall be monitored for a minimum of two years.
5.	Trees to be planted in proximity to relocated Oakville Hydro overhead infrastructure north of Upper Middle Road must be species and cultivars that do not interfere with overhead wires.
6.	Roots of trees situated adjacent to woodlands and planted trees will be pruned to avoid damage by machinery/compaction.
7.	Root zones within natural heritage features shall be fenced or avoided by restricting construction activities to outside of these features.
8.	Construction vehicle access shall be limited to areas adjacent to identified Candidate Significant Woodlands to prevent soil compaction and/or the initiation of soil erosion events.
9.	Dust suppressants will be applied during dry periods to those areas which generate large amounts of dust.
10.	Earth movement immediately adjacent to woodlands will be restricted during periods of high dust generation.

Exhibit 8-1. Mitigation Measures and Commitments to Future Work

ID#	Mitigation Measures and Commitments to Future Work
WILDLIFE	
11.	Breeding bird and wildlife surveys and specified SAR surveys shall be carried out at the appropriate time of year during detailed design.
12.	At the detailed design stage, a more detailed wildlife observation protocol will be drafted to ensure the appropriate mitigation measures are followed for encounters with wildlife.
13.	Removal of vegetation within the study areas shall occur between the months of September to April, which is outside of the typical breeding bird period (May 1st to July 31st) within southern Ontario. Canadian Wildlife Services (CWS) will be consulted should tree and/or vegetation removal be required during the breeding bird window.
14.	Species at Risk (SAR) identified as potentially occurring within the study area shall be surveyed for during detailed design by a qualified ecologist/biologist or ecologist. Should any of the species be observed within the construction area, a Transplant and Relocation Plan shall be prepared and implemented prior to construction. If SAR are encountered, the project ecologist/biologist and the Ministry of Natural Resources and Forestry shall be contacted immediately for direction.
15.	Wildlife incidentally encountered during construction will not knowingly be harmed.
16.	Works will be completed in accordance with the Migratory Birds Convention Act and other applicable legislation.
17.	Enhanced wildlife crossing opportunities will be considered at the Detailed Design stage.
FISHERIES	
18.	A fisheries impact assessment would be required during detailed design of Trafalgar Road to determine if a *Fisheries Act* Authorization would be required.
19.	In-water construction activities shall adhere to the warm watercourse specific timing windows set out by the MNRF to avoid critical spawning/migration periods (i.e., from March 15th to July 15th).
20.	Temporary flow passage measures will be developed and implemented in accordance with relevant permits as required (e.g. Permits To Take Water) to isolate the temporary instream construction zones and maintain clean flow downstream.
21.	Details of the type and placement of sediment and erosion control to be used will be outlined in Sediment and Erosion Control Plan to be prepared during Detailed Design.
22.	Crossing spans shall be sufficiently wide and a defined channel should be established within the crossing. Opportunities to return the channel for the east branch of East Morrison Creek north of Dundas Street to natural form and function (i.e. natural channel design) will be explored during Detailed Design.
GROUNDWATER	
23.	Obtain a Permit to Take Water if the extraction of groundwater in excess of 50,000 litres per day is required.
STORMWATER / FLUVIAL GEOMORPHOLOGY	
24.	Hydraulic modelling and SWM sizing will be updated at the detailed design stage taking into consideration updated HEC-RAS modelling and associated floodplain mapping for the adjacent development applications.

Exhibit 8-1. Mitigation Measures and Commitments to Future Work

ID#	Mitigation Measures and Commitments to Future Work
25.	Culvert dimensions and bankfull channel dimensions will be confirmed during the Detailed Design Stage in consultation with Conservation Halton. Culverts will be designed to accommodate both hydrologic and fluvial geomorphology requirements as well as aquatic habitat requirements. Culvert sizing will ensure that substrate appropriate to the upstream and downstream reaches can be utilized.
26.	Channel designs will be prepared by appropriate technical experts during detailed design. This design will ensure that fish passage for prolonged swimming speeds is made possible up to a 10 year return event through each structure.
27.	Potential treatment train approach with infiltration/retention elements installed before an OGS unit in conjunction with super pipes will be reviewed at detailed design to manage runoff from Trafalgar Road between Dundas Street and the Morrison-Wedgewood Diversion Channel, in order to achieve water quality targets.
28.	The feasibility of infiltration facilities, such as Low Impact Development (LID) measures will be determined during detailed design using site specific information, best-management practices from current guidance documents, while recognizing that modifications to facilities may be required to account for local soil conditions.
29.	A sediment and erosion control plan that is consistent with the Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Guideline for Urban Construction will be prepared during detailed design. Erosion threshold flow rates will be established for all subcatchments, utilizing updated and detailed modelling for the area.
30.	A monitoring plan for the construction and post-construction phases will be prepared in accordance with the Town's Stormwater Monitoring Guidelines for South of Dundas Street (2011) and North of Dundas Street (2012) during detailed design.
31.	Environmental supervision of sediment and erosion control will be reviewed at the detailed design stage with Conservation Halton.
PROPERTY REQUIREMENT	
32.	Property requirements will be confirmed during detailed design and will be acquired at fair market value.
NOISE	
33.	New noise walls will be installed at identified properties for mitigating Outdoor Living Areas situated adjacent to the Trafalgar Road.
34.	Existing noise walls will be replaced to conform to the recommended wall heights (up to 3.5 m), excluding the recently installed noise walls situated on the east side of Trafalgar Road south of Upper Middle Road).
35.	The details of the noise wall (e.g. type, colour, aesthetics, etc.) will be determined during detailed design, and in consultation with the affected property owners.
36.	Construction noise constraints will be incorporated into contract documents.
37.	Construction activities throughout the project will conform to current local municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation.
38.	Contractors are required to keep idling of construction equipment to a minimum and maintain equipment

