

Dundas Street (Regional Road 5) Improvements Class Environmental Assessment Study

**Brant Street (Regional Road 18)
to Bronte Road (Regional Road 25)**



ENVIRONMENTAL STUDY REPORT



May 2015





DUNDAS STREET (Regional Road 5) CORRIDOR IMPROVEMENTS

Brant Street to Bronte Road

Class EA Study

Environmental Study Report

May 2015



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1. INTRODUCTION

1.1 Introduction and Background

Dundas Street (Regional Road 5) is an east-west major arterial road which runs through Halton Region. Dundas Street was formerly under the jurisdiction of the Ministry of Transportation and was previously known as Highway 5. In 1998, the Ministry of Transportation transferred Highway 5 to Halton Region, and the Region subsequently renamed the road as Regional Road 5 (Dundas Street).

Dundas Street is one of the most important transportation facilities in the existing and future Halton Region transportation network. This roadway serves the movement of goods and commuters and distributes traffic to and from the Provincial freeway system, as well as providing access to residential, commercial and industrial land uses in north Oakville, Burlington and neighbouring municipalities of Hamilton to the west and Mississauga to the east.

In 1999, Regional Council approved the Regional Roads 5 & 25 Corridor Strategy Final Study Report (PPW140-99), which provided an overall strategy for the Dundas Street corridor. Dundas Street was identified in that study as a primary transit corridor that would incorporate High Occupancy Vehicle (HOV) lanes in the future. The study was undertaken as a Master Plan under the Class Environmental Assessment for Municipal Road Projects. The Master Plan met the first two phases of the Municipal Class Environmental Assessment (EA) process including need and justification, identification and evaluation of alternatives, and the selection of a preferred option. Based on the results of the study, environmental assessments for the proposed widening of Dundas Street and specific structure improvements were identified in the Region's Roads Capital Program.

The need to widen Dundas Street was reaffirmed through the Halton Functional Road Network and North Halton Transportation Study (1999), Halton Transportation Master Plan (2004) and more recently, through the Halton Region Transportation Master Plan (to 2031) – The Road to Change (2011).

Given the foregoing, Halton Region proceeded with Class EA Studies of Dundas Street through the Town of Oakville and City of Burlington, in order to implement the proposed widening as identified through earlier studies and the Region's Transportation Master Plan.

Dundas Street will continue to be a critical east-west corridor to move people, goods and services in and through Halton. As travel demand grows, Halton Region is continuing to improve Dundas Street. Some sections have already been expanded to six lanes, some sections are under construction; and other sections are still in the planning stages.

The Class EA Study for the section of Dundas Street from Neyagawa Boulevard to Proudfoot Trail (including crossing of the Sixteen Mile Creek structure) was completed and approved in 2003. That Class EA Study was undertaken ahead of other sections of

Dundas Street because of the deteriorated condition of the bridge over Sixteen Mile Creek. The recommended alternative for Dundas Street from Neyagawa Boulevard to Proudfoot Trail is for a six-lane urban road, including a new 6-lane structure over Sixteen Mile Creek. Construction began in 2007 and was completed and opened for public use in the summer of 2012.

Another Class EA Study was undertaken for the section of Dundas Street from east of Highway 403 to Oak Park Boulevard, and was approved in 2005. The recommended alternative for Dundas Street from east of Highway 403 to Oak Park Boulevard is for a six-lane urban road with a 6.5 m raised median. Construction began in 2012 and the roadway is already opened with 6-lanes between Ninth Line and Oak Park Boulevard.

In December 2012, the Class EA Study for the section of Dundas Street from Bronte Road to Proudfoot Trail was completed. The recommended alternative is for Dundas Street to be widened from four to six lanes between Bronte Road and Proudfoot Trail. The future curb lanes have been protected for HOV/transit lanes in the interim and with the long term provision to convert them to dedicated higher order transit lanes as transit ridership increases. Construction for this section began in fall 2014 and is ongoing.

The Class EA Study for Dundas Street between Neyagawa Boulevard and Oak Park Boulevard was completed in December 2013. Similar to the Bronte Road to Proudfoot Trail section of Dundas Street, the recommended alternative for Dundas Street between Neyagawa Boulevard and Oak Park Boulevard is to widen from four to six lanes. The future curb lanes have protected for HOV/transit lanes in the interim with the long term provision to convert them to dedicated higher order transit lanes as transit ridership increases. Construction is anticipated to begin in summer 2016.

Improvements to intersections on Dundas Street were also completed as part of the Class EA Studies carried out for Appleby Line (Regional Road 20) in the City of Burlington and Bronte Road (Regional Road 25) in the Town of Oakville. Both the Appleby Line and Bronte Road intersections are built out to 6 through lanes with exclusive left turn and right turn lanes on Dundas Street.

The Class EA Study for Dundas Street between Brant Street and Bronte Road (this study) was initiated in 2009. Significant works have been carried out, including four Public Information Centres (PICs) – held in 2009, two in 2011, and one in 2014 – which identified the need for Dundas Street to have a 6-lane cross section.

Beyond Halton Region, Dundas Street continues easterly in the City of Mississauga as an existing 6-lane urban road, and continues westerly in the City of Hamilton as an existing 4-lane rural road. As part of the City of Hamilton New East-West Corridor Class EA Study, it is proposed that Dundas Street be widened to a 6-lane urban road between Kerns Road and the new Upcountry Link with provision for active transportation facilities. From Kerns Road easterly (within the jurisdiction of Halton Region), Dundas Street is to be widened to 6-lane with a continuous centre left turn lane. The EA is approved and the City of Hamilton is now proceeding to detailed design.

1.1.1 Higher Order Transit and Recent Planning

In the Metrolinx Regional Transportation Plan (2008), The Big Move, a higher-order transit facility along Dundas Street between Brant Street and Kipling Station was identified. The need for a higher order transit facility on Dundas Street was also included in the Halton Region Transportation Master Plan (to 2031) – The Road to Change.

The planning for proposed improvements on Dundas Street between Proudfoot Trail and Brant Street was initiated in 2009 (subsequently, the study limits expanded to Trafalgar Road to Brant Street).

In 2011, an investigation of the feasibility of dedicated BRT lanes on Dundas Street between Trafalgar Road and Brant Street was carried out. As part of the overall corridor planning, the provision for higher order transit was undertaken to ensure that the long-term infrastructure improvements protected for the opportunity for rapid transit. This included an investigation of curb vs median BRT facilities on Dundas Street. A curb lane option was identified as preferred for protection as part of the infrastructure improvements.

Completing the widening of Dundas Street through Oakville and Burlington will take a number of years, and after meeting with residents, local municipalities, transit authorities and others, further consideration was given to the implementation approach. With the widening of Dundas Street to 6-lanes, there is 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. In parallel, active transportation, bus stops and transit priority measures can be provided at key intersections as required. The timing for introduction of HOV lanes / transit improvements is to be determined in consultation with the local municipalities (i.e. Town of Oakville and City of Burlington, which are the transit operators in their respective areas). As transit ridership builds, there is the opportunity to convert the HOV lanes into dedicated bus lanes in the future (i.e. 2031).

1.1.2 Current Class Environmental Assessment Study

Given the above, Halton Region has divided the original study limits from Trafalgar Road to Brant Street into three sections and is carrying out three co-ordinated, but separate Class Environmental Assessment Studies. These studies have been carried out in the following order and built on earlier related work the Project Team has already completed (see **Exhibit 1-1**).

- **Section 1:** Bronte Road (Regional Road 25) to Proudfoot Trail – Town of Oakville [Class EA Study completed in December 2012; detailed design was completed. Construction began in fall 2014 and is ongoing. A copy of the Environmental Study Report may be viewed online at <http://www.halton.ca/EAprojects>.]
- **Section 2:** Neyagawa Boulevard (Regional Road 4) to Oak Park Boulevard – Town of Oakville [Class EA Study completed in November 2013. A copy of the Environmental Study Report may be viewed online at <http://www.halton.ca/EAprojects>.]

- **Section 3:** Brant Street (Regional Road 18) to Bronte Road (Regional Road 25) – City of Burlington / Town of Oakville [this study]

Exhibit 1-1: Dundas Street Corridor and Environmental Assessment Studies



- Section 1: Bronte Road (Regional Road 25) to Proudfoot Trail
- Section 2: Neyagawa Boulevard (Regional Road 4) to Oak Park Boulevard
- Section 3: Brant Street (Regional Road 18) to Bronte Road (Regional Road 25)

The purpose of this Environmental Study Report is to document the decision making process for the Environmental Assessment Study for the proposed improvements on Dundas Street (**Section 3**) between Brant Street and Bronte Road in the City of Burlington and the Town of Oakville.

1.2 Ontario Environmental Assessment Act

Municipal road projects are subject to the Ontario Environmental Assessment (EA) Act. The class environmental assessment process is an approved process under the EA Act for a specific group or “class” or projects. Projects such as these are therefore approved subject to compliance with an approved Class EA process.

The proponent for this study is Halton Region. Accordingly, the study is being carried out in accordance with the requirements of the *Municipal Class Environmental Assessment* (2000, as amended 2007 and 2011) prepared by the Municipal Engineers Association.

1.2.1 Municipal Class Environmental Assessment (EA) Process

The Municipal Class Environmental Assessment (EA) is an approved class environmental assessment process which applies to municipal infrastructure projects including roads, water and wastewater. The Municipal Class EA outlines a comprehensive planning process which includes the following steps: problem definition; identification of alternatives (including “do nothing”); analysis and evaluation of their

effects on the environment including the natural, social, economic and engineering; determination of a preferred alternative and associated mitigation measures; and, consultation with technical agencies and the public throughout the process. The Class EA process provides a rational planning approach to determining a preferred alternative for addressing the problem (or opportunity). The Municipal Class EA is an approved environmental assessment planning document which describes the process that proponents must follow in order to meet the requirements of the Ontario EA Act.

Providing the Class EA planning process is followed, a proponent does not have to apply for formal approval under the EA Act.

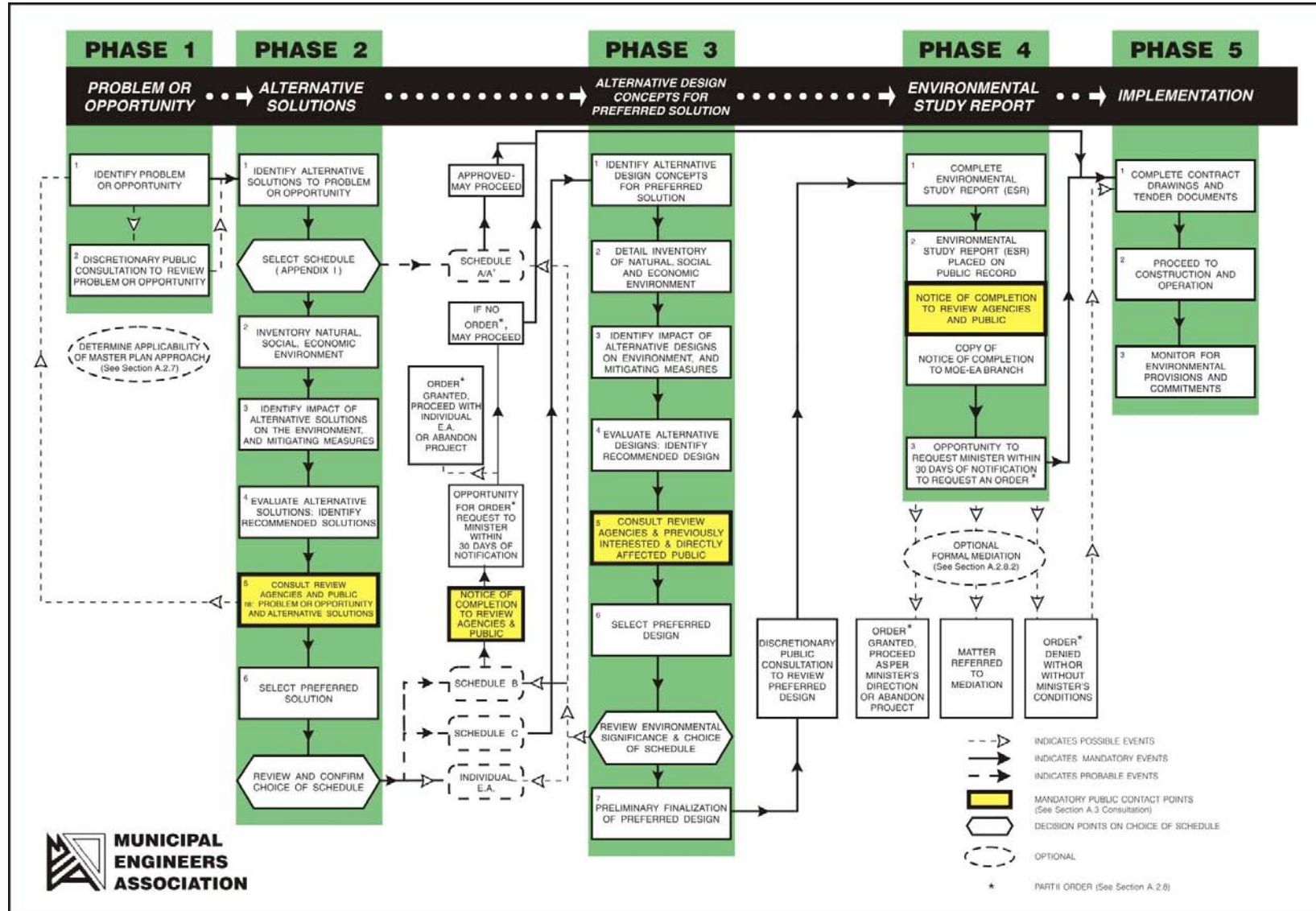
The Municipal Class EA process is shown on **Exhibit 1-2** and includes:

- Phase 1 - identify the problem or opportunity
- Phase 2 - identify alternative solutions
- Phase 3 - examine alternative methods of implementing the preferred solution
- Phase 4 - prepare and file an Environmental Study Report
- Phase 5 - proceed to detailed design, construction and operation

The four types of projects or activities to which the Municipal Class EA applies are:

- | | |
|---------------|--|
| Schedule 'A' | <ul style="list-style-type: none">• projects which are limited in scale, have no or minimal adverse environmental effects and generally includes the majority of municipal road maintenance, operational, and emergency activities• <i>these projects are pre-approved and therefore a municipality can proceed without further approval under the EA Act</i> |
| Schedule 'A+' | <ul style="list-style-type: none">• projects which are limited in scale, have no or minimal adverse environmental effects and generally includes the majority of municipal road maintenance, operational, and emergency activities• <i>these projects are pre-approved, however, the public is to be advised prior to implementation</i> |
| Schedule 'B' | <ul style="list-style-type: none">• projects which have the potential for some adverse environmental effects and generally includes improvements and minor expansions to existing facilities• <i>these projects are approved subject to a screening process which includes contacting directly affected public and relevant review agencies</i> |
| Schedule 'C' | <ul style="list-style-type: none">• projects which have the potential for significant environmental effects. These projects generally include construction of new facilities and major expansions.• <i>these projects must proceed under the planning and documentation procedures outlined in the Municipal Class EA document.</i> |

Exhibit 1-2: Municipal Class Environmental Assessment Process



Source: Municipal Class Environmental Assessment, Municipal Engineers Association, October 2000, as amended in 2007 & 2011

The proposed nature of the Dundas Street undertaking identifies it as Schedule ‘C’ under the Municipal Class EA. An Environmental Study Report (ESR) is required for Schedule ‘C’ projects, documenting the environmental assessment process which is carried out prior to proceeding with the implementation of the preferred undertaking. The ESR must be filed for a minimum 30 day public review period. If concerns are raised that cannot be resolved through discussions with the proponent of the project, a “Part II Order” may be requested. This is explained in the next section.

