



Midtown Oakville
Transportation and Stormwater
Municipal Class
Environmental Assessment
Final Report
June 2014

Volume 1 of 3
Report and Appendices A to C



Project consultant

Executive Summary

A. Introduction and Background

The Midtown Oakville Municipal Class Environmental Assessment (EA) study develops a practical, long-term strategy to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville to 2031, as identified in the Livable Oakville Plan, the town’s official plan.

This project is a continuation of Switching Gears, Oakville’s Transportation Master Plan study, to further assess the infrastructure needs in Midtown Oakville to meet Phase 3 and 4 of the Class EA planning and design process, as outlined in the Municipal Engineers Association “Municipal Class Environmental Assessment”, (October 2000, as amended in 2007 and 2011).

Cole Engineering Group Ltd. was retained by the Town of Oakville in 2012, following completion of the town’s Transportation Master Plan study to complete this Municipal Class EA study for Midtown Oakville.

Study Objectives

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

Study Area and Location

Midtown Oakville is centred on Trafalgar Road and the QEW as shown in **Figure ES-1**. Midtown Oakville is characterized by several unique and highly desirable features, including a large wooded ravine, natural heritage, and large-scale public land ownership. It is approximately 100 hectares in size and bounded by the Queen Elizabeth Way (QEW) to the north, Cornwall Road to the south, Chartwell Road to the east, and Sixteen Mile Creek valley to the west. For purposes of this Municipal Class EA, the study area also encompasses areas to the north and east of the urban growth centre limits.

Figure ES-1: Study Area

B. Consultation

Consultation with the public and technical agencies was a key component of the EA process. For this study, an intensive consultation program was followed. The study team met with various stakeholders and technical agencies throughout the duration of the study to gather valuable input and varying opinions. The following sections briefly present the consultation program.

Technical Agencies Committee

The Technical Agencies Committee (TAC) was formed at the project initiation stage. A long list of agencies were invited to the TAC meetings.

The first TAC meeting was held on July 17, 2012 to present various elements of the study, including transportation needs, future traffic volumes, road concept screening options and alternatives, stormwater management design, and constraints such as utility conflicts and property impacts. The second TAC meeting was held on March 27, 2014 to present a study update, details of the preferred concept and next steps.

Comments received from Conservation Halton (CH) required additional consultation with CH staff. A number of additional meetings and conference calls were held with respect to issues regarding stormwater, a candidate significant woodlot and crossing of the Morrison Creek diversion channel.

The Ministry of Transportation (MTO) expressed concerns regarding the new connections to QEW and impacts to mainline traffic flows. A series of meetings were held with MTO as a microsimulation model

was developed and calibrated to demonstrate future operations on QEW with and without the proposed Midtown Oakville improvements. Modifications were adopted into the resulting design to address weaving and merging on the QEW.

Additional consultation with Metrolinx and Halton Region occurred over the course of the study to share information regarding parallel studies, integrate proposed plans and property requirements.

Agency Stakeholders Workshop

A two-day Agency Stakeholders Workshop was held in March 2013. The workshop was split into two all-day sessions to provide sufficient time to accommodate the volume of material to be reviewed as well as a working session to develop network alternatives. The first session was held on March 1, 2013, and the second session was held one week later, on March 8, 2013.

The workshop was held in order to collaborate with key players from various agencies that contribute to the overall development of Midtown Oakville. The meeting built upon decisions and work completed to date, and allowed participants to work in groups in a design charrette format to layer pedestrian, cycling, transit, and road improvements onto aerial maps to determine preferred solutions. Advantages and disadvantages of various improvements were discussed, and the evaluation criteria assessing the improvements were also presented.

Stakeholders

A Stakeholder Advisory Group comprising of representatives from various associations was formed at the project initiation stage.

The first Stakeholders Advisory Group meeting was held on July 17, 2012. This meeting was held in order to present various elements of the study, including transportation needs, future traffic volumes, road concept screening options and alternatives, stormwater management design, and constraints, such as utility conflicts and property impacts.

The second Stakeholders Advisory Group meeting was held on March 27, 2014 to present a study update, details of the preferred concept and next steps.

Public

Three Public Open House (POH) sessions were held over the course of the study.