Exhibit 8-1. Mitigation Measures and Commitments to Future Work

ID#	Mitigation Measures and Commitments to Future Work
	in good working order to reduce noise from the construction activities.
AIR QUALITY	
39.	The number of machines operating in any one area will be minimized during construction.
40.	A Dust Control Plan will be developed during detailed design and implemented during construction to minimize the generation of dust via materials handling, vehicle movement and wind erosion.
41.	Minimizing idling time and posting signage to this effect around the construction site.
42.	Stationary equipment (e.g., generators, compressors etc.) will be situated as far away from sensitive receptors as practical.
43.	Using equipment sized for the particular job and operating equipment at optimum rated loads;
44.	Only use heavy equipment that is in good operating condition and compliant with applicable federal regulations for off-road diesel engines during construction
45.	Areas potentially impacted by particulate levels will be further vegetated where required. Planting coniferous trees should be considered in these areas.
ARCHAEOLOGY	
46.	A Stage 2 Archaeological Assessment will be completed during detailed design in undisturbed areas north of Dundas Street.
47.	In the event that any Aboriginal heritage, remains or significant Aboriginal artifacts are uncovered during further assessment work, the First Nations communities and/or organizations contacted throughout the course of this study will be contacted immediately.
48.	No construction activities shall take place within the study area prior to the Ministry of Tourism, Culture and Sport (Heritage Operations Unit) confirming in writing that archaeological licensing and technical review requirements have been satisfied.
MATERIALS MANAGEMENT	
49.	A construction work plan will be developed which designates locations for stockpiling of soils and other materials including fuel. Prior to commencement of construction, the limits of protection areas will be delineated and fenced to avoid inadvertent intrusion of machinery or other activities such as stockpiling of excess material. This fencing should be maintained and remain in place until final grading and landscaping has been completed.
50.	Excavated materials requiring stockpiling will be in accordance with OPSS 180.07.06 and placed in pre-determined locations, at least greater than 30 m away from any watercourse. The perimeters of stockpiles will be encircled with silt fencing, according to OPSD 219.110.
51.	Re-fueling stations should be located within a centralized location on-site away from the identified Candidate Significant Woodlands, watercourses and their recommended buffers.
52.	Re-fueling stations should be constructed in a manner to prevent soil and/or surface and groundwater contamination from any leaks or spills.
53.	An emergency response kit should be made available at each re-fueling station in case of a spill.
54.	Any chemical transfer/maintenance shall be conducted within the refueling station areas.

Exhibit 8-1. Mitigation Measures and Commitments to Future Work

ID#	Mitigation Measures and Commitments to Future Work
55.	If soil removed during construction is determined to be contaminated, disposal of contaminated soil will be consistent with Part XV.1 of the *Environmental Protection Act* and Ontario Regulation 153/04.
56.	The possibility that an application for a Permit to Take Water to the MOECC may be needed if the construction dewatering is calculated more than 50,000 L/day.

8.3 Permits and Approvals

Following the successful completion of the Class EA process documented in this ESR prepared under the Municipal Class EA (October 2000, as amended in 2007 and 2011), all requirements for Phases 1 to 4 of the Class EA process will have been met. Other approval requirements will be addressed for the project during detail design which may include:

- *Ontario Heritage Act* requirements for Archaeological Clearance;
- Health and safety requirements during construction under Ontario's *Occupational Health and Safety Act*; and
- Potential notification/permissions from respective utilities with facilities in the area.

It should also be noted that water takings in Ontario are governed by the Ontario *Water Resources Act* (OWRA) and the Water Taking Regulation (O.Reg. 387/04). A Permit to Take Water (PTTW) is required for construction activities, if the diversion of surface water or the extraction of groundwater is in excess of 50,000 litres per day. The MOECC Central Region PTTW Coordinator will be consulted during Detailed Design to confirm any approval requirements for water takings during construction or operation.