1.2.2 Part II Order

The Municipal Class EA process includes an appeal provision to change the status of a project from being subject to the Municipal Class EA process to being subject to an Individual Environmental Assessment as per Part II of the Ontario EA Act. The latter requires the submission of an EA document to the Minister of the Environment for government review and approval.

It is recommended that all stakeholders work together to determine the preferred means of addressing a problem or opportunity. If concerns regarding a project cannot be resolved in discussions with the proponent, then members of the public, interest groups or technical review agencies may request the Minister of the Environment, by order, to require a proponent to comply with Part II of the EA Act before proceeding with a proposed undertaking which has been subject to Class EA requirements. The Minister of the Environment then decides whether to deny the request, refer the matter to mediation or require the proponent to comply with Part II of the EA Act.

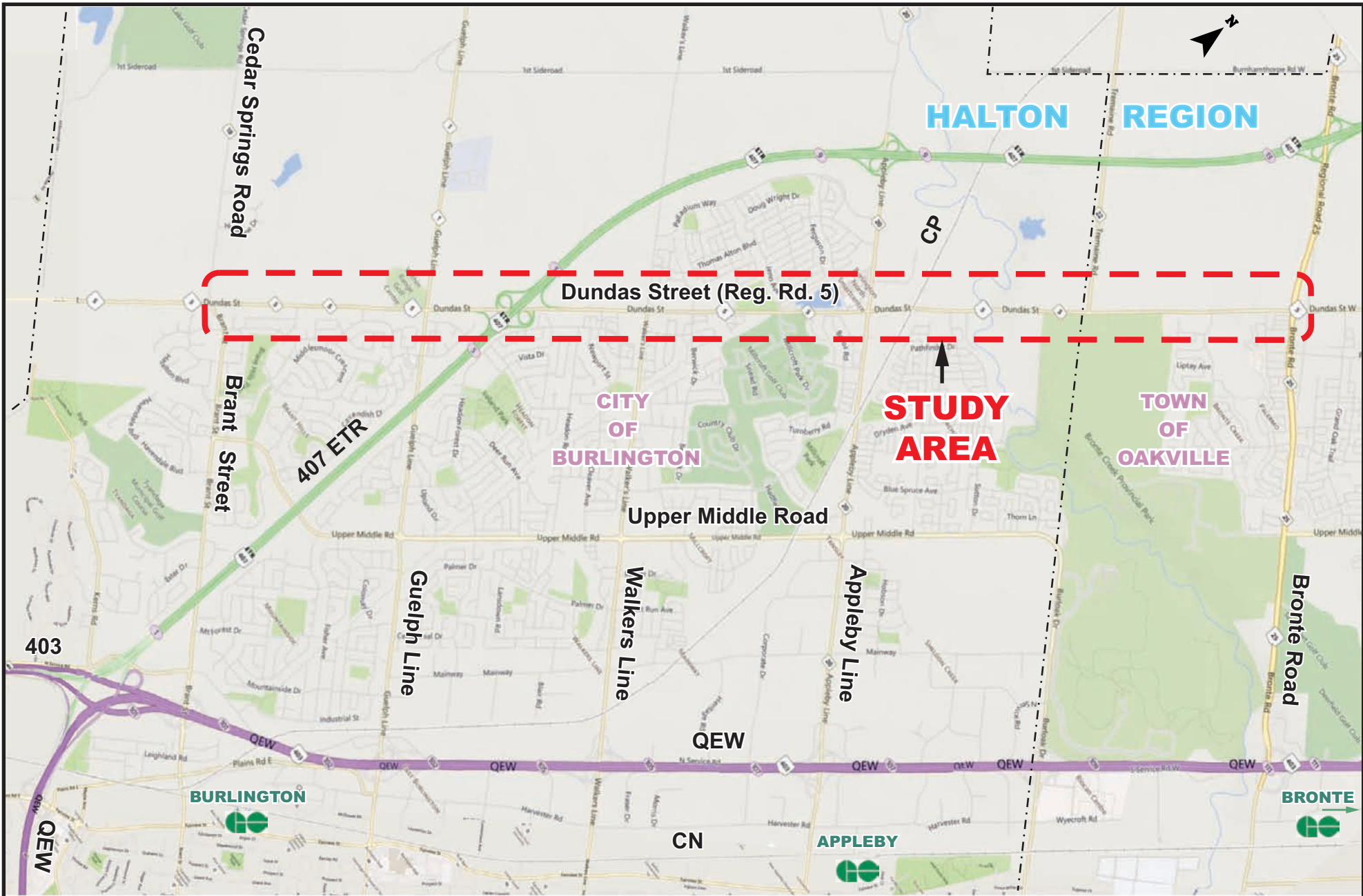
Additional information regarding this appeal process may be obtained from the Halton Region website (<http://www.halton.ca/EAprojects>).

1.3 Study Area

The study area of approximately 10.5 km is shown on **Exhibit 1-3** and it includes Dundas Street from Brant Street to Bronte Road within the City of Burlington and the Town of Oakville. The easterly study limit will tie into the existing 6-lane section of Dundas Street east of Bronte Road and the westerly limit will tie into the Brant Street / Dundas Street intersection which is currently undergoing detailed design for the widening from 4-lane to 6-lane.

1.4 Study Approach

In order to fulfill the Municipal Class EA requirements, the study followed the Municipal Class EA process as shown in **Exhibit 1-2**. This process ensures a thorough understanding of the problem being addressed and the alternatives considered and their associated potential environmental impacts and mitigation measures. This process also includes consultation with the public and technical agencies. The main study stages and associated study schedule are shown in **Exhibit 1-4**.



DUNDAS STREET CLASS EA STUDY
Brant Street to Bronte Road

STUDY AREA

Exhibit

1-3

Exhibit 1-4: Study Stages

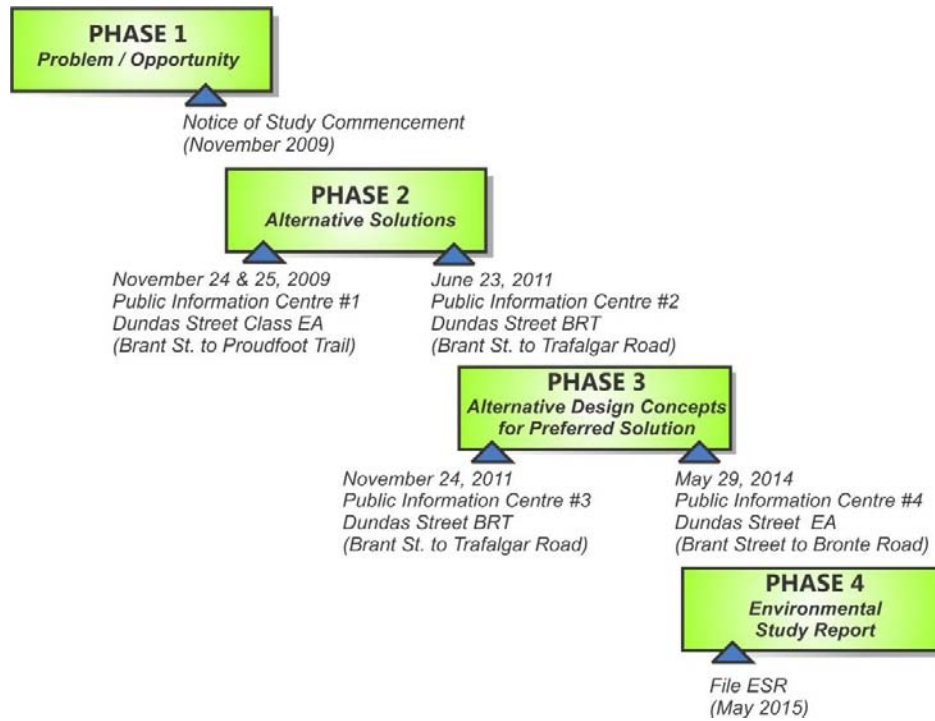


Exhibit 1-5: Study Organization



1.5 Study Organization

The study organization reflects the general administrative and technical needs of the study as well as the study’s consultation program. The latter has been developed to ensure that all of those with a potential interest in the study have the opportunity to participate and provide input during the process.

The study organization is shown in **Exhibit 1-5** and described in the following sections.

1.5.1 Project Team

The study has been carried out to date under the direction of the Project Team which included senior staff of Halton Region. Members of the Project Team include:

Mr. Jeffrey Reid, C.E.T.	Project Manager
Ms. Melissa Green Battiston, P.Eng.	Supervisor Transportation Planning
Mr. Matt Krusto	Transportation Coordinator
Mr. Patrick Monaghan, C.E.T.	Transportation Planner
Mr. Dave Collum, P.Eng.	Project Manager, Engineering and Construction

1.5.2 Consultant Team

The Consultant Team retained by Halton Region to assist in carrying out the study includes:

MMM (Transportation)	<ul style="list-style-type: none"> • project management / consultation • Class EA requirements • transportation analysis • roadway design • structure design • stormwater management • noise analysis
MMM (Infrastructure & Environment)	<ul style="list-style-type: none"> • natural environmental effects • fisheries • vegetation • landscaping/streetscaping
Archaeological Services Inc.	<ul style="list-style-type: none"> • heritage resource assessment • Stage 1 archaeological overview
Thurber Engineering	<ul style="list-style-type: none"> • geotechnical
Novus Environmental	<ul style="list-style-type: none"> • air quality
DTAH	<ul style="list-style-type: none"> • urban design
GLPi	<ul style="list-style-type: none"> • consultation and facilitation

1.5.3 Town of Oakville / Oakville Transit

The study area is located partly within the Town of Oakville, as such the Town of Oakville and Oakville Transit have been two of the key agencies in participating throughout the EA Study to ensure consistency with planning in the Town (see **Section 5.2.2**). Following is a list of meetings that have occurred to date.

Date	Purpose
January 21, 2011	Town of Oakville meeting to discuss the current study processes, overview of the Dundas BRT Planning Project and Trafalgar Road BRT Planning Project, ridership forecasts, and upcoming workshop for both studies
April 13, 2011	Meeting with Oakville Transit and the Town of Oakville to discuss the transit ridership forecasting procedure, and potential station locations.
March 11, 2014	Meeting with Town of Oakville and City of Burlington to discuss the reinitiation of “Section 3” of Dundas Street EA from Brant Street to Bronte Road, and to review the preliminary plan and key issues (including the long term provision for higher order transit as warranted and active transportation components) associated with this section.

1.5.4 City of Burlington / Burlington Transit

Given that the majority of the study area is located partly within the City of Burlington, as such the City of Burlington and Burlington Transit have been two of the key agencies in participating throughout the EA Study to ensure consistency with future planning (see **Section 5.2.2**). Following is a list of meetings that have occurred to date.

Date	Purpose
January 19, 2011	Meeting with the City of Burlington to discuss the current study process, overview of the Dundas BRT Planning Project, ridership forecasts, and upcoming workshop with the Trafalgar Road BRT Planning Project.
April 13, 2011	Meeting with Burlington Transit to discuss the transit ridership forecasting and potential station locations.
October 19, 2011	Meeting with Burlington Transit to discuss the BRT Route network development and staging, identification of transit priority measures, major / minor Station development, and curb vs. median BRT operation on Dundas Street.
March 11, 2014	Meeting with City of Burlington and Town of Oakville to discuss the reinitiation of “Section 3” of Dundas Street EA from Brant Street to Bronte Road, and to review the preliminary plan and key issues (including the long term provision for higher order transit as warranted and active transportation components) associated with this section.
May 8, 2014	Meeting with Burlington Transit and City of Burlington to discuss “Section 3” of Dundas Street EA from Brant Street to Bronte Road, and to review the preliminary plan and key issues (including the long term provision for higher order transit as warranted and active transportation components) associated with this section.

1.5.5 Conservation Halton and Ministry of Natural Resources and Forestry

Recognizing the importance of retaining natural features throughout the study area and ensuring planning was carried out to minimize impacts, Conservation Halton (CH) and the Ministry of Natural Resources and Forestry (MNR) were considered to be a key agency and was provided several opportunities to provide input during the study (see **Section 5.2.3**). Following are meetings that have occurred to date.

Date	Purpose
April 16, 2010	To discuss the project approach, existing conditions and process for evaluation.
July 19, 2011	To discuss the key natural and drainage features along the Dundas Street corridor.
August 30, 2011 (Site Visit)	To discuss Bronte Creek Valley and Tansley Bridge improvements as part of the overall Dundas Street corridor improvements.
September 22, 2011	Site Meeting with Conservation Halton to discuss the key natural and drainage features along the Dundas Street corridor.
March 3, 2014	Meeting with MNR, CH, Ontario Parks, and Niagara Escarpment Commission to discuss the re-initiation of “Section 3” of Dundas Street EA from Brant Street to Bronte Road, and to review the preliminary plan and key issues (including natural environment constraints, Bronte Creek Provincial Park, and potential impact to NEC Area) associated with this section.
June 2, 2014	Meeting with MNR, CH, Ontario Parks, and Niagara Escarpment Commission to discuss the proposed improvements of Dundas Street EA from Brant Street to Bronte Road, and to review the preliminary plan and key issues (including natural environment constraints, Bronte Creek Provincial Park, and potential impact to NEC lands) associated with this section.
September 29, 2014	Meeting with MNR and CH to review the preliminary plan and key issues (including stormwater management strategy, fluvial geomorphic requirements, natural environment constraints, etc.).
December 8, 2014	Meeting with MNR and CH to review the proposed work at Culvert 22 and Culvert 23 (Fourteen Mile Creek), and overall stormwater management and fluvial geomorphic recommendations associated with the Dundas Street Class EA Study.

1.5.6 Technical Agencies Committee

Technical agencies, including federal, provincial and municipal agencies and utilities, with a potential interest in the study or whose mandate may be affected, were contacted in Fall 2009 to ascertain whether or not they wanted to participate in the study, the

appropriate contact and potential issues and concerns, and requested to provide technical input and to comment on the study’s findings. The main points of contact are listed below and related correspondence and minutes of meetings are provided in **Appendix A** and **Appendix B**, respectively.

Date	Purpose
November 24, 2009	Technical Agencies Committee Meeting to review and receive input regarding study approach, problems/opportunities being addressed, background information and development of alternatives.
March 3, 2011	Workshop #1 (Joint Dundas Street and Trafalgar Road Improvements Studies) to discuss Bus Rapid Transit (BRT) principles and implementations, approach to ridership forecast, constraints and opportunities analysis for BRT on Dundas Street and Trafalgar Road, development of alternatives and preliminary impact assessment.
May 12, 2011	Workshop #2 (Joint Dundas Street and Trafalgar Road Improvement Studies) to discuss ridership forecast, BRT curb vs. median comparison factors and urban design.
November 16, 2011	Workshop #3 (Joint Dundas Street and Trafalgar Road Improvements Studies) to discuss transit service concept, outcomes of ridership forecast, BRT evaluation, cost and staging, corridor development including station amenities and streetscaping opportunities.
August 2012 and March 2013	Technical Agencies were provided with newsletter updates on Dundas Street Class EA Studies (sections from Bronte Road to Proudfoot Trail and from Neyagawa boulevard to Oak Park Boulevard).
May 14, 2014	Technical Agencies Committee to discuss “ Section 3 ” of Dundas Street EA from Brant Street to Bronte Road, and to review the preferred preliminary plan, key issues associated with this section and input from the respective technical agencies, as well as next steps.

Agencies and utilities invited to participate in the study are listed below.

Federal

- CEAA
- CN Rail
- Environment Canada
- Fisheries and Oceans Canada
- Aboriginal Affairs and Northern Development Canada

Provincial

- Ministry of Aboriginal Affairs
- Ministry of Agriculture Food and Rural Affairs
- Ministry of Tourism, Culture and Sport (formerly Ministry of Culture)

- Ministry of the Environment and Climate Change (formerly Ministry of the Environment)
- Ministry of Municipal Affairs and Housing
- Ministry of Natural Resources and Forestry (formerly Ministry of Natural Resources)
- Ministry of Transportation
- 407ETR
- Niagara Escarpment Commission
- Infrastructure Ontario (Formerly Ontario Realty Corporation)
- Metrolinx / GO Transit

Municipal

- City of Burlington
- Town of Oakville
- Burlington Transit
- Oakville Transit
- Conservation Halton
- Halton Regional Police Service
- Halton Emergency Management
- Halton Region Ambulance Services
- Burlington Fire Department
- Oakville Fire Department
- Halton EEAC (Ecological & Environmental Advisory Committee)
- HAAC (Halton Agricultural Advisory Committee)
- Halton District School Board
- Halton Catholic District School Board
- Burlington Heritage
- Heritage Oakville
- Burlington Chamber of Commerce
- Oakville Chamber of Commerce

Utilities

- Oakville Hydro
- Burlington Hydro
- Hydro One
- Bell
- Enbridge
- COGECO
- Rogers
- TELUS
- Union Gas

First Nations

- Alderville First Nation
- Credit River Metis Council
- Curve Lake First Nation
- Hiawatha First Nation

- Metis Nation of Ontario
- Mississaugas of Scugog Island
- Mississaugas of the New Credit First Nation
- Mohawk Council of Akwesasne
- Oneida Nation of the Thames
- Six Nations Haudenosaunee Confederacy Council
- Six Nations of the Grand River
- The Mohawks of the Bay of Quinte First Nation
- Wahta Mohawks Territory

1.6 Constructability Workshop

Recognizing the sensitivity of the Bronte Creek Valley (Tansley Bridge), a 1-day Constructability Workshop was held on September 23, 2014 as part of the Class EA Study to better understand the methods to construct the widening of Tansley Bridge such that elements of design, construction, and mitigation can be integrated into the documentation of the EA Study. The Constructability Review was undertaken in a Workshop environment (both site visit and boardroom) that included a team of experts who were predominately independent of the Project Team. Representatives from Conservation Halton also participated in the Workshop. Key issues discussed at the Workshop include: Dundas Street lane closures, construction staging and property access, structural steel – girder erection, south structure deck and truss demolition, south structure pier demolition, south structure – east abutment removal, south structure pier footing demolition, valley access, creek crossing, east pier construction and stormwater management. A copy of the Constructability Workshop Report can be found in **Appendix L**.

1.7 Public Consultation

1.7.1 Public Consultation

A key component of the EA process is public consultation during the process. For this study, the main points of public consultation are:

- to notify the public that the study was commencing,
- to review and receive public input regarding the problem being addressed and discuss issues related to the project including alternative solutions, environmental considerations and evaluation criteria,
- to review and receive public input regarding the evaluation of alternatives and the preferred alternative including proposed mitigation measures,
- to review the ESR upon filing on record.

Four Public Information Centres have been provided as follows. It should be noted that even though the respective Public Information Centres focus on different study limits of Dundas Street, the overall intent was to study and assess transportation needs along the Dundas Street corridor and to identify the improvements required to support future growth and development in Halton Region. The PICs included:

Date	Purpose
November 24 and 25, 2009	Public Information Centre #1 (Dundas Street Class EA Brant Street to Proudfoot Trail) To review and receive public comments about the study scope and discuss issues related to the project including alternative solutions, environmental considerations and evaluation criteria.
June 23, 2011	Public Information Centre #2 (Dundas Street BRT Brant Street to Trafalgar Road) To review and receive public comments about the problems being addressed, the alternatives being considered (curb BRT vs. median BRT), and the preliminary factors for analyzing and evaluating the alternatives.
November 24, 2011	Public Information Centre #3 (Dundas Street BRT Brant Street to Trafalgar Road) To obtain public input on evaluation of curb BRT vs. median BRT alternatives, identification of the preferred alternative (curb BRT), functional plan for Dundas Street corridor with curb BRT facilities and other active transportation facilities, conceptual cross sections with landscaping, findings of noise analysis and typical mitigation measures.
May 29, 2014	Public Information Centre #4 (Dundas Street Class EA Brant Street to Bronte Road) To present the preliminary design plan for the proposed Dundas Street improvements between Brant Street and Bronte Road, and collect public input regarding the proposed improvements.

Other PICs to support the other sections of Dundas Street from Bronte Road to Proudfoot Trail, and from Neyagawa Boulevard to Oak Park Boulevard have been documented separately under the respective Dundas Street Environmental Study Reports (December 2012 and November 2013, respectively).

The comments received from the public are discussed in **Chapter 5** of this Report. In addition, individual meetings with property owners are also summarized in **Chapter 5**.

Information on the Dundas Street Transportation Corridor Improvements Environmental Assessment Study can be found on the project website at: www.halton.ca/EAprojects.

1.7.2 Filing of Environmental Study Report

The Environmental Study Report (ESR) for the Dundas Street Class EA Study Brant Street to Bronte Road (i.e. this report) documented the decision making process during the study. The Notice of Study Completion of this Class EA Study (issued on **May 21, 2015**) notified members of the public and agencies that the ESR would be available for public review for a 30-day period. The ESR was made available for public review at the following locations during normal business hours:

- Halton Region Clerk’s Department
1151 Bronte Road, Oakville, Ontario
- Town of Oakville Clerk’s Department
1225 Trafalgar Road, Oakville, Ontario
- City of Burlington Clerk’s Department
426 Brant Street, Burlington, Ontario
- Burlington Public Library - Alton Library
3040 Tim Dobbie Drive, Burlington Ontario
- Oakville Public Library - Glen Abbey Branch
1415 Third Line, Oakville, Ontario

1.8 Ministry of Infrastructure’s Class Environmental Assessment

Property will be required from Infrastructure Ontario (IO) (formerly Ontario Realty Corporation) as part of the proposed undertaking for the Dundas Street improvements between Brant Street and Bronte Road. Infrastructure Ontario received project notification and was invited to attend the Technical Agency workshops during the Class EA study.

Typically when IO disposes or leases lands, or when rights to lands and any other realty activities are required, they have EA requirements under the Ministry of Infrastructure (MOI) “MOI Class EA Process for Realty Activities Other Than Electricity Projects approved April 2004, amended September 11, 2008”. This includes satisfying the seven-point site-specific analysis. Given that the IO project is ancillary to the Dundas Street undertaking, it is intended that their EA requirements are addressed as part of the Municipal Class EA process. This is in keeping with **Section 9.7.1** of the MOI Class EA.

The following outlines how this Environmental Study Report (ESR) addresses IO’s seven point analysis criteria for a Category B Consultation and Documentation Report.

1. Describe the Undertaking

This ESR documents the need for improvements on Dundas Street between Brant Street and Bronte Road (Regional Road 25) and that provincially owned property would be required to accommodate the proposed improvements for Dundas Street (see **Chapter 6** Project Description).

2. Description of Environmental Effects, Mitigation and Monitoring

This ESR documents the potential environmental effects of the project and the associated mitigation measures and monitoring commitments (see **Section 6.4** Potential Environmental Effects, Mitigation Measures and Commitments to Future Work). Each factor included in IO’s seven point site-specific analysis (per **Section 4.2** of the MOI Class EA) has been addressed under subsections of **Section 6.4** of the ESR covering socio-economic environment, cultural environment, and natural environment.

3. Consult with Directly Affected Agencies and the Public

This ESR documents consultation with directly affected parties including agencies, First Nations, property owners, and the general public. Stakeholder involvement and consultation are documented in **Section 1.5** Study Organization, **Section 1.6** Public Consultation, and **Chapter 5** Project Consultation Process. Copies of correspondence, meeting minutes and public consultation records are included in **Appendices A, B and C** of the ESR, respectively.

4. Reporting

This ESR documents all the issues typically discussed in a Category B Consultation and Documentation Report and includes ways in which these will be addressed or resolved.

5. Confirmation of Category B

This ESR identifies the need to acquire provincially owned property (mostly along the frontage of the properties directly adjacent to Dundas Street). The potential effects to the required property are well understood from a technical perspective and are considered to be minor in nature. Consultation with technical agencies has been carried out to ensure adequate mitigation measures are proposed and there will be ongoing consultation with technical agencies during detailed design (see **Chapter 6** – Project Description). This is in keeping with a Category B undertaking.

6. Notice of Completion and 30 Calendar Day Review

This ESR has been made available for public and agency review in accordance with the Ontario *Environmental Assessment Act*. Review locations are noted in **Section 1.7.2** Filing of Environmental Study Report. Notification of Study Completion has been provided to technical agencies, First Nations, property owners, and members of the public who are on the study mailing lists.

7. “Part II Order” Requests (if Any)

The Ontario *Environmental Assessment Act* allows a public and government review period. Within the review period, if concerns regarding this project cannot be resolved in discussion with the proponent (in this case, Halton Region), a person may request that the Minister of the Environment make an order for this project to comply with Part II of the *Environmental Assessment Act*. This would allow the Minister of the Environment to require further consideration or impose conditions under certain situations based on that review (see **Section 1.2.2** Part II Order).

2. PROBLEM BEING ADDRESSED

2.1 Introduction and Background

Phase 1 of the Municipal Class EA process involves the identification of the problem and/or opportunity being addressed by the study. For the study, this included:

- reviewing the following:
 - Greenbelt Plan (2005), Niagara Escarpment Plan (Office Consolidation 2014), and Parkway Belt West Plan (1978) (**Sections 2.1.1, 2.1.2 and 2.1.3**)
 - Metrolinx Regional Transportation Plan – The Big Move (2008), The Big Move Baseline Monitoring Report (2013) (**Section 2.1.4**)
 - Metrolinx Dundas Bus Rapid Transit Benefits Case (2010) (**Section 2.1.5**)
 - Halton Region Official Plan (2006), ROPA 38 (December 16, 2009) (**Section 2.1.6**)
 - Halton Region Transportation Master Plan (to 2031) – The Road to Change (2011) (**Section 2.1.7**)
 - Halton Region’s “Regional Roads 5 and 25 Corridors” Final Report (1999) (**Section 2.1.8**)
 - Halton Region Active Transportation Plan (ongoing) (**Section 2.1.9**)
 - City of Burlington Official Plan (**Section 2.10**)
 - City of Burlington Transportation Master Plan (**Section 2.11**)
 - Livable Oakville Plan (2009) (**Section 2.1.12**)
 - North Oakville West Secondary Plan (2008) (**Section 2.1.13**)
 - Switching Gears: Oakville Transportation Master Plan (2013) (**Section 2.1.14**)
 - Town of Oakville Active Transportation Master Plan (2009) (**Section 2.1.15**)
 - related studies/projects (**Section 2.1.16**)
- undertaking a traffic analysis (**Section 2.2**) including the review of:
 - i) existing traffic volumes
 - ii) developing ridership estimates for bus services along Dundas Street and Trafalgar Road; and
 - iii) future travel demands
- preparing findings and conclusions of the existing and future travel demands (**Section 2.3**)
- developing a statement of the problem being addressed by the study (**Section 2.4**)
- assessing alternatives at a planning level (**Section 2.5**)

2.1.1 Greenbelt Plan (2005)

The Greenbelt Plan (Ministry of Municipal Affairs and Housing, 2005) was reviewed in the context of the study area between Brant Street and Bronte Road. The study area is largely located outside of the Greenbelt “Protected Countryside” areas, except for areas in the proximity of the Bronte Creek Provincial Park (west of Tremaine Road), and lands just between 407 ETR and Guelph Line on the north side of Dundas Street. It should be noted that the Province in November 2012 announced it is considering expanding the Greenbelt area. One of the first proposals is to add the Glenorchy Conservation Area in the Town of Oakville to the Greenbelt. The Glenorchy Conservation Area is located to the east of the Study Area (east of Bronte Road). For more information, please see Ministry of Municipal Affairs website: <http://www.mah.gov.on.ca/Page10143.aspx>.

2.1.2 Niagara Escarpment Plan (Office Consolidation 2014)

Dundas Street between Brant Street and Guelph Line (north side), and Dundas Street between Brant Street and Eaglesfield Drive (south side) are within the Niagara Escarpment Plan area, most are designated as the Escarpment Protection Area, as well as a small areas designated as Escarpment Natural Area and Escarpment Rural area. Niagara Escarpment Plan Part 1.3, Part 1.4 and Part 1.5 state the objectives, criteria and permitted uses for the land use designations noted above, and Part 2 of the Niagara Escarpment Plan provides development criteria.

As defined in the Niagara Escarpment Plan Section 1.4 Escarpment Protection Area, “Included in this designation are Escarpment features that have been significantly modified by land use activities such as agriculture or residential development, land needed to buffer prominent Escarpment Natural Areas, and natural areas of regional significance”. The Escarpment Natural Area is defined in the Niagara Escarpment Plan to “contain important plant and animal habitats and geological features and cultural heritage features and are the most significant natural and scenic areas of the Escarpment”.

Section 2.15 of the Niagara Escarpment Plan addresses the design and locates of new and expanded transportation and utility facilities. It stated that the reconstructed transportation facilities should minimize impact on the Escarpment environment. Relevant references in the Niagara Escarpment Plan also include policies associated with water resources, wooded areas, wildlife habitat, heritage and agriculture (i.e. Parts 2.2, 2.6, 2.7, 2.8, 2.10, and 2.12 in the Niagara Escarpment Plan).

As noted in the Niagara Escarpment Plan, transportation and utility facilities are permitted in Escarpment Natural Areas provided they are considered “essential”. The need and justification for improvements on the Dundas Street corridor is documented in Section 2.2 of the Environmental Study Report.

2.1.3 Parkway Belt West Plan (1978)

Between Brant Street and 407 ETR, lands adjacent to the south side of Dundas Street are located with the Parkway Belt West Plan (Map 2-4 and Map 2-3). These lands are designated Public Open Space and Buffer Area, as well as Utility within the Public Uses Area. Based on **Section 5.4.1** of the Parkway Belt West Plan, linear transportation facility is one of the permitted uses within Public Use Area.

2.1.4 Metrolinx Regional Transportation Plan – The Big Move (2008), Metrolinx The Big Move Baseline Monitoring Report (2013)

Metrolinx is a provincial crown agency established by the Ontario government in 2006, tasked to develop and implement an integrated multi-modal transportation plan for the Greater Toronto and Hamilton Area (GTHA). Its mandate includes providing seamless, coordinated transportation throughout the region. In November 2008, Metrolinx published its Regional Transportation Plan (RTP) – *The Big Move*. The RTP is the third piece in the province’s approach to prepare the GTHA for growth and sustainability, building upon the Greenbelt Plan and the Growth Plan. It reaches 25 years into the future toward a transportation system that provides connectivity among modes, encourages the most financially and environmentally appropriate modes, as well as offers multi-modal access and shapes growth by supporting intensification.

The RTP identifies three sets of priorities: for the first 15 years; years 15 to 25; and longer term. It proposes a broad range of actions and policies that may include legislative changes, the creation of new programs and / or establishment in the policy framework guiding decision making. A higher-order transit facility along Dundas Street between Brant Street and Kipling Station was identified.

Metrolinx released The Big Move Baseline Monitoring Report in September 2013. The report serves as a snapshot of the work carried out in the last five years (since 2008) as part of the 25 Year Plan. A number of projects are already underway including the Mississauga Transitway, Eglinton Crosstown LRT and York Region Viva Next Rapidways. The Dundas Street corridor is listed as one of the “Next Wave” projects, noting that it is in the planning phase.

2.1.5 Metrolinx Dundas Bus Rapid Transit Benefits Case (2010)

As noted above, Dundas Street between Brant Street and Kipling TTC Station was identified as one of the regional rapid transit corridors in the Metrolinx RTP 15-year plan; linking urban growth centres in Etobicoke, Mississauga, Oakville and Burlington. In 2010, Metrolinx completed the Dundas Bus Rapid Transit Benefits Case which compared combinations of full BRT and light BRT between Kipling Station (City of Toronto) and 407 ETR (City of Burlington). Overall, findings indicated that a full BRT (i.e. exclusive right-of-way of branded buses) or combination of full BRT and light BRT (i.e. mixed traffic operation of branded buses) would generate economic benefits and support the municipalities’ objectives (Toronto, Mississauga, Oakville and Burlington) to revitalize the Dundas Street corridor.

2.1.6 Halton Region Official Plan (2006)

The Halton Region Official Plan was adopted by Regional Council in March 1994 and approved by the Minister of Municipal Affairs and Housing in November 1995. Between 2001 and 2004, a major review of The Regional Plan (1995) was undertaken in accordance with The Planning Act. This culminated in the adoption of Regional Official Plan Amendment 25 (ROPA 25) by Regional Council on June 23, 2004. The amendment was appealed and subsequently adjudicated by the Ontario Municipal Board in April-August 2006 with the issuance of a number of decisions.

This Office Consolidation of the Official Plan, referred to as *Halton Regional Official Plan (2006)*, incorporates all modifications, subsequent approvals, and approved amendments to the Plan up to and including August 17, 2006.

Halton Region's Amendment No. 38 (December 2009) to the Region's Official Plan (ROPA 38) represents the completion of the second stage of the "two-stage" approach adopted by Regional Council to implement the results of the five year statutory comprehensive review of the Regional Official Plan as required under **Section 26** of the Planning Act. ROPA 38 is based largely on the 13 Official Plan Directions contained in the "Towards Sustainability" report endorsed by Council in June 2009 and brings the Region's Official Plan into conformity with a number of Provincial initiatives including, the Provincial Policy Statement (2014), the Growth Plan for the Greater Golden Horseshoe, and the Greenbelt Plan.

ROPA 38 identifies a 50 m right-of-way for the Dundas Street corridor. The amendment also identifies Dundas Street from Brant Street to Highway 403 as a Higher Order Transit corridor.

2.1.7 Halton Region Transportation Master Plan (to 2031) – The Road to Change (2011)

Halton Region Transportation Master Plan (to 2031) – The Road to Change was conducted to meet Phases 1 and 2 of the Municipal Class Environmental Assessment (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 all modes of travel.

The study provides the 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.

Elements of the Halton Region Transportation Master Plan have:

- identified a 50 m right-of-way on Dundas Street with an urban cross section including off-road Active Transportation facilities (i.e. multi-use path) for pedestrians and cyclists on both sides of the road
- identified Dundas Street to be widened from 4 to 6 lanes with the provision for as 4 general traffic lanes plus 2 lanes for Transit / High Occupancy Vehicles

2.1.8 Regional Roads 5 and 25 Corridors Study (1999)

In 1997 and 1998, the Ministry of Transportation transferred Highway 5 and Highway 25 to Halton Region. Subsequently, Halton Region renamed the roads as Regional Road 5 (Dundas Street) and Regional Road 25 (Bronte Road) and initiated a Corridor Strategy Study to "*develop a long term vision for the corridors which harmonizes transportation goals with broader community planning, urban design, and environmental objectives.*"

A series of technical investigations was undertaken in consultation with municipalities, agencies and the public. For the Dundas Street corridor, three strategies were considered

including: preservation (maintain existing 4 lane capacity); expansion (widen to 6 lanes); and, transit promotion (widen to 6 lanes with added lanes dedicated to exclusive transit or High Occupancy Vehicles (HOV) usage).

The 1999 study considered the widening of Dundas Street beyond 6 lanes, but concluded that an eight lane roadway would act as a barrier to both pedestrians and cyclists, as well as, impose capacity constraints for Dundas Street through traffic at intersections since added time would be required for pedestrians crossing Dundas Street.

Taking into consideration the existing and future conditions, the results of the technical analyses, and consultation with municipalities, agencies and the public, the study recommended:

- widening of Dundas Street to six “general purpose” lanes initially and converting the new lanes for dedicated use of transit / HOV when the supporting initiatives are in place.

The Regional Roads 5 and 25 Study also reaffirmed Dundas Street (Regional Road 5) as a major arterial under the Regional functional classification system with the following functional characteristics:

- to serve mainly inter-regional and regional travel demands including the movement of heavy trucks;
- to accommodate regional (GO Transit) and local high-order transit services and /or HOV; and,
- to connect nodes where nodes combine residential and employment lands that favour pedestrian traffic and public transit over the private auto to create a vibrant, diverse and supportive urban environment.

2.1.9 Halton Region Active Transportation Plan (ongoing)

Halton Region is 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, rollerblading, 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 Dundas Street improvements, features of active transportation were considered. (See Halton Region website for more information <http://www.halton.ca/activetransportation>.)

2.1.10 City of Burlington Official Plan (2013)

The City of Burlington Official Plan (Office Consolidation December 2013) establishes the policies for the land use and growth in the City of Burlington. Within the Study Area, lands on the south side of Dundas Street are largely low density and medium density residential areas; with some commercial uses at major intersections such as Walkers Line (neighbourhood commercial) and Appleby Line (regional commercial). The Bronte Creek Provincial Park is located between the Bronte Creek valley and Tremaine Road, south of Dundas Street.

On the north side of Dundas Street, lands between Brant Street and 407 ETR are part of the Greenland area (Niagara Escarpment and Greenbelt area – See Sections 2.1.1 and 2.1.2). East of 407 ETR, lands are part of the business corridor / neighbourhood commercial up to Walkers Line. Between Walkers Line and Appleby Line, lands are designated for low density and medium density residential and transition into regional commercial at Appleby Line. From Appleby Line to Sutton Drive, lands are designated as regional commercial and general employment. Land uses in the northwest quadrant of Dundas Street / Tremaine Road are to be determined through a City initiated Secondary Plan process.

2.1.11 City of Burlington Cycling Master Plan (2009)

As part of the City of Burlington Cycling Master Plan, Dundas Street between Brant Street and the Oakville/Burlington municipal boundary is proposed to implement cycle tracks and multi-use paths to accommodate cyclists and pedestrians.

2.1.12 Livable Oakville Plan (2009)

The Livable Oakville Plan (2009 Town of Oakville Official Plan) applies to all lands within the town except the North Oakville East and West Secondary Plan areas. Livable Oakville established policy framework for identified growth areas, as well as, updates the current general policies, land use policies and apply lands south of Dundas Street to north of Highway 407. The plan identified Dundas Street within the limits of Oakville as a major arterial and as a busway corridor, as well as including multi-use paths along the corridor.

2.1.13 North Oakville West Secondary Plan (2008)

The North Oakville West Secondary Plan (Official Plan Amendment 289, May 2009) identified land use and population projections for future planned development north of Dundas Street. The lands north of Dundas Street between Tremaine Road and Bronte Road within the Study Area are within the North Oakville West Secondary Plan. The Secondary Plan identifies the lands as part of the employment district and natural heritage system area. Dundas Street is identified as a Major Arterial / Transit Corridor in Figure NOW 2 – Land Use Plan, and also a Busway Corridor with Primary Transit Corridor Service in Figure NOW 4 – Transportation Plan.

2.1.14 Switching Gears: Oakville Transportation Master Plan (2013)

The Town of Oakville Transportation Master Plan (2007) established transportation policy direction and infrastructure plans for all travel modes (automobiles, transit, cycling, walking) in Oakville to 2021. An update of the Transportation Master Plan – Switching Gears: Oakville Transportation Master Plan was carried out to provide directions for transportation planning to 2031. Switching Gears: Oakville Transportation Master Plan (2013) is available on the Town's website (<http://www.oakville.ca/townhall/switching-gears-tmp.html>) and identified Dundas Street as a major arterial to have dedicated transit lanes.

2.1.15 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 objective of this ATMP Study was to formulate a plan consisting of short, mid and long-term actions and recommendations that will establish and support a desired level of active transportation (cycling and walking) for Town of

Oakville residents. The plan recommended multi-use trails along Dundas Street within the limits of Oakville, as well as, a pedestrian sidewalk along one side of the roadway and multiple grade separated pedestrian crossings. In the Study Area between Tremaine Road and Bronte Road, it is proposed that off-road / in-boulevard multi-use trails be implemented along Dundas Street.

2.1.16 Related Studies / Projects

Other related studies/projects include:

- Dundas Street Improvements Class EA Study (Proudfoot Trail to Neyagawa Boulevard) – This study was undertaken by Halton Region and included the widening of Dundas Street to six lanes from Proudfoot Trail to Neyagawa Boulevard. The EA was completed and approved in 2003. Construction began in 2007 and was completed and opened for public use in the summer of 2012.
- Dundas Street Improvements Class EA Study (Bronte Road to Proudfoot Trail) - This study was undertaken by Halton Region and included the widening of Dundas Street from four to six lanes between Bronte Road and Proudfoot Trail. The future curb lanes include the provision for HOV / transit lanes which can be converted to dedicated higher order transit lanes as transit ridership increases. The Environmental Study Report was filed in December 2012. Construction began in fall 2014 and is ongoing.
- Dundas Street Improvements Class EA Study (Neyagawa Boulevard to Oak Park Boulevard) - This study was undertaken by Halton Region and included the widening of Dundas Street from four to six lanes between Neyagawa Boulevard and Oak Park Boulevard. The future curb lanes include the provision for HOV / transit lanes which can be converted to dedicated higher order transit lanes as transit ridership increases. The Environmental Study Report was filed in November 2013.

2.2 Transportation Analysis

As part of the Dundas Street corridor improvements between Brant Street and Bronte Road, a detailed traffic operations assessment entailing capacity and micro-simulation analyses has been undertaken for the existing year 2013 and for future planning horizon years 2021 and 2031. This report documents the assumptions, analysis methodology, existing and future operating conditions.

2.2.1 Study Scope

The traffic study encompasses a review of existing traffic conditions, review of background material including available traffic impact study reports, estimation of future year travel demand, need and justification for turn-lanes and assessment of future traffic operating performance for Dundas Street with 2 General Purpose Lanes (GPL) *plus* a curbside HOV lane (per direction) under horizon year 2021, and 2 General Purpose Lanes (GPL) *plus* a curbside BRT lane (per direction) under horizon year 2031.

A review of existing available turning movement count data suggests that the afternoon peak hour intersection demand is noticeably greater than the morning peak hour; accordingly the future conditions traffic analysis focuses on afternoon peak hour traffic operations. This is likely due to the inclusion of shopping and school trips in the afternoon.

The traffic analysis utilizes Synchro software for capacity analysis and micro-simulation model VISSIM for estimating intersection delays and corresponding levels of service.

2.2.2 Study Methodology

Existing traffic conditions were assessed on the basis of current peak hour turning movement volumes and traffic signal control timing plans provided by Halton Region. Available intersection turning movement counts from years 2011 through 2013 were reviewed to ensure existing condition peak-period traffic demand is not understated. The existing turning movement volumes were balanced across the study area network to reflect existing (year 2013) baseline peak hour conditions.

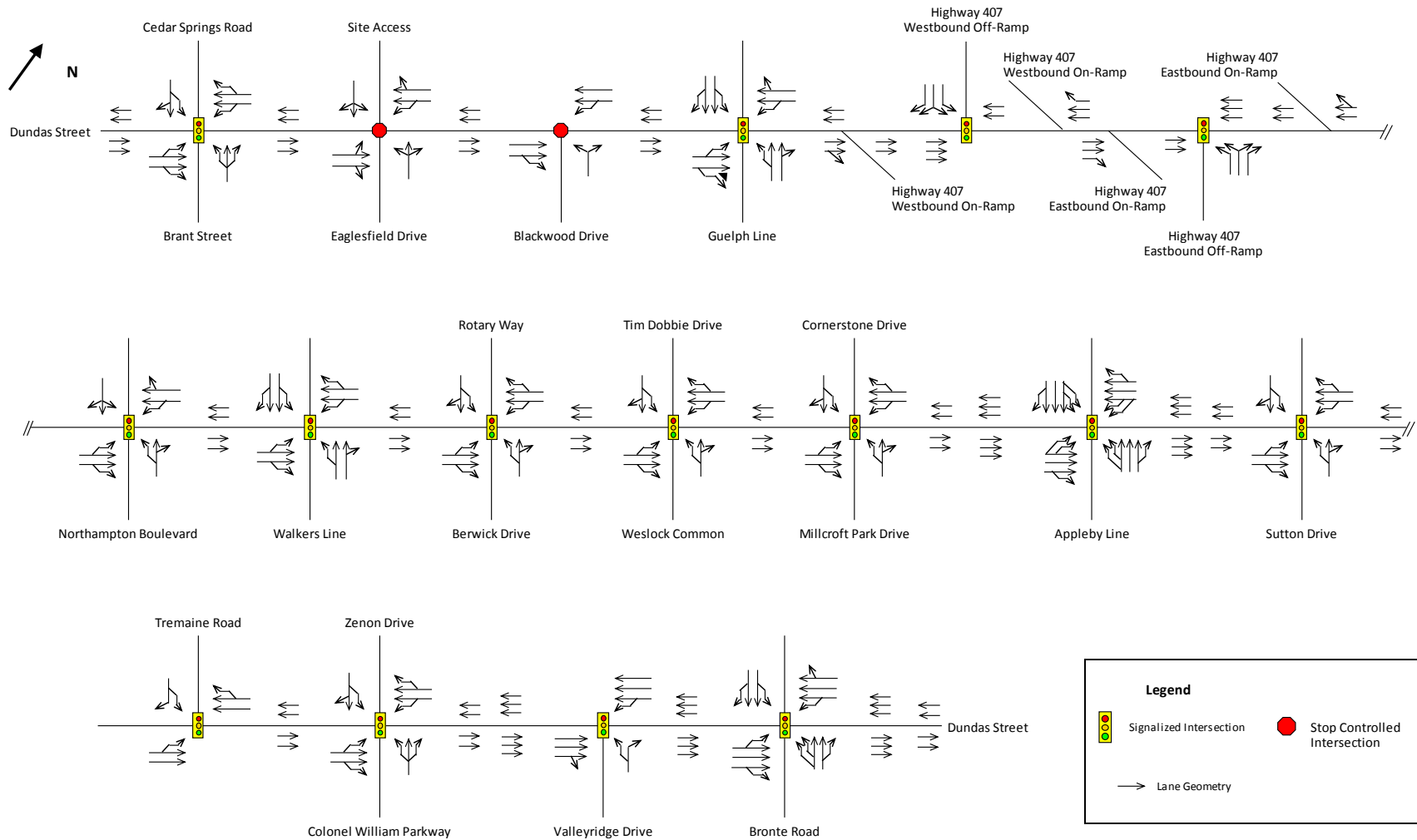
These existing balanced turning movement volumes provided the starting point for projecting the travel demand forecasts to horizon years 2021 and 2031. Future traffic volumes were established based on a review of growth projections from Halton Region's PM peak hour EMME travel demand forecasting model; and available traffic impact studies conducted for the proposed developments along Dundas Street within or in proximity of the Study Area limits (i.e. between Brant Street and Bronte Road). Traffic impact study reports which were available were reviewed as part of this traffic analysis.

2.2.3 Existing Conditions

The following is a general overview of the operations of Dundas Street within the Study Area between Brant Street and Bronte Road.

- Each of the study area signalized intersections has separate left-turn lanes on the Dundas Street approaches. The existing lane configuration and traffic control is illustrated in **Exhibit 2-1**.
- Dundas Street is a major east-west arterial road that spans Halton Region and extends into the City of Hamilton in the west and into the City of Mississauga in the east. This roadway carries goods and commuter traffic and distributes traffic to and from the Provincial Freeway system, as well as providing access to residential, commercial and industrial development.
- The 24-hour traffic volumes on Dundas Street for years 2010 through 2013 range from 22,000 and 35,000 vehicles.
- The roadway generally has a four-lane cross-section and a posted speed limit of 80 km/h with some segments of corridor posted at 60 km/h.
- The eastbound and westbound through movements are the predominant movements during the morning and afternoon peak hours respectively. This travel pattern is indicative of a high volume commuter route.
- The peak direction mid-block traffic volumes on Dundas Street corridor range from 1,700 to 2,300 vehicles during the morning peak hour (eastbound direction) and from 1,900 to 2,400 vehicles during the afternoon peak hour (westbound direction).

Exhibit 2-1: Existing Lane Configuration and Traffic Control

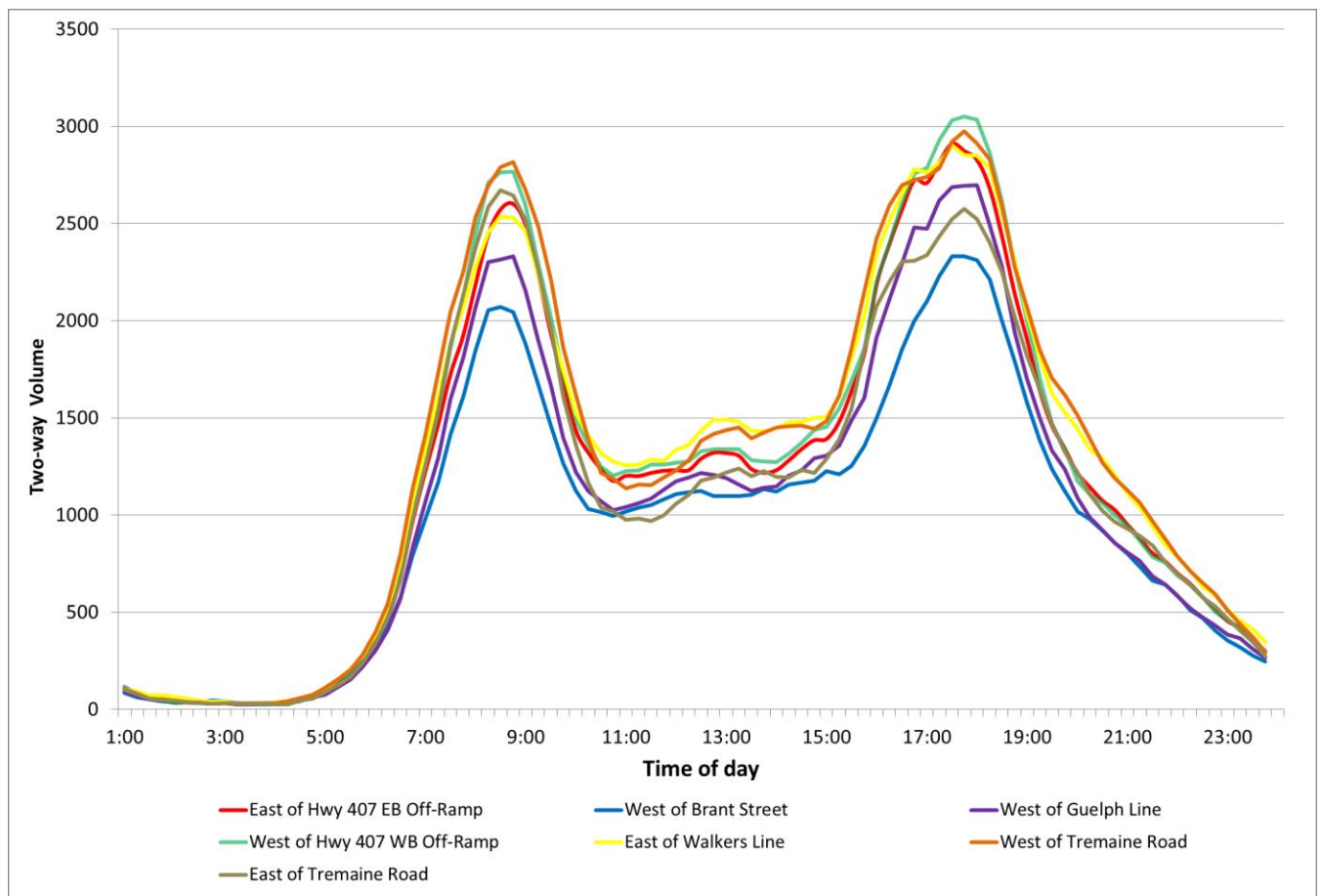


- The Dundas Street intersections from Guelph Line to Sutton Drive (within City of Burlington), and from Tremaine Road to Bronte Road (within Town of Oakville) currently operate under actuated-coordinated traffic signal control with a signal cycle length of 140 seconds and 120 seconds, respectively, in each of the morning and afternoon peak hours. Intersection at Brant Street operates under actuated-coordinated signal control with a cycle length of 110 seconds.

2.2.3.1 Existing Traffic Volumes

The Dundas Street corridor reflects strong directional commuter patterns as the morning and afternoon peak periods (6 hours) account for approximately 50% of the total daily traffic. **Exhibit 2-2** shows the two-way hourly traffic profile during a typical weekday.

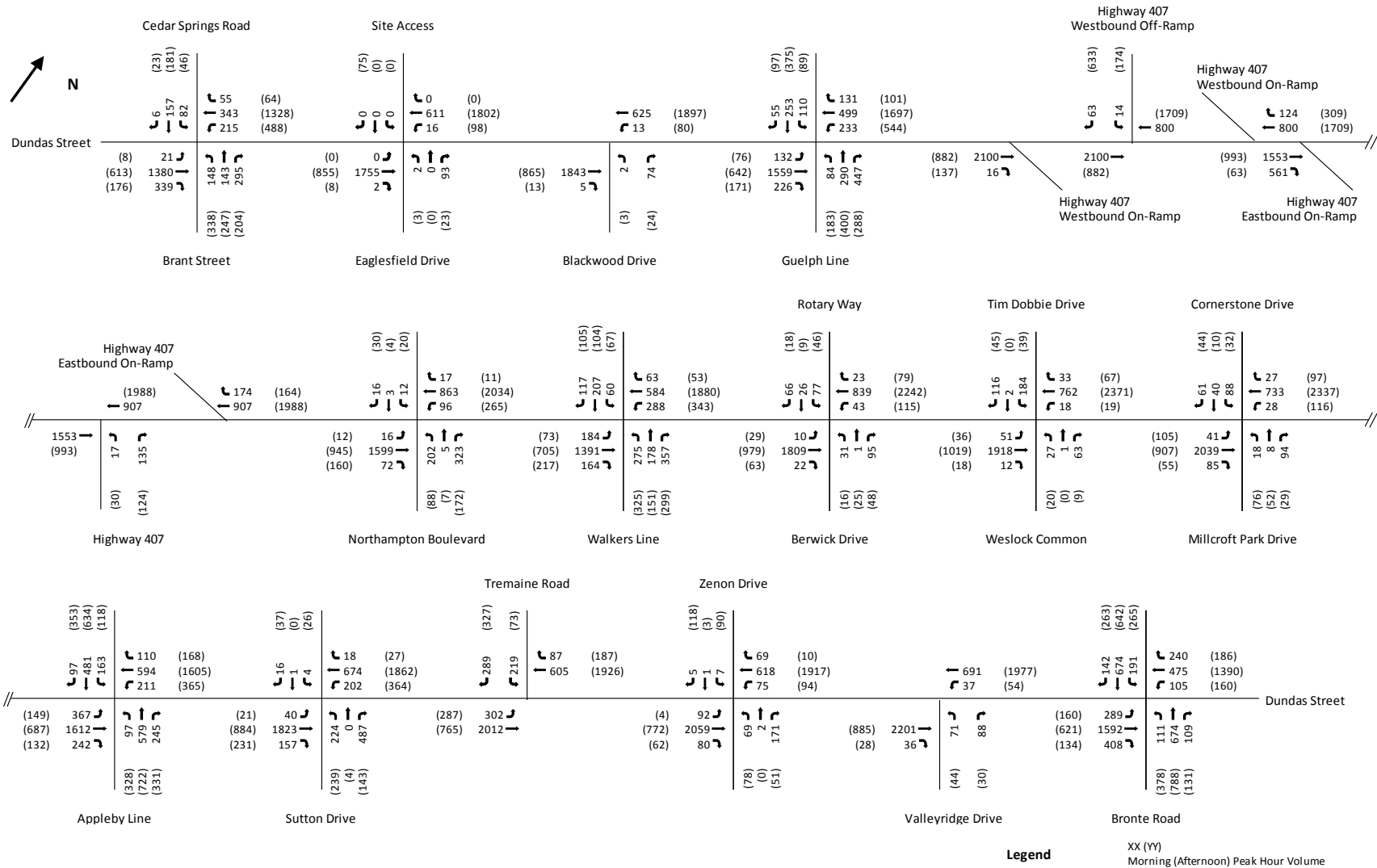
Exhibit 2-2: Dundas Street Hourly Traffic Profile (Two-way volumes)



Source: 2013 Halton Region ATR Count

As mentioned previously, Halton Region provided the existing available turning movement counts from 2011 to 2013 which were compiled and balanced across the study area network into a consistent set of volumes to reflect existing baseline peak hour conditions. The existing balanced turning movement volumes are summarized below in **Exhibit 2-3**.

Exhibit 2-3: Existing Weekday Traffic Volumes



2.2.3.2 Existing Traffic Operations

The existing condition micro-simulation analysis suggests that each of the intersections in the Study Area operates with an overall level-of-service (LOS) ‘D’ or better during both the morning and afternoon peak hours. While some of the side street turning movements and Dundas Street left-turn movements operate as LOS ‘E’, Dundas Street through traffic experiences lower delays and operates with LOS ‘C’ or better. The intersection LOS summary for the morning and afternoon peak hours are summarized in **Table 2-1**.

The analysis also identifies locations which may be candidates for dual-left-turn-lanes in the future. These include westbound left turn movements at Brant Street, Guelph Line, and Walkers Line, and eastbound left turn movement at Tremaine Road.

Table 2-1: Existing Weekday Peak Hour Intersection Level of Service

Intersection*	Weekday Morning Peak Hour		Weekday Afternoon Peak Hour	
	Delay (s)	LOS	Delay (s)	LOS
Dundas Street at Brant Street*	26	C	46	D
Dundas Street at Eaglesfield Drive	1	A	2	A
Dundas Street at Blackwood Drive	1	A	1	A
Dundas Street at Guelph Line*	45	D	47	D
Dundas Street at Highway 407 Westbound Off-Ramp*	4	A	19	B
Dundas Street at Highway 407 Eastbound Off-Ramp*	6	A	9	A
Dundas Street at Northampton Boulevard*	12	B	11	B
Dundas Street at Walker Line*	38	D	29	C
Dundas Street at Berwick Drive*	11	B	9	A
Dundas Street at Weslock Common*	13	B	6	A
Dundas Street at Millcroft Park Drive*	9	A	15	B
Dundas Street at Appleby Line*	42	D	43	D
Dundas Street at Sutton Drive*	27	C	23	C
Dundas Street at Tremaine Road*	21	C	36	D
Dundas Street at Zenon Drive*	11	B	14	B
Dundas Street at Valleyridge*	5	A	6	A
Dundas Street at Bronte Road*	38	D	41	D

*Note: Existing Signalized intersections

The description of Level of Service (LOS) for intersections under traffic signal control is as follows:

- LOS A :** Describes free-flow operations with low delay, up to 10 s/veh. This occurs when progression is extremely favourable and most vehicles arrive during the green phase.
- LOS B :** Describes reasonably unimpeded operation with delays greater than 10 and up to 20 s/veh. This occurs with good progression and/or short traffic signal cycle lengths.
- LOS C :** Describes stable operation with delays greater than 20 and up to 35 s/veh. Higher delays may result from only fair progression, and/or longer cycle lengths.
- LOS D :** Indicates a less stable condition in which small increases in flow can substantially increase delay and reduce travel speed. Operations with delay greater than 35 and up to 55 s/veh.

The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths and high volume to capacity (v/c) ratios.

LOS E : Characterized by unstable operation and significant delays (greater than 55 and up to 80 s/veh). High delay values generally indicate inappropriate signal timing plans, adverse progression, long cycle lengths and high v/c ratios.

LOS F : Operations with delay in excess of 80 s/veh. This often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the lane groups. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

The description of LOS for un-signalized intersections (stop-controlled or roundabout) is as follows:

LOS A : Describes free-flow operations with low delay, up to 10 s/veh.

LOS B : Describes reasonably unimpeded operation with delays greater than 10 and up to 15 s/veh.

LOS C : Describes stable operation with delays greater than 15 and up to 25 s/veh.

LOS D : Indicates a less stable condition in which small increases in flow can substantially increase delay and reduce travel speed. Operations with delay greater than 25 and up to 35 s/veh.

LOS E : Characterized by unstable operation and significant delays (greater than 35 and up to 50 s/veh).

LOS F : Operations with delay in excess of 50 s/veh.

2.2.4 Future Conditions

Halton is one of the most rapidly growing communities in Ontario; based on the planning estimates established through the Sustainable Halton process, the Region will grow from a population of approximately 492,000 with employment of 262,000, to approximately 780,000 residents and 390,000 jobs by 2031.¹

As a result of the proposed development, the Study Area and adjacent lands are likely to undergo significant transformation from the existing rural character to an urban landscape and with this transformation, there will be an increase of transportation demand on the road network. Based on a review of the existing traffic operating conditions and a review of the planned development, it has been determined that the existing road network would not provide sufficient capacity to accommodate future travel demand along Dundas Street and will lead to increased congestion.

The Halton Region EMME travel demand model (TDM) was used to test several lane configuration alternatives such as introduction of High Occupancy Vehicle lanes (HOV), high order transit options like Bus Rapid Transit (BRT), or both as an alternative to the widening to 6 mixed use lanes; intended to address future deficiencies along the Dundas Street corridor.

2.2.4.1 Interim Conditions – Horizon Year 2021

The 2021 forecasts were derived based on the existing turning movement volume distribution and the application of net traffic growth (combination of anticipated traffic growth and traffic diversion) identified by Halton Region's Travel Demand Model (TDM). The TDM represents weekday afternoon peak hour conditions, and therefore future travel demand and level-of-service impacts have been evaluated for afternoon peak

¹ Halton Region Transportation Master Plan to 2031- The Road to Change, September 2011

hour conditions. The detailed description of the analytical approach applied to estimate the 2021 afternoon peak hour traffic volumes follows.

A review of available Ministry of Transportation's historical traffic data (from 1988 to 2006) for Dundas Street at 407 ETR and Highway 403 interchanges suggests that daily traffic volume has been growing at approximately 2% and 3% per year, respectively. Although the daily growth rate may not be representative of the peak hour growth, nonetheless, it serves to provide an estimate of anticipated growth. Based on the foreknown development of the New Oakville Hospital just east of the Study Area limits and the scale of proposed development along Dundas Street, the analysis assumes a 3% growth for both the east and west directions from existing 2013 to year 2021. A traffic impact study undertaken in December 2010 for Bronte Road and Dundas Street Residential Development reaffirms the 3% growth rate assumption for the short-term. In addition to the east-west growth, a 2% annual growth has been applied to the existing north-south through movements.

Turning movement volumes for all study area intersections were established based on a comparative review of existing turning movement volumes grown to horizon year 2021 based on abovementioned growth rates, and turning movement volumes from the individual traffic impact study reports described previously.

The growth along the Dundas Street corridor to 2021 is a reflection of the expected rapid growth in the area, and is anticipated to become relatively stable to and beyond 2031 as development in the area reaches a more mature state. The projected 2021 afternoon peak hour traffic volumes are summarized in **Exhibit 2-4**.

Anticipated HOV Share Under 2021 Conditions

The HOV share on Dundas Street in 2021 was established based on a review of cordon count data and the *QEW HOV Performance Monitoring Study, 2012*. The Dundas Street cordon data available for years 2006 and 2011 suggests that the afternoon peak hour proportion of cars with 2 occupants or more reflect approximately 19% and 14% of the total demand respectively.

A review of the *QEW HOV Performance Monitoring Study* suggests that the provision of HOV lanes along QEW corridor in 2010 had the effect of drawing away carpools from the parallel arterial roads and it brought down the afternoon peak hour/period auto occupancy on Dundas Street by approximately 5%. Nevertheless, it is anticipated that this diverted HOV traffic would revert back to the arterial corridor once the installation of HOV lanes on Dundas Street is complete. Also, it is noteworthy that based on a before-after study along the QEW HOV corridor the occupancies increased by approximately 9% to 17% during the morning peak hour and by approximately 2% to 12% during the afternoon peak hour, within one year of operation. Accordingly, the Dundas Street 2021 analysis considers 20% HOV share reasonable for the purpose of the micro-simulation assessment.

The 2021 afternoon peak hour traffic volumes illustrated in **Exhibit 2-4** were split into 20% HOVs (anticipated HOV share in 2021), 10% transit share (based on Halton Region's Transportation Master Plan, 2011) and the remainder were split into Single Occupant Vehicles (SOVs) & truck traffic. The anticipated mode split by class of vehicle in the peak hour peak direction is illustrated in **Exhibit 2-5** and **Table 2-2**.

Exhibit 2-4: 2021 PM Peak Hour Traffic Volumes (Rationalized Growth Rate)

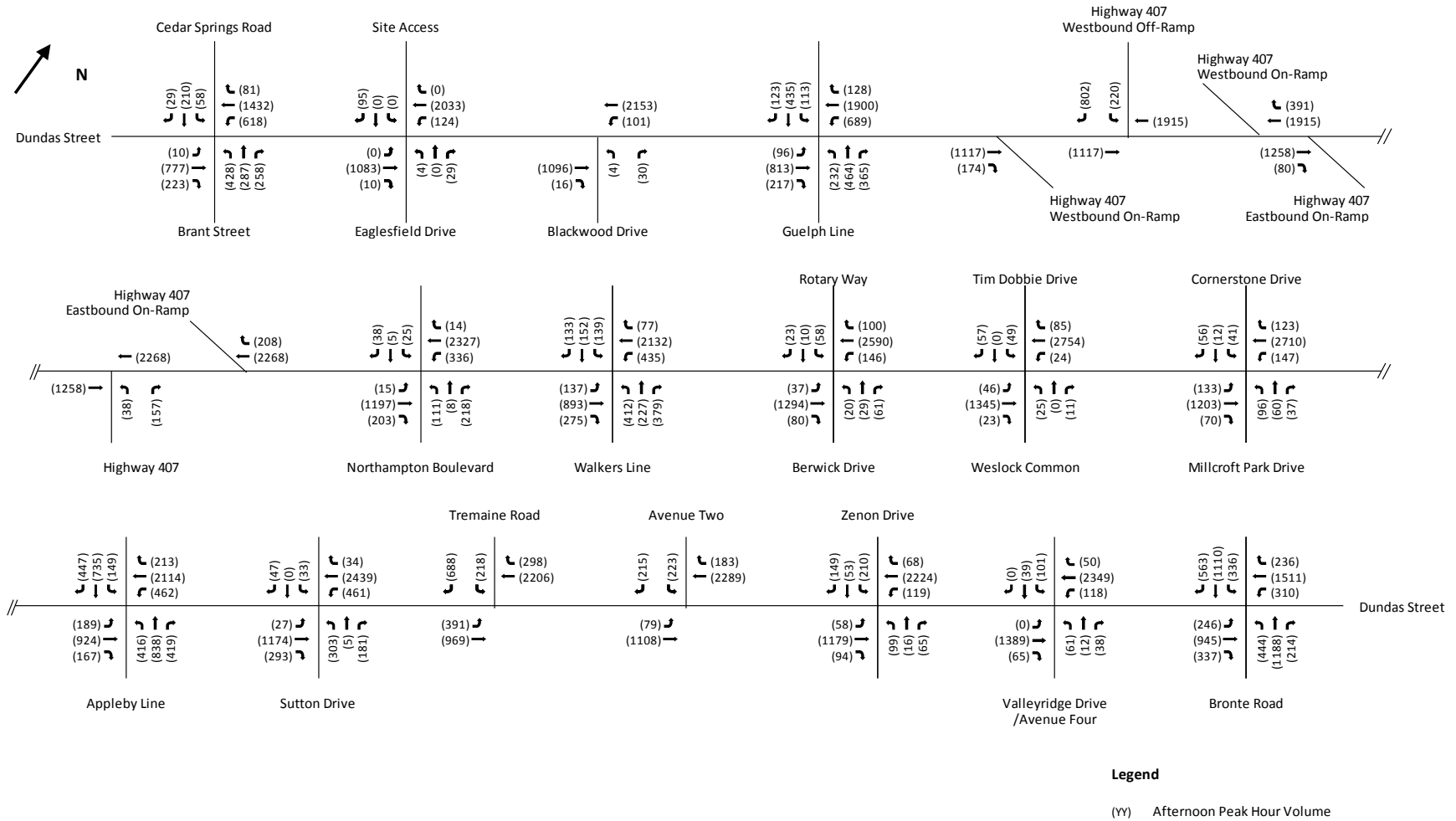
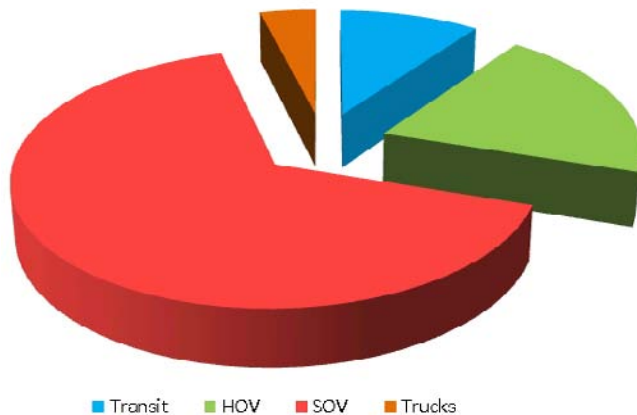


Exhibit 2-5: Anticipated Mode Split - Horizon Year 2021



Peak hour peak direction HOVs will account for 20 % of vehicles carrying ~31 % of person trips in 2021 (in one HOV lane)

Peak hour peak direction SOVs will account for 80 % of vehicles carrying ~59 % of person trips in 2021 (in two GPLs)

Transit will account for 10 % of person trips in 2021

Table 2-2: 2021 PM Peak Hour Volume Projection

Existing PM peak hour peak direction traffic volume (typical) in 2 General Purpose Lanes =	2400	veh/hr
Capacity (based on 2 General Purpose Lanes) =	2400	veh/hr
Existing Auto Occupancy (PM peak hour) =	1.2	person/veh
TOTAL 2021 demand (based on 3% annual growth i.e. 27% increase) =	3660	person/hr
	3050	veh/hr
TRANSIT Share (10%, based on Halton Region Transportation Master Plan, September 2011) =	365	person/hr
	365	veh/hr
HOV (20% based on review of available cordon count data) =	1125	person/hr
	535	veh/hr
Net AUTO Volume on GPL =	2150	veh/hr
No. of persons on GPL =	1075	persons/lane/hr
No. of persons on HOV + Transit =	1490	persons/lane/hr

2021 Intersection Levels of Service

As described previously, the 2021 traffic operations assessment evaluates performance under 4 GPL *plus* 2 HOV lane scenario in which HOV lane use is restricted to carpools and buses, and right-turning traffic where separate right-turn lanes are not provided. The analysis assumes that the through transit traffic would use the same phase as the through GPL traffic. Left-turning traffic at the signalized intersections may use the protected left-turn phase or may utilize available gaps in the opposing through traffic.

The analysis encompasses use of Synchro software to develop future traffic signal timing plans and micro-simulation tool VISSIM to estimate intersection delays and levels of service. The future conditions micro-simulation analysis focusses on afternoon peak hour conditions (as afternoon peak hour demand is higher than the morning peak hour demand), and takes into account all local intersection improvements including turn lanes and traffic signal control, new Dundas Street connections, and new right-in-right-out intersections.

The analysis results indicate that with an additional lane, all the study area intersections would provide an overall LOS ‘D’ or better for the 2021 afternoon peak hour condition, except for the intersection at Bronte Road. At Bronte Road and Dundas Street intersection, left turn movements on all approaches are expected to operate at LOS ‘E’ or ‘F’. Southbound through movement would operate at LOS ‘F’ with over 500 m queue. This indicates the need for additional capacity on Bronte Road by 2021. Notwithstanding high delays at most side street and turning movements, the Dundas Street through traffic would operate at an acceptable LOS ‘D’. Similar condition can be found at Appleby Line. The intersection would operate at LOS ‘D’ with 52 seconds average delay. Left turn movements with double lanes for all the approaches could operate at LOS ‘E’. This is mainly due to the heavy traffic demand (over 7,000 vehicles per hour) at the intersection.

At all the other intersections, traffic movements on Dundas Street approaches (i.e. eastbound and westbound movements) are expected to operate at adequate LOS ‘D’ or better, except the eastbound left movements at Walkers Line and Tremaine Road, and the westbound left movements at Brant Street, Guelph Line, and Walkers Line are expected to operate at the capacity (LOS ‘E’). The 2021 afternoon peak hour intersection LOS summary is presented in **Table 2-3**.

Table 2-3: 2021 PM Peak Hour Intersection Level of Service

Intersection	Weekday Afternoon Peak Hour	
	Delay (s)	LOS
Dundas Street at Brant Street	37	D
Dundas Street at Eaglesfield Drive	1	A
Dundas Street at Blackwood Drive	2	A
Dundas Street at Guelph Line	44	D
Dundas Street at Highway 407 Westbound Off-Ramp	27	C
Dundas Street at Highway 407 Eastbound Off-Ramp	2	A
Dundas Street at Northampton Boulevard	11	B
Dundas Street at Walker Line	38	D
Dundas Street at Berwick Drive	9	A
Dundas Street at Weslock Common	4	A
Dundas Street at Millcroft Park Drive	14	B
Dundas Street at Appleby Line	52	D
Dundas Street at Sutton Drive	19	B
Dundas Street at Tremaine Road	31	C
Dundas Street at Avenue Two	12	B
Dundas Street at Zenon Drive	18	B
Dundas Street at Avenue Four/ Valleyridge Drive	8	A
Dundas Street at Bronte Road	92	F

A sensitivity scenario was conducted for the 2021 planning horizon year, with 6-lane widening of Bronte Road and double-left turn lanes for eastbound and westbound traffic on Dundas Street. The intersection with improved configuration would operate at LOS ‘E’ with 56 seconds average delays, as compared to LOS ‘F’ with 92 seconds average delays. The widening of Bronte Road from 4 to 6 lanes has been identified as part of the Region’s TMP.

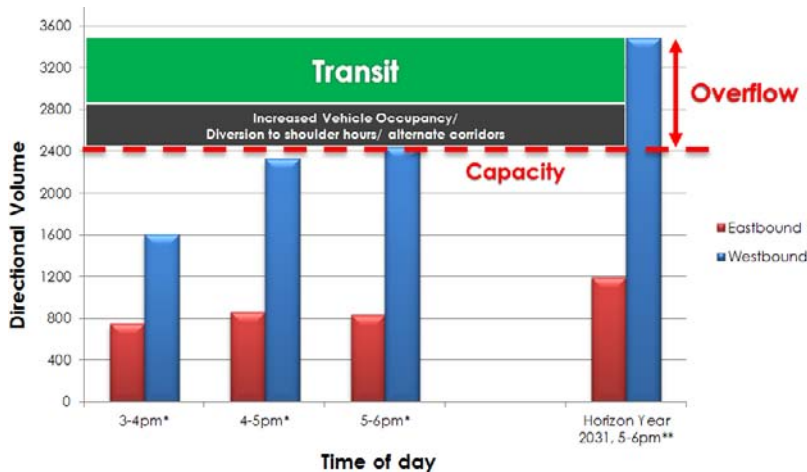
2.2.4.2 Horizon Year 2031

The analytical approach applied to estimate the 2031 traffic forecasts is the same as that adopted for 2021 traffic forecasts, described in **Section 2.2.4.1**. The 2031 traffic volumes were established based on a collective review of the traffic growth trends along Dundas Street corridor, and growth identified in the available traffic impact study reports. The historical growth trends, anticipated transit mode share and available traffic impact study reports were then reviewed to refine the estimate for 2031 travel demand before undertaking detailed micro-simulation.

Note that the growth along the Dundas Street corridor to 2021 is a reflection of the expected rapid growth in the area, and is anticipated to become relatively stable to and beyond 2031 as development in the area reaches a more mature state. As described previously, the 2021 analysis assumed a 3% annual growth for both the east and west directions to year 2021, so the traffic volumes grew by approximately 27% from existing conditions. The 2031 traffic volume projection assumed a 2% growth resulting in a cumulative growth of approximately 43% to 2031 relative to existing conditions.

While there is available capacity in the off-peak direction to accommodate the projected growth, the peak direction operates near capacity currently and therefore diversion to other travel modes and travel routes is anticipated and will be required; as illustrated in **Exhibit 2-6** and **Table 2-4**. The overflow peak hour demand in 2031 will likely be accommodated as follows:

Exhibit 2-6: Anticipated Travel Demand Management- Horizon Year 2031



Future travel demands are likely to increase beyond available capacity. It is anticipated that overflow will be accommodated by alternative methods, as presented in Table 5.

Note: * Based on review of Halton Region Intersection TM Count- Dundas St at Hwy 407 WB Off-Ramp, 2013
 ** 2031 traffic volume based on trend projection

Table 2-4: 2031 PM Peak Hour Volume Projection

Existing PM peak hour peak direction traffic volume (typical)	2400	veh/hr
Capacity (based on 2 General Purpose Lanes)	2400	veh/hr
Existing Auto Occupancy (PM peak hour)	1.2	person/veh
TOTAL 2031 demand (based on 2% annual growth) =	4120	person/hr
	3430	veh/hr
TRANSIT Share (20% of person trips)	825	person/hr
Future Occupancy (assume to increase by 10%)	1.3	person/veh
Net AUTO Volume on GPL =	2535	veh/hr
Estimated AUTO diversion =	135	veh/hr
Estimated diversion to shoulder hours/alternate routes/ transit (% of TOTAL 2031 demand) =	4%	

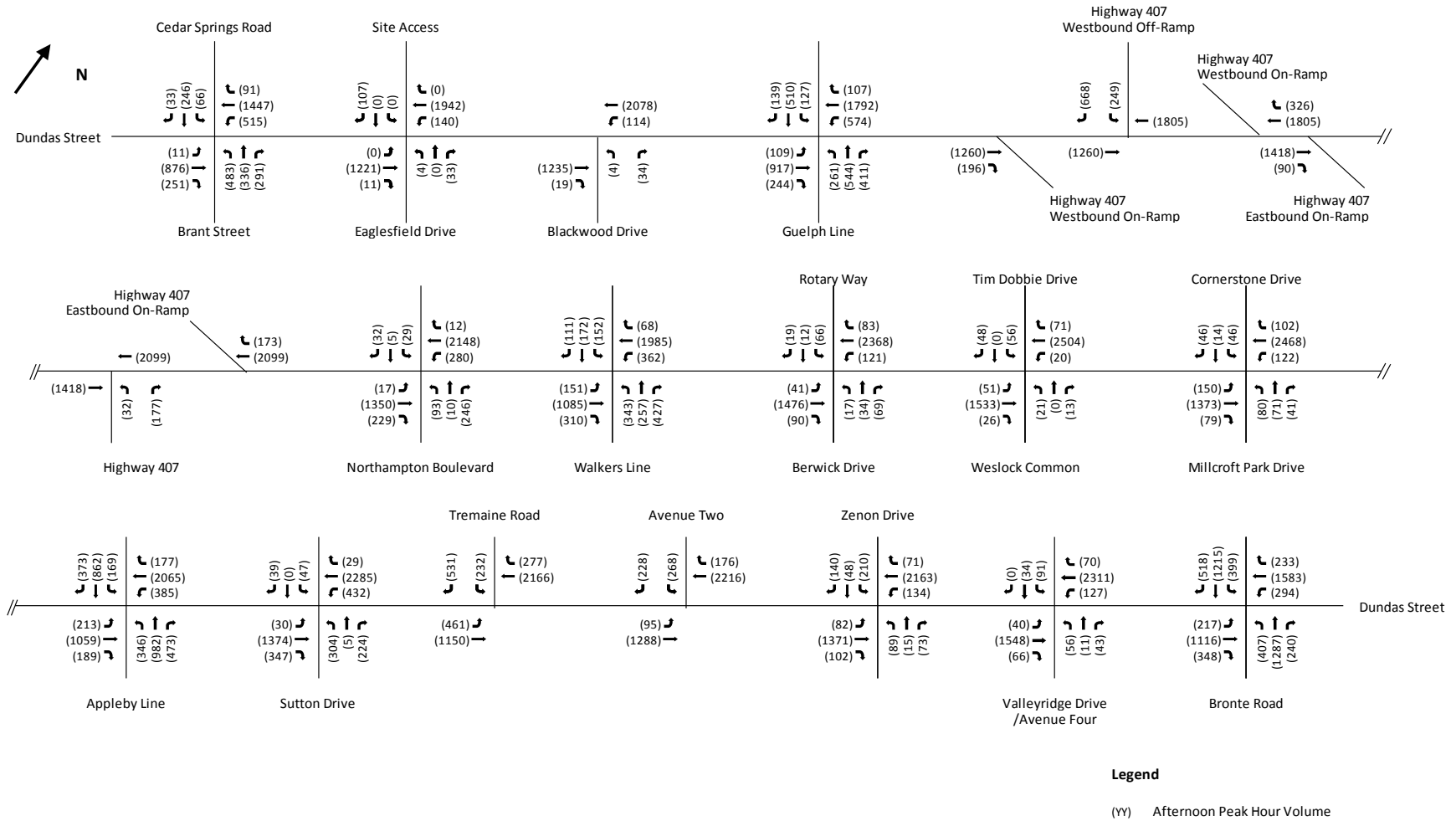
As described previously, the 2031 estimated traffic volumes were established assuming that there is no spare capacity in the peak hour peak direction and so the 2031 peak hour peak direction volumes were maintained in the vicinity of the existing peak hour peak direction traffic volumes. The estimated 2031 afternoon peak hour traffic volumes after refinement are summarized in **Exhibit 2-7**.

2031 Intersection Levels of Service

The 2031 traffic operations assessment evaluates performance under 4 GPL *plus* 2 BRT lane scenario in which BRT lane use is restricted to buses, and right-turning traffic where separate right-turn lanes are not provided. The analysis assumes that the through bus traffic would use the same phase as the through GPL traffic and the left-turning vehicles at the signalized intersections may use the protected left-turn phase or may utilize available gaps in the opposing through traffic. The analysis encompasses use of Synchro software to develop future traffic signal timing plans and micro-simulation tool VISSIM to estimate intersection delays and levels of service.

The micro-simulation analysis indicates that with the predicted increase in off-peak direction and cross-street demand in 2031, each of the study area intersections will experience greater delays. Walkers Line, Appleby Line and Bronte Road intersections along Dundas Street will experience an average delay of approximately 60 to 90 seconds. The higher delays are associated with higher crossing road traffic demand which competes for green time with the Dundas Street phases. Each of the other study area intersections are expected to operate with an adequate LOS ‘D’ or better under projected future demand and the proposed lane configurations. The intersection LOS summary is presented in **Table 2-5**.

Exhibit 2-7: 2031 Weekday PM Peak Hour Volumes



Note: Volumes in this exhibit are reflective of vehicles in the general purpose lanes only (i.e. not including vehicles in the HOV/transit lanes).

Table 2-5: 2031 PM Peak Hour Intersection Level of Service

Intersection	Weekday Afternoon Peak Hour	
	Delay (s)	LOS
Dundas Street at Brant Street	43	D
Dundas Street at Eaglesfield Drive	3	A
Dundas Street at Blackwood Drive	1	A
Dundas Street at Guelph Line	50	D
Dundas Street at Highway 407 Westbound Off-Ramp	30	C
Dundas Street at Highway 407 Eastbound Off-Ramp	5	A
Dundas Street at Northampton Boulevard	9	A
Dundas Street at Walker Line	56	E
Dundas Street at Berwick Drive	15	B
Dundas Street at Weslock Common	5	A
Dundas Street at Millcroft Park Drive	17	B
Dundas Street at Appleby Line	67	E
Dundas Street at Sutton Drive	24	C
Dundas Street at Tremaine Road	36	D
Dundas Street at Avenue Two	19	B
Dundas Street at Zenon Drive	18	B
Dundas Street at Avenue Four/ Valleyridge Drive	11	B
Dundas Street at Bronte Road	88	F

2.2.5 Double Left-Turn Lane Requirements

Given the magnitude of anticipated population and employment growth, transportation infrastructure improvements including new intersections and road extensions, resulting change in travel patterns and the associated level of uncertainty in the rate at which the above may actually take place to years 2021 and 2031, it should be noted that the predicted future peak hour traffic volumes (generated by factoring existing turning movement counts by a growth rate reflective of average growth along Dundas Street corridor) may not be precise to the level of turning movements (it is unlikely that all study area turning movements will grow at the same rate). Based on the projected traffic volume for year 2021 and 2031, the southbound left turn movement at Walkers Line and Dundas Street intersection could operate with a single lane. Hence, the traffic analysis was conducted assuming only a single lane for this movement. However, for the purpose of the EA Study, a double left turn lane would be protected at arterial road intersections.

As mentioned earlier, the Region has planned to widen Bronte Road to 6 lanes (post 2021). Based on the review of 2031 peak hour turning movement volumes, double left turn lanes would be required for eastbound, westbound and southbound left turn movements at the Bronte Road and Dundas Street intersection. In the current study, Dundas Street corridor is proposed at 6 lanes and will align with the existing 6 lane cross section at Bronte Road intersection. However, additional lane configuration improvements at this intersection will be reassessed and if required could be improved with Bronte Road widening.

2.3 Traffic Findings and Conclusions

A detailed traffic operations assessment has been undertaken as part of the Dundas Street EA study between Brant Street and Bronte Road. This traffic study focusses on assessing intersection operations under existing and future conditions; specifically, evaluating and addressing existing traffic congestion along the corridor, and in developing suitable mitigation strategies that can accommodate anticipated traffic growth in the Study Area.

Dundas Street functions as a commuter route operating near capacity in the peak direction of travel under present day peak hour conditions. Micro-simulation analysis confirms that the study area Dundas Street intersections operate with an overall LOS 'D' or better under both the existing condition morning and afternoon peak hours. Some of the side street turning movements and Dundas Street left-turn movements operate with a relatively lower level of service. The westbound left turn movements at Brant Street, Guelph Line, and Walkers Line, and eastbound left turn movement at Tremaine Road experiences greater delays and operate with LOS 'E/F', indicating a need for intersection improvements.

As urban development continues along the corridor, the travel demand will surpass the capacity of a 4 lane arterial and Dundas Street will require widening to 6 lanes. The future conditions analysis evaluates operating performance under 4 GPL *plus* 2 HOV lane configuration in year 2021 and 4 GPL *plus* 2 BRT lane configuration in year 2031. The existing condition analysis serves as a benchmark for comparison with operations under the future lane configurations.

The future traffic volumes were established based on a collective review of the traffic growth predicted by Halton Region's Travel Demand Model (TDM), historical traffic growth trends along Dundas Street corridor, and growth identified in the available traffic impact study reports.

A review of the available Ministry of Transportation's historical traffic data suggests 3% per annum growth along Dundas Street to year 2021, i.e. approximately 27% growth relative to existing travel demand. The 2031 traffic volume projection assumes a 2% growth resulting in a cumulative growth of approximately 43% by 2031. The growth along the Dundas Street corridor to 2021 is a reflection of the expected rapid growth in the area, and is anticipated to become relatively stable to and beyond 2031 as development in the area reaches a more mature state.

A combination of the rationalized growth rates and turning movement volume estimates from the available traffic studies was used to develop turning movement forecasts which were adjusted into a consistent set of balanced volumes before input into the micro-simulation model.

Synchro and VISSIM software were used for developing optimized traffic signal timing plans for future conditions and detailed micro-simulation analysis, respectively. The future year traffic analysis incorporates all local intersection improvements including turn lanes and traffic signal control, new Dundas Street connections, and some minor right-in-right-out intersections as identified in the available traffic impact study reports. In addition, the 6-lane widening for Brant Street, Guelph Line, and Bronte Road, and the 4-

lane widening for Tremaine Road proposed in the Halton Region Roads Capital Projects (2014-2031) were also included in the 2031 analysis.

The anticipated mode share for 2021 includes 20% HOVs (based on review of cordon count data, and QEW HOV Performance Monitoring Study), 10% transit share (based on Halton Region's Transportation Master Plan, 2011), and remainder split into Single Occupancy Vehicles and trucks.

A review of the estimated 2021 afternoon peak hour traffic volumes indicate that the Dundas Street traffic demand is highest at the Bronte Road intersection, followed by the Appleby Line intersection. The analysis suggests that the Dundas Street intersection with Bronte Road is expected to operate with delays of up to 90 seconds and a corresponding level of service 'F' in the 2021 afternoon peak hour. This indicates the need for capacity improvements on Bronte Road by 2021. Sensitivity analysis undertaken with inclusion of double left-turn lanes on the eastbound and westbound approaches and 6-lane widening on Bronte Road suggests reduction in overall intersection delay to 56 seconds and a corresponding level of service 'D/E' in the afternoon peak hour.

At all the other intersections, traffic movements on Dundas Street approaches (i.e. eastbound and westbound movements) is expected to operate at adequate LOS 'D' or better, except the eastbound left movements at Walkers Line and Tremaine Road, and the westbound left movements at Brant Street, Guelph Line, and Walkers Line would operate at capacity (LOS 'E'). Some traffic movements on side street approaches (i.e. northbound and southbound left turn movements) would operate at LOS 'E' under 2021 afternoon peak hour conditions.

The 2031 estimated traffic volumes were established assuming that there is no spare capacity in the peak hour peak direction general purpose lanes and so the 2031 peak hour peak direction volumes were maintained in the vicinity of the existing peak hour peak direction traffic volumes. The off-peak direction peak hour demand is expected to grow by 43% to 2031.

The micro-simulation analysis indicates that with the increase in off-peak direction and cross-street demand in 2031, each of study area intersections will experience greater delays. Walkers Line, Appleby Line and Bronte Road intersection with Dundas Street will experience an average delay of approximately 60 to 90 seconds. The higher delays are associated with higher crossing road traffic demand which competes for green time with the Dundas Street phases. The higher delays are associated with higher crossing road traffic demand which competes for green time with the Dundas Street phases. Each of the other study area intersections operates with an adequate LOS 'D' or better under projected future demand and the proposed lane geometry.

Candidates for double left-turn lanes based on a review of present day left-turning traffic volumes and the 2021 forecasts are listed in **Section 2.2.5**.

Given the magnitude and level of uncertainty in the rate of population and employment growth, timing of transportation infrastructure improvements including new roads and road extensions and resulting change in travel patterns, this traffic analysis (based on the assumptions described previously) provides an indication of probable future traffic operating conditions. However, it is important to note that as development occurs and it

is anticipated that demand on the transportation network will also increase. With the widening of Dundas Street to 6-lanes, there is 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. In parallel, active transportation, bus stops and transit priority measures can be provided at key intersections as required. The timing for introduction of HOV lanes / transit improvements is to be determined in consultation with the local municipalities (i.e. Town of Oakville and City of Burlington, which are the transit operators in their respective areas). As transit ridership builds, there is the opportunity to convert the HOV lanes into dedicated bus lanes in the future (i.e. 2031).

2.4 Problem Being Addressed

Based on the review of existing conditions on Dundas Street and the analysis of existing traffic volumes and projected future travel demands and the findings and recommendations of related studies, the problem being addressed by the study was defined as follows:

- existing Dundas Street is operating at capacity during peak hours, which means there is limited capacity available to accommodate additional traffic as the areas adjacent to Dundas Street develop;
- future travel demands indicate the need to provide for 6 lanes with provision for 4 general traffic lanes and 2 HOV lanes with the ability to convert to 4 general traffic lanes with 2 dedicated BRT lanes as transit ridership increases;
- level of existing traffic volumes require that 4 lanes be maintained during construction;
- as urban development continues to proceed in the area, there is a need to provide facilities for pedestrians and cyclists.

Therefore, Halton Region carried out this study to address the foregoing in accordance with the Municipal Class EA process.

2.5 Planning Alternatives

At the planning level, the following alternatives were identified for consideration:

- "do nothing"
- limit development
- travel demand management measures
- improved transit service
- intersection and/or operational improvements
- improvements to other roadways
- improvements to Dundas Street

The above-noted planning alternatives were assessed in terms of how they would address the problem under consideration outlined in **Section 2.4**. A brief description of each of the planning alternatives is outlined below. **Table 2-6** summarizes the analysis and

evaluation of the planning alternatives under factor groups such as socio-economic environment, cultural environment, natural environment, transportation and costs.

Do Nothing

This alternative involves maintaining status quo. The existing roadway would be retained in its present form and operational problems would continue to deteriorate. To do nothing would result in the escalation of congestion issues, reduction in the safety of the corridor, continuing operational issues at intersections along the corridor, and impact operation efficiency of transit services. While this alternative is not considered to be a reasonable alternative, it is carried forward as part of the EA process and used for comparison purposes.

Limit Development

Projections of future travel demands are based on the approved future urban area as shown in the Halton Region Official Plan. Limiting development was not considered to be reasonable in isolation, and therefore was not carried forward for further consideration as part of this study.

Travel Demand Management Measures

Travel Demand Management (TDM) measures include measures to reduce the number of vehicles during the peak hours, e.g. carpooling, staggered work hours, etc. While these are part of Halton Region's overall transportation strategy, on their own, they do not address the need for additional capacity on Dundas Street. There is a deficiency in roadway capacity under existing conditions, and while travel demand measures may help manage the rate of growth in travel demand; however, travel demand will continue to increase with ongoing growth and development. Therefore, this alternative is carried forward for further consideration as part of the overall transportation strategy.

Improved Transit Service

The increased use of transit is part of the overall transportation strategy and it is expected that services will be improved through planning by local transit authorities. The widening of Dundas Street will assist in achieving and implementing Halton Region's Transportation Master Plan by providing additional lanes and infrastructure to support transit service provided by the local municipalities and GO Transit, including provision for transit priority measures. Improved transit service also supports improvement in active transportation where people can combine different transportation modes in their trip (e.g. walk / transit or bike / transit). Therefore, this is carried forward for further consideration as part of the overall transportation strategy.

Intersection / Operational Improvements

Intersection improvements include the addition of traffic signals, auxiliary lanes (e.g. right turn and left turn lanes) and additional lanes through the intersection. They would not fully address the identified problem but are required as part of the overall improvement strategy. Operational improvements include modifications to signal timing plans, traffic signal interconnect systems, and road user information systems. They would not fully address the identified problem but are required as part of the overall improvement strategy.

Improvements to Other Roadways

Improvements to other roadways have been identified as part of the Halton Region Transportation Master Plan, as well as other local improvements by the City of Burlington and the Town of Oakville. These are required as part of the overall transportation strategy in addition to improvements in the Dundas Street corridor and will be subject to separate studies.

Improvements to Dundas Street

Improvements to Dundas Street are required in order to address future corridor requirements. In the Halton Region Transportation Master Plan, Dundas Street was identified as requiring additional capacity and widening from 4 to 6 lanes with the provision for 4 general traffic lanes and 2 lanes for transit / high occupancy vehicles. Facilities for pedestrians and cyclists would also be considered as part of the improvements. Therefore, this is carried forward for further consideration as part of this study.

Table 2-6: Analysis and Evaluation of Alternative Solutions

FACTORS	ALTERNATIVES SOLUTIONS						
	Do Nothing	Limit Development	Travel Demand Management Measures	Improved Transit Service	Intersection and/or Operational Improvements	Improvements to Other Roadways	Improvements to Dundas Street
Socio-Economic Environment							
Property Effects / Existing Land Use / Community Effects	<ul style="list-style-type: none"> No impact to adjacent properties and existing land use 	<ul style="list-style-type: none"> No impact to adjacent properties and existing land use 	<ul style="list-style-type: none"> No impact to adjacent properties and existing land use 	<ul style="list-style-type: none"> Would likely have some property impact due to the implementation of transit related improvements (e.g. bus bays, transit stops, intersection reconstruction, etc.) 	<ul style="list-style-type: none"> Would likely have some property impact particularly for properties in close proximity to the intersections Minimal impact to overall existing land use 	<ul style="list-style-type: none"> Improvements on other roadways have already been identified as part of the Region and local Transportation Master Plans. Impact to existing properties would be determined based on respective EA studies Potential impact to access along the improved roadways 	<ul style="list-style-type: none"> Some property impact to adjacent property. Most of the widening will likely be to the north side of the road due to existing development on the south side Existing accesses on Dundas Street will become right-in/right-out only; however, U-Turn will be permitted at signalized intersections
Consistency with Planning Policies (Official Plan, Transportation Master Plan, Active Transportation Plan)	<ul style="list-style-type: none"> Not consistent with the Halton Region Transportation Master Plan Not consistent with Region's, City's and Town's objective to promote Active Transportation 	<ul style="list-style-type: none"> Not consistent with the planned population and employment growth identified by Halton Region, City of Burlington and Town of Oakville 	<ul style="list-style-type: none"> Consistent with the Region, City of Burlington and Town's objectives to manage travel demand However, this is not consistent with the Region's, City's and Town's need to provide additional capacity with the Dundas Street corridor 	<ul style="list-style-type: none"> Consistent with the Region's, City's and Town's vision to increase transit modal share 	<ul style="list-style-type: none"> Will not fully address transportation needs in the future 	<ul style="list-style-type: none"> Improvements on other roadways have already been identified as part of the Region, City and Town Transportation Master Plans 	<ul style="list-style-type: none"> Consistent with the Region's, City's and Town's Transportation Master Plans and Official Plans to provide additional capacity with the Dundas Street corridor
Impacts to Future Development	<ul style="list-style-type: none"> Would not provide the transportation network improvements required (e.g. additional capacity) to support future developments (e.g. North Oakville Secondary Plan) 	<ul style="list-style-type: none"> Not consistent with the planned population and employment growth identified by Halton Region, City of Burlington and Town of Oakville 	<ul style="list-style-type: none"> No direct physical impact to future development 	<ul style="list-style-type: none"> No direct physical impact to future development 	<ul style="list-style-type: none"> No direct physical impact to future development Does not provide the infrastructure improvement required for future developments 	<ul style="list-style-type: none"> Future developments will coordinate with the Region, City / Town to integrate with proposed roadway improvements 	<ul style="list-style-type: none"> Future developments will coordinate with the Region, City / Town to integrate with proposed Dundas Street improvements
Noise	<ul style="list-style-type: none"> Some potential increase in noise level due to increased traffic near noise sensitive areas adjacent to Dundas Street when compared to existing conditions 	<ul style="list-style-type: none"> Likely no significant impact to existing noise sensitive areas adjacent to Dundas Street 	<ul style="list-style-type: none"> Likely no significant impact to existing noise sensitive areas adjacent to Dundas Street 	<ul style="list-style-type: none"> Minimal change in noise level from new transit services 	<ul style="list-style-type: none"> Minimal change in noise level 	<ul style="list-style-type: none"> Potential increase in noise level to noise sensitive areas adjacent to the roadways 	<ul style="list-style-type: none"> Potential increase in noise level to noise sensitive areas adjacent to Dundas Street
Cultural Environment							
Archaeological Resources	<ul style="list-style-type: none"> A Stage 1 archaeology assessment was carried out. Areas adjacent to Dundas Street between Brant Street and 407 ETR (north and south sides) are largely identified as having archaeological potential. Between 407 ETR and Bronte Road, intermittent areas on either north or south sides of Dundas Street have been identified to have archaeological potential. A cemetery investigation is recommended if construction activities are proposed along the existing Dundas Street right-of-way at Nelson Cemetery, St. John's Cemetery and St. Paul's Cemetery. Details may be found in Appendix H – Stage 1 Archaeological Assessment. 						
Built Heritage Resources / Cultural Landscape	<ul style="list-style-type: none"> A built heritage and cultural landscapes review was carried out. Between Brant Street and Bronte Road, there are 14 Built Heritage Resources (BHR) and 14 Cultural Heritage Landscape (CHL). The features are listed in Appendix G Cultural Heritage Resource Assessment. No impact to cultural heritage landscapes 			<ul style="list-style-type: none"> Implementation of bus bays may have minor impacts to features located directly adjacent to the roadway. 	<ul style="list-style-type: none"> Likely limited impact to built heritage features. 	<ul style="list-style-type: none"> May have impact to other built heritage features along those roadways. 	<ul style="list-style-type: none"> Design will be modified to minimize impact to built heritage features where possible. Mitigation measures will be reviewed as required.

FACTORS	ALTERNATIVES SOLUTIONS						
	Do Nothing	Limit Development	Travel Demand Management Measures	Improved Transit Service	Intersection and/or Operational Improvements	Improvements to Other Roadways	Improvements to Dundas Street
Natural Environment							
Fisheries and Aquatic Habitat	<ul style="list-style-type: none"> Potential minor impact on fish habitat quality through increased traffic demand and resulting incremental contaminant runoff from existing roads No net loss of fish habitat 	<ul style="list-style-type: none"> No net loss of fish habitat 	<ul style="list-style-type: none"> No net loss of fish habitat 	<ul style="list-style-type: none"> Incremental effects on fish habitat may be experienced to accommodate transit initiatives such as new stations, etc. These effects will depend on nature of improvements relative to watercourse features No net loss of fish habitat 	<ul style="list-style-type: none"> Incremental effects on fish habitat may be experienced to accommodate intersection and/or operational improvements. These effects will depend on nature of improvements relative to watercourse features No net loss of fish habitat 	<ul style="list-style-type: none"> Potential fish habitat effects associated with culvert replacements / extensions for road widening – dependent on nature of undertaking and agency liaison Increased contaminant runoff volumes may be generated with widened pavement surface 	<ul style="list-style-type: none"> Potential fish habitat effects associated with culvert replacements / extensions for road widening – dependent on nature of undertaking and agency liaison Increased contaminant runoff volumes may be generated with widened pavement surface No net loss of fish habitat
Surface Water Quality and Quantity	<ul style="list-style-type: none"> Potential minor impact on surface water quality through increased traffic demand and resulting incremental contaminant runoff from existing roads 	<ul style="list-style-type: none"> No direct impact to surface water quality and quantity 	<ul style="list-style-type: none"> No direct impact to surface water quality and quantity 	<ul style="list-style-type: none"> Incremental effects on surface water resources may be experienced to accommodate transit initiatives such as new stations, etc. These effects will depend on nature of improvements relative to watercourse features 	<ul style="list-style-type: none"> Potential impact on surface water quality through increased traffic demand and resulting incremental increase in contaminant runoff from existing roads 	<ul style="list-style-type: none"> Potential water quality effects through widening at existing water courses (short term impact due to construction, long term impact due to increased runoff) 	<ul style="list-style-type: none"> Potential water quality effects through widening at existing water courses (short term impact due to construction, long term impact due to increased runoff)
Vegetation (Wetland and Upland)	<ul style="list-style-type: none"> No physical impacts to vegetation Possible incremental contaminant drift with increased traffic demand – localized vegetation stress 	<ul style="list-style-type: none"> No physical impacts to vegetation 	<ul style="list-style-type: none"> No physical impacts to vegetation 	<ul style="list-style-type: none"> Incremental effects (such as vegetation / wetland intrusion) may occur to accommodate various transit initiatives. These effects will depend on nature and location of improvements 	<ul style="list-style-type: none"> Potential for physical removal of vegetation in localized areas where improvements are made. Anticipated that these would be relatively minor 	<ul style="list-style-type: none"> Potential for physical removal where road widening borders existing vegetation / wetlands or where vegetation / wetlands features extend into right-of-way Typically results in edge effects rather than fragmentation 	<ul style="list-style-type: none"> Potential for physical removal where road widening borders existing vegetation / wetlands or where vegetation / wetlands features extend into right-of-way Typically results in edge effects rather than fragmentation
Wildlife	<ul style="list-style-type: none"> No physical impacts to wildlife and wildlife habitats 	<ul style="list-style-type: none"> No physical impacts to wildlife and wildlife habitats 	<ul style="list-style-type: none"> No physical impacts to wildlife and wildlife habitats 	<ul style="list-style-type: none"> Potential for incremental habitat removal / intrusion to accommodate various transit initiatives. These effects will depend on nature and location of improvements 	<ul style="list-style-type: none"> Potential for physical habitat impact in localized areas where improvements are made. Anticipated that these would be relatively minor, if any 	<ul style="list-style-type: none"> Potential for habitat removal where road widening borders existing vegetation / wetlands or where vegetation / wetland features extend into right-of-way Existing drainage crossing structures used by wildlife may require lengthening Potential for reduced quality in habitat adjacent to the widened roadway (increased noise, light) 	<ul style="list-style-type: none"> Potential for habitat removal where road widening borders existing vegetation / wetlands or where vegetation / wetland features extend into right-of-way Existing drainage crossing structures used by wildlife may require lengthening Potential for reduced quality in habitat adjacent to the widened roadway (increased noise, light)

FACTORS	ALTERNATIVES SOLUTIONS						
	Do Nothing	Limit Development	Travel Demand Management Measures	Improved Transit Service	Intersection and/or Operational Improvements	Improvements to Other Roadways	Improvements to Dundas Street
Transportation							
Ability to Accommodate Traffic Demand	<ul style="list-style-type: none"> Will not provide capacity and infrastructure required for future transportation demand on Dundas Street 	<ul style="list-style-type: none"> Dundas Street is operating near capacity based on existing development and will be influenced by development elsewhere in the wider corridor 	<ul style="list-style-type: none"> Would help to reduce and optimize transportation demand Would require significant changes to travel behavior to achieve improved levels of service 	<ul style="list-style-type: none"> Provides choice for mobility needs of population (reduces auto dependency); potential for reduction of traffic congestion 	<ul style="list-style-type: none"> Localized improvements would not be sufficient to accommodate transportation demand generated by scale of planned urban development 	<ul style="list-style-type: none"> Needs for improvements to other roads to support future transportation demand generated for planned development have been established and identified in the Halton Transportation Master Plan 	<ul style="list-style-type: none"> Supports transportation demand for urban growth adjacent to the corridor and surrounding area
Costs							
Order of Magnitude Cost (Construction Costs)	N/A	N/A	\$	\$\$	\$\$	\$\$\$	\$\$\$
SUMMARY	Do Nothing would restrict future approved development and would not address future transportation needs.	Projections of future travel demands are based on the approved future urban area as shown in the Halton Region Official Plan. Limiting development was not considered to be reasonable in isolation.	While these are part of Halton Region’s overall transportation strategy, on their own they do not address the need for additional capacity on Dundas Street.	The increased use of transit is part of the overall transportation strategy and it is expected that services will be improved through planning by local transit authorities. The widening of Dundas Street will assist in achieving and implementing Halton Region’s Transportation Master Plan by providing additional lanes and infrastructure to support enhanced transit services and provide for a multi-modal corridor.	They would not fully address the identified problem but are required as part of the overall improvement strategy.	These are required as part of the overall transportation strategy in addition to improvements in the Dundas Street corridor and will be subject to separate studies.	Improvements to Dundas Street are required in order to address future corridor requirements, and support implementation of transit strategies.
RECOMMENDED TO BE CARRIED FORWARD	NO	NO	YES – but as part of the overall transportation solution	YES – but as part of the overall transportation solution	YES – but as part of the overall transportation solution	NO – under separate studies	YES – carried forward as the preferred alternative solution