The first POH was held at town hall on June 13, 2012. This POH was the first point of contact with the general public to present an overview of existing conditions, conceptual plans for the future, and to request input on issues, concerns and suggestions for consideration during the study. A panel discussion led by members of the study team actively involved the public in discussion. Information was also provided on display boards in an informal open house format to solicit feedback from attendees and to offer the opportunity to interact with the study team.

The second POH was held at town hall on June 19, 2013. The purpose of the second POH was to present the study background and context, the road, active transportation and transit needs, the main priorities and evaluation criteria, the alternative improvements, the preliminary evaluation, and to gather public input. Attendees were encouraged to ask questions and/or provide feedback following a formal presentation. An information package was distributed as attendees moved to seven roving stations that highlighted the various alternatives and preliminary evaluations and were facilitated by study team members.

The third POH was held at town hall on April 2, 2014. The purpose of this POH was to review the project details, present the preferred solution to the public, and address public comments. Attendees were provided with an information package that contained background information and details about the elements of the preferred plan. Display boards were available for review prior to and following a formal presentation. There was also a private landowners room available with town staff to address any individual questions and concerns of impacted property owners.

Impacted Landowners

A series of meetings were held in March 2014 with the impacted landowners. The meetings allowed landowners to discuss individually with town staff any concerns regarding the property requirements for the proposed transportation improvements in Midtown Oakville.

C. Needs and Opportunities

The Midtown Oakville growth area is envisioned for a minimum gross density of 200 residents and jobs (combined) per hectare by 2031 in accordance with the Province's Growth Plan. A mix of approximately 5,900 residential units and 186,000 to 279,000 m² of commercial and employment space is expected to accommodate an estimated 12,000 residents and 8,000 jobs. The needs and opportunities for accommodating the planned growth were investigated.

Existing Transportation Conditions

Currently the road network for Midtown Oakville is made up of one key north-south arterial – Trafalgar Road crossing the QEW. A supporting network of arterial and local roads provide access to existing land uses. The Oakville GO station is a major transit hub within Midtown Oakville and is well served by transit – 16 Oakville Transit routes connect to GO Rail and GO Bus routes.

There is limited existing pedestrian and cycling infrastructure. Sidewalks are provided on only some roads, multi-use trails are provided in the boulevards along Leighland Avenue and Eighth Line, and on-road cycle lanes are provided on White Oaks Boulevard. Along the western edge of Midtown Oakville is the Sixteen Mile Creek Trail and to the northeast is the Morrison Valley Trail.

Intersection capacity analysis was undertaken for the existing traffic conditions. Through discussions with the Ministry of Transportation (MTO), a VISSIM microsimulation model was also developed to assess the operations of the QEW mainline and ramp terminals at the interchanges that provide access to Midtown Oakville – Trafalgar Road and Royal Windsor Drive.

The observed traffic in the Midtown Oakville area indicates capacity constraints and congesting at peak times. Although most signalized intersections within the study area operate at acceptable levels of service, two intersections – Cross Avenue / Lyons Lane and Cross Avenue/Cornwall Road – experience more significant capacity constraints under existing conditions. These congestion issues also impact Oakville Transit service to and from GO Oakville station.

On the QEW, operational constraints were identified in AM peak for eastbound traffic around the Dorval Drive interchange and westbound at the Royal Windsor Drive interchange. In the PM peak a westbound constraint occurs between Ford Drive and Trafalgar Road interchanges due to high volumes and weaving manoeuvres.

Future “Do Nothing” Transportation Conditions

An assessment of the transportation network within the study area without any new Midtown-related transportation infrastructure improvements was undertaken to identify the operational performance of the “Do Nothing” network in accommodating Midtown Oakville growth.

Although the “Do Nothing” scenario assumes no improvements to the transportation infrastructure within Midtown Oakville, it does include a number of planned and committed transportation improvements by region and town as per the 2031 Base Case in the town’s TMP. Additionally, through consultation with MTO, planned provincial improvements documented in MTO’s *Transportation Environmental Study Report for Highway 403 and Queen Elizabeth Way from Trafalgar Road to Winston Churchill Boulevard* (TESR) are explicitly modelled in the “Do Nothing” scenario. These include:

- Extension of the existing HOV lanes on QEW from Trafalgar Road to Winston Churchill Boulevard
- North to East (Highway 403 SB to QEW EB) and East to North (QEW WB to Highway 403 NB) ramps at the Highway 403 / Ford Drive interchange
- Core-collector system along QEW to facilitate movements between Ford Drive and Winston Churchill Boulevard and to accommodate the new North to East / East to North ramps

Overall, during the AM and PM peak hour, most signalized intersections within the study area will operate with significant capacity constraints. The existing municipal road network does not have enough reserve capacity to accommodate full build-out of Midtown Oakville. Transit service on Trafalgar Road and Cross Avenue will be significantly impacted by traffic delays on the road network.

Using the microsimulation model, the QEW was found to have significant operational constraints at the Trafalgar Road interchange in both the AM and PM peaks, with the interchange ramp terminals being unable to serve the demand placed and queues spilling back onto the QEW mainline. The operational constraint eastbound at Dorval Drive interchange on the QEW is exacerbated by future traffic growth.

Existing Drainage Conditions

Major drainage areas within the Midtown Oakville study area were determined using 1 m contour data provided by the town. The drainage areas were further refined based on plan and profile information received from the town for roads and highways within the study area. The drainage catchments within the Midtown Oakville study area contribute flow to the following four watercourses:

- Lower Morrison Creek
- Wedgewood Creek
- Morrison/Wedgewood Diversion Channel
- Sixteen Mile Creek

The existing drainage conditions of the Midtown Oakville study area were simulated using a Visual OTTHYMO (VO2) hydrology model. The hydrologic parameters were determined for each drainage catchment within the Midtown Oakville study area, including the assessment of current imperviousness determined based on the land use of each catchment. Target flows for each of the four subwatersheds were determined based on the existing flow conditions.

As per the *Lower Morrison/Wedgewood Creeks – Flood, Erosion and Master Drainage Plan Study (R.V. Anderson, 1993)*, there are downstream hydraulic capacity constraints which must be considered when establishing allowable discharge rates from all new developments within the Lower Morrison Creek and Wedgewood Creek subwatersheds. Using updated hydrologic modelling and the assessments completed in the R.V. Anderson report, target peak flow rates were determined for each of the four watersheds.

It is also indicated in the *Morrison/Wedgewood Diversion Channel – Spill Control Class Environmental Assessment*, prepared by AMEC Environment & Infrastructure (May 2012), that there is a current potential for a spill of flood waters during extreme storm conditions which potentially affect those lands within the vicinity of the diversion channel, as well as properties further downstream. However, work is currently being undertaken on behalf of Conservation Halton in order to mitigate these flood impacts of the diversion channel.

D. Problem and Opportunity Statement

The following problem / opportunity statement was developed for the Midtown Oakville Municipal Class EA study by considering existing conditions and input from the project team, technical agencies, and various stakeholders:

Midtown Oakville is a provincially designated Urban Growth Centre and there is an opportunity for this area to develop into a “complete urban community”, as identified in Livable Oakville. For Midtown Oakville to achieve these policy objectives, there is a need to improve the existing transportation network to enhance growth and economic development opportunities. Stormwater system improvements to support the proposed transportation network may also be required to help ensure Midtown Oakville has a balanced, accessible and sustainable transportation network for all modes of travel (walking, cycling, transit service and vehicles).

E. Alternative Network Solutions

Given the needs for the Midtown Oakville area, a number of opportunities to accommodate pedestrians, cyclists, transit riders and vehicles, such as improving connections, enhancing the public realm, and establishing a mix of uses, have been identified. Potential infrastructure improvements range from revised road alignments to new road, transit, and active transportation connections, including additional crossings of the QEW. Infrastructure needed to accommodate pedestrians, cyclists, and vehicles, such as improving connections, enhancing the public realm, and establishing a mix of uses, have been identified. This EA study focused on developing transportation solutions to achieve the following:

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

Combination Options

A range of alternatives were identified and assessed through consultation with the public agency stakeholders for each road network improvement considered as part of this study. Through the development of alternatives for the above improvements, it was found that Improvements A, B, C and D (described below) were closely inter-related. Therefore, alternatives for these four improvements were developed in combination (“Combination Options”). Of all the various alternatives for Improvements A, B, C and D, four combination options were formulated.

Improvement A: North / South QEW Road Crossing and Improvement C: North / South QEW Active Transportation / Priority Crossing

The QEW was identified to be a major barrier for north-south travel through the area. Trafalgar Road is the only existing crossing for cars, buses, trucks, cyclists, and pedestrians. Traffic analysis has shown that some intersections along Trafalgar Road are operating at capacity during peak periods. The safety of cyclists and pedestrians on Trafalgar Road has also been identified as an issue since this group is more negatively impacted by the crossing options of the QEW on/off ramps, where vehicles are accelerating on to a ramp or checking for gaps in traffic in order to merge and cyclists or pedestrians may be overlooked.

Improvement A considered an additional crossing of the QEW east of Trafalgar Road, which would accommodate all modes of transportation, while also providing an increased level of safety for crossing the QEW for pedestrians and cyclists.

Improvement C considered an additional crossing of the QEW east of Trafalgar Road for transit and active transportation only, which would improve transit operations and also provide an increased level of

safety for pedestrians and cyclists crossing the QEW. This improvement was considered in conjunction with Improvement A.

Improvement B: Trafalgar Road Interchange

With the anticipated growth and development in Midtown Oakville, and the need for improved connectivity and accessibility, a direct off-ramp from eastbound QEW to Midtown Oakville was considered. Improvements to the existing at-grade intersection of the eastbound QEW off-ramp at Trafalgar Road including an additional through movement and related road works were also considered.

Improvement D: Cross Avenue Extension

Improvement D considered various options for extending Cross Avenue / Davis Road easterly through Midtown Oakville. A continuous east-west road through Midtown Oakville will provide greater connectivity on both sides of Trafalgar Road and can be designed to accommodate all modes. Direct access can be provided to/from the QEW via Trafalgar Road and Royal Windsor Drive interchanges.

Improvement E: Iroquois Shore Road Widening

Improvement E considered widening Iroquois Shore Road to provide four travel lanes plus a centre turning lane, as well as bike lanes and sidewalks on both sides of the road. The alternatives for Improvement E included widening Iroquois Shore Road to the south, widening along the centreline and widening to the north.

Improvement F: Royal Windsor Drive Interchange

With the anticipated growth and development in Midtown Oakville, and need for improved connectivity and accessibility, improvements to Royal Windsor Drive interchange were considered as Iroquois Shore Road and Royal Windsor Drive are connected to create another crossing of the QEW east of Trafalgar Road.

The four alternatives for the Royal Windsor Driver interchange included new on and off ramps that build upon the existing partial interchange configuration. New ramps in one or more alternatives included a westbound QEW off-ramp, an eastbound QEW on-ramp, and a buttonhook off-ramp from eastbound QEW to provide direct access to Midtown Oakville.

Active Transportation Crossings

Active transportation crossings of the QEW, both east and west of Trafalgar Road, for pedestrians and cyclists were considered. New crossings for pedestrians and cyclists can encourage more active, sustainable modes of travel while increasing the safety of this group of road users.

Improvement G: East Active Transportation Crossing

Improvement G consisted of four alternatives to enhance the QEW crossing experience for pedestrians and cyclists on the east side of Trafalgar Road. All of the Improvement G alternatives feature separate rights-of-way for active transportation with variations in their starting and ending locations and, thus, the

number of QEW ramp crossings and potential for conflict with vehicles. All but one alternative features a direct connection to the Oakville GO station.

Improvement H: West Active Transportation Crossing

Improvement H consisted of four alternatives to enhance the QEW crossing experience for pedestrians and cyclists on the west side of Trafalgar Road. In anticipation of an active transportation crossing to the west of Trafalgar Road, a pier within the QEW right-of-way, approximately 300 m west of Trafalgar Road, was constructed as part of previous works on the QEW corridor that were completed in 2010. All of the west active transportation crossing alternatives provided a connection from the southwest corner of the Oakville Place and the adjacent residential neighbourhood to Midtown Oakville and the Oakville GO station.

F. Evaluation of Alternative Network Solutions

A detailed assessment of the alternative network solutions was completed based on the evaluation criteria. This section highlights only notable differences among alternatives. The complete evaluation matrix is provided in **Appendix F**.

Combination Options

Through the evaluation process, Combination Option #3 was selected as the preferred option. Option #3 best addresses the Problem / Opportunity Statement to develop Midtown Oakville into a “complete urban community”, improve the existing transportation network to enhance growth and economic development opportunities (including creating new development parcels north of Iroquois Shore Road on the town hall lands), and provide a more balanced, accessible and sustainable transportation network for all modes of travel (walking, cycling, transit service and vehicles). By combining the North-South QEW Road Crossing and the North-South QEW Active Transportation / Priority Crossing, capital costs for this combination option are more efficiently utilized.

Iroquois Shore Road Widening

Through the evaluation process based on the established criteria, Improvement E2 – widening Iroquois Shore Road along the centreline – was selected as the preferred alternative. Widening along the centreline will result in less severe property impacts to existing properties on both sides of the road and will not significantly impact the existing land uses / social environment.

Royal Windsor Drive Interchange

Through the evaluation process based on the established criteria, Improvement F2 was selected as the preferred alternative as it best complied with land use planning goals and objectives given the environmental constraints, capital costs and staging requirements.

East Active Transportation Crossing

Improvement G2, which provides for a continuous connection for pedestrians and cyclists across all interchange ramps, was selected as the preferred alternative. This alternative eliminates conflicts between active transportation modes and vehicular traffic at the Trafalgar Road QEW interchange.

West Active Transportation Crossing

Improvement H2, which connects Oakville Place to Midtown Oakville, was selected as the preferred alternative. This alternative connects to Argus Road and the proposed multi-use trail adjacent to the new QEW off-ramp under Trafalgar Road into Midtown Oakville. This alternative provides the least skewed crossing of the QEW providing the shortest crossing distance.

G. Preferred Concept

The overall preferred concept, shown in **Figure ES-2**, is comprised of various elements including:

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

To meet the need for additional north-south capacity over the QEW, the preferred concept provides a new crossing of the QEW midblock between Trafalgar Road and Eighth Line and an extension of Royal Windsor Drive over the QEW connect to Iroquois Shore Road at Eighth Line. The North-South Crossing is intended to accommodate passenger vehicles, transit on dedicated bus lanes, pedestrians and cyclists.

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

- A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp that crosses under Trafalgar Road. This reduces the impacts of future traffic demand on the existing constrained intersections along Trafalgar Road at the off-ramp as well as at Cross Avenue. The underpass of Trafalgar Road also provides the opportunity for improved active transportation connections into Midtown Oakville.
- A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp to Cross Avenue at the Royal Windsor Drive interchange. A direct route from Midtown Oakville to eastbound QEW is provided via a new on-ramp at Royal Windsor Drive opposite Cross Avenue. A new westbound QEW off-ramp at Royal Windsor Drive will provide an alternative route to Midtown Oakville and surrounding areas.

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

Improved capacity is provided on Iroquois Shore Road by widening of the road to a 4-lane cross-section plus a centre-turning lane, with on-street bike lanes and sidewalks on both sides. Iroquois Shore Road connects with the extension of Royal Windsor Drive providing one continuous corridor.

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

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

H. Design

An iterative process that included traffic analysis and design criteria was undertaken, with input from MTO, technical agencies and the public, to develop the design for the preferred concept as shown in **Figure ES-3**. The preliminary design includes the following:

Improvements to the QEW Trafalgar Road Interchange

- Realignment of the existing eastbound QEW off-ramp
- New eastbound QEW direct off-ramp to Cross Avenue
- New multi-use trail from Argus Road to Cross Avenue under Trafalgar Road
- Realignment of South Service Road
- Realignment of Argus Road

Improvements to the QEW Royal Windsor Drive Interchange

- New westbound QEW off-ramp
- New eastbound QEW on-ramp, including auxiliary lane to Ford Drive off-ramp
- Realignment of eastbound QEW off-ramp
- New QEW eastbound direct off-ramp to Cross Avenue
- Widening and extension of Royal Windsor Drive to Iroquois Shore Road at Eighth Line
- Realignment of North Service Road
- Realignment of South Service Road

New North-South Crossing across QEW

- Provides pedestrian / cyclist facilities
- Provides dedicated bus lanes
- Provides general purpose lanes
- Accommodates potential widening of the QEW that may be contemplated by MTO

Extension of Cross Avenue

- New connection from Trafalgar Road to Royal Windsor Drive
- Provides pedestrian / cyclist facilities
- Provides general purpose lanes
- Accommodates lay-by parking where appropriate

Widening of Iroquois Shore Road

- Provides continuous pedestrian / cyclist facilities on both sides of the road
- Accommodates one additional general purpose lane in each direction plus a median turn lane

Active Transportation Crossings across QEW

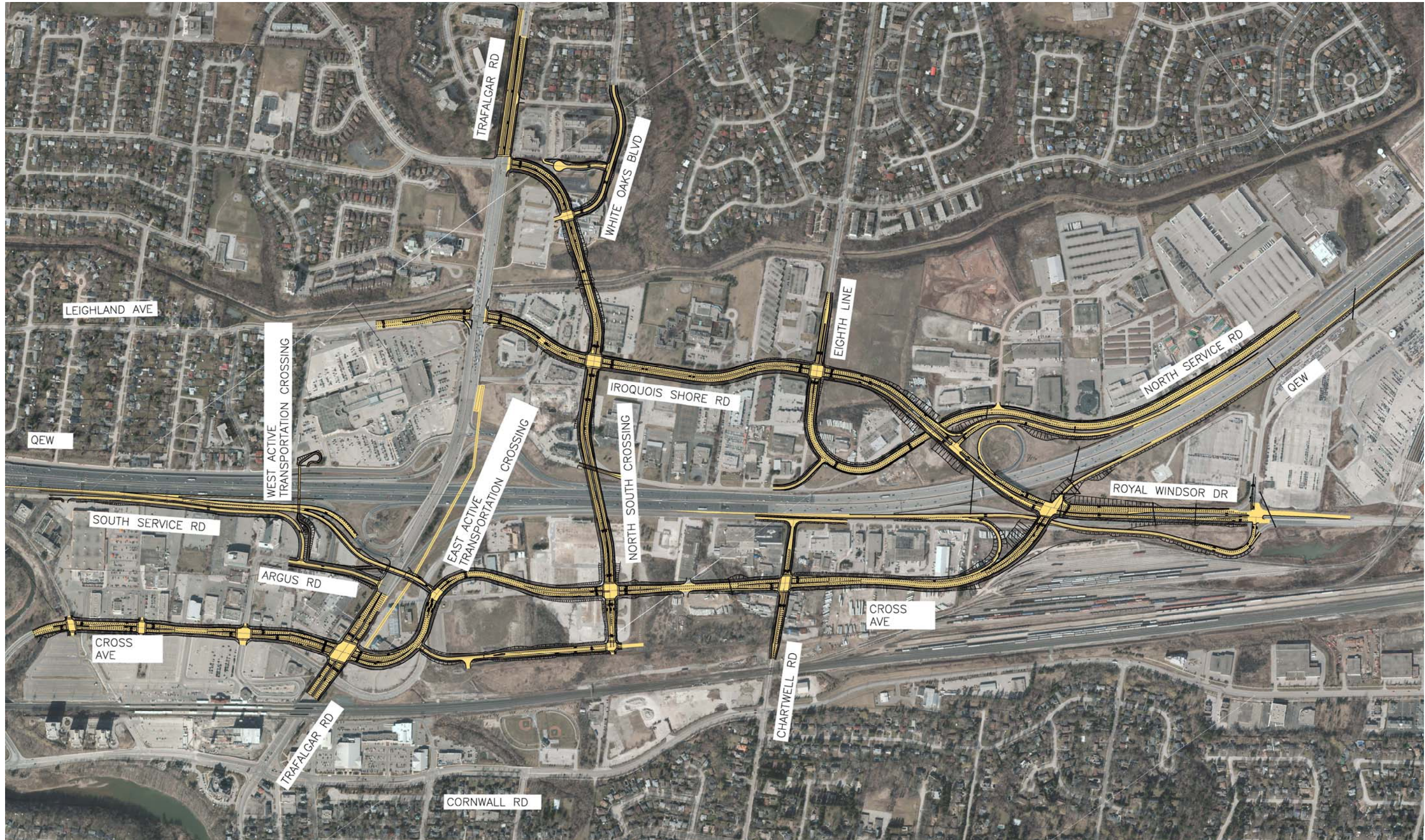
- Active Transportation Crossing of QEW on the east side of Trafalgar Road
- Active Transportation Crossing of QEW on the west side of Trafalgar Road

Figure ES-2: Preferred Concept Plan



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Figure ES-3: Preliminary Design of Preferred Concept



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J. Stormwater Management

Proposed Conditions

The proposed drainage conditions of the Midtown Oakville study area resulting from the proposed transportation and land use improvements were simulated using a Visual OTTHYMO (VO2) hydrology model. The proposed conditions VO2 model was used to determine the storage for each of the four subwatersheds required to meet the target flow rates. As part of the preferred alternative, a diversion of some of the drainage from the Lower Morrison Creek watershed to the Sixteen Mile Creek watershed was also considered, as there are currently major flooding and erosion issues within the Lower Morrison and Wedgewood Creeks. This diversion was assessed at a high level in order to determine the feasibility and benefits to decreasing flows in Lower Morrison Creek. The analysis done as part of this Class EA for the proposed diversion indicates that the hydrological benefits of the proposed diversion are limited as the total combined storage requirements for both of the Lower Morrison Creek and Sixteen Mile Creek subwatersheds are not significantly reduced with the proposed diversion. It is therefore not proposed to implement the diversion at this time, but the diversion may be reconsidered in the future.

Preliminary Stormwater Management Criteria

The stormwater management (SWM) analysis includes recommendations on preliminary SWM criteria for any future development within the Midtown Oakville study area. The predominant focus of the preliminary SWM criteria recommended as part of this Class EA is on setting flow targets for each of the subwatersheds within the Midtown Oakville study area, with a preliminary assessment of water quality, erosion control and water balance requirements. Preliminary SWM criteria developed were:

- Future development or transportation improvement within the study area is to utilize the Midtown Oakville EA Study hydrology model in order to demonstrate that the target flows are met for each subwatershed;
- Any future development or transportation improvement within the Midtown Oakville study area is to also achieve Enhanced Level 1 Protection, as per the Ministry of Environment's (MOE) *Stormwater Management Planning and Design Manual* (March 2003);
- Any future development or transportation improvement within the Midtown Oakville study area is also to provide water balance controls by achieving the greater of either of the two following requirements:
 - Provide retention of 5 mm over the entire area of the proposed development, as per the City of Toronto's *Wet Weather Flow Management Guidelines* (November 2006) ; or
 - Retain stormwater on-site to achieve an equivalent annual volume of infiltration as pre-development conditions, as per Section 3.2 of the MOE *Stormwater Management Planning and Design Manual* (March 2003).

This water balance objective could be achieved by a variety of low impact development (LID) measures, as specified in the *Low Impact Development Stormwater Management Planning and Design Guide*, prepared by Credit Valley Conservation and Toronto and Region Conservation Authority (2010). Implementation of the water balance criteria will provide inherent in terms of reduction of downstream erosion through a decrease in runoff from frequent rainfall events. It should be noted that the town intends

to complete a separate flood study in the near future which will confirm the final SWM criteria for the Midtown Oakville study area.

Hydraulics

Hydraulic analysis was completed for the Morrison/Wedgewood Diversion Channel and the Lower Morrison Creek in order to evaluate the hydraulic impacts resulting from the proposed transportation improvements. The hydraulic analysis was done using a HEC-RAS model for each watercourse. The purpose of the hydraulic analysis was to demonstrate that there are no significant hydraulic impacts as a result of the proposed transportation improvements. Only the proposed major crossings of these watercourses were analyzed during the current study, with assessment of smaller crossings and linear drainage systems to be completed during future design phases. As part of the proposed transportation improvements, two new major watercourse crossings will be required at:

- Morrison/Wedgewood