Based on the current regulation, a Category 2 application requiring a technical review of the proposed water taking by a qualified person would be needed if volumes exceed the above amount. Further information and specific details will be determined during detailed design.

A permit from Conservation Halton would be required prior to any development/site alteration within regulated areas (O.Reg. 42/06).

At the QEW ramp terminal intersections, MTO-approved PHM-125 signal drawings are required prior to implementation of ladder-type pedestrian crosswalks.

The Canadian *Environmental Assessment Act* (CEAA) was not triggered for this project.

This page is intentionally blank.

9. References

Archeoworks Inc., April 2013:
Stage 1 Archaeological Assessment (AA) for: The Widening of Trafalgar Road (Regional Road 3) from Highway 407 to Cornwall Road, Town of Oakville. Presented to AECOM Canada Ltd.

Chapman, L.J. and D.F. Putnam, 1984:
The Physiography of Southern Ontario Third Edition: Ontario Geological Survey Special Volume 2. Ministry of Natural Resources.

Department of the Environment, 1972:
The Canada Land Inventory, Report No. 2 – 1965 (Reprinted – 1969, 1972). Soil Capability Classification for Agriculture.

ENTRA Consultants (ENTRA), 2007:
Town of Oakville – Oakville Transportation Master Plan. Prepared for the Town of Oakville.

Gillespie, J.E., R.E. Wicklund and M.H. Miller, 1971:
The Soils of Halton County Report No. 43 of the Ontario Soil Survey. Prepared for the Ontario Department of Agriculture and Food and Canada Department of Agriculture.

GO Transit, 2002:
GO Transit Inter-Regional Bus Rapid Transit.

Metrolinx, 2012:
Midtown Oakville Mobility Hub Study.

Metrolinx, 2008:
The Big Move – Regional Transportation Plan. Prepared for the Ontario Government.

Ministry of Municipal Affairs and Housing (MMAH), 2005:
Provincial Policy Statement.

Ministry of Infrastructure (MOI), 2006:
Places to Grow Better Choices. Brighter Future. Growth Plan for the Greater Golden Horseshoe. Prepared for the Government of Ontario.

Municipal Engineers Association, October 2000, as amended in 2007 & 2011:
Municipal Class Environmental Assessment.

Province of Ontario, 1990:
Planning Act, R.S.O. 1990, Chapter p. 13. Last amendment: 2006, C. 32, Sched. C, ss. 47, 48.

Regional Municipality of Halton (Halton Region), 2013:
Amendment No. 39 to the Regional Plan (2006). Adopted by Regional Council on July 13, 2011.

Regional Municipality of Halton (Halton Region), 2009:
Amendment No. 38 to the Regional Plan (2006). Adopted by Regional Council on December 16, 2009.

Regional Municipality of Halton (Halton Region), 2009:
Amendment No. 37 to the Regional Plan (2006). Adopted by Regional Council on December 16, 2009.

Regional Municipality of Halton (Halton Region), 2006:
Halton Region Official Plan.

Regional Municipality of Halton (Halton Region), 2011:
Halton Transportation Master Plan to 2031 – The Road to Change. Prepared by Dillon Consulting.

Regional Municipality of Halton (Halton Region), 2004:
Halton Transportation Master Plan.

Town of Oakville, 2013:
Trafalgar Road Corridor Study Vision 2057 - Terms of Reference.

Town of Oakville, 2010:
Town of Oakville Transit Strategy.

Town of Oakville, 2009:
Town of Oakville Active Transportation Master Plan.

Town of Oakville, June 2009:
Livable Oakville Plan.

Town of Oakville, 2008:
North Oakville East Secondary Plan.

Town of Oakville, April 2008:
North Oakville East Cycling Strategy.

Town of Oakville, May 2008:
Draft Midtown Business and Development Plan.

Town of Oakville, May 2008:
North Oakville East Trails Plan.

TSH et. al., 2006:
North Oakville Creeks Subwatershed Study.

Unterman McPhail Associates, January 2013:
Cultural Heritage Assessment Report Built Heritage Resources and Cultural Heritage Landscapes, Trafalgar Road Improvements Cornwall Road to Highway 407, Town of Oakville. Prepared for AECOM Canada Ltd.

Websites

http://www.conservationhalton.on.ca/
http://www.cosewic.gc.ca/
http://www.gotransit.com/
http://www.halton.ca/
http://www.hrps.on.ca/
http://www.mah.gov.on.ca/
http://www.moi.gov.on.ca/
http://www.oakville.ca/
http://www.speciesatrisk.gc.ca/default_e.cfm

Personal Communication

Conservation Halton (2009):
Personal Communication. Natural Environment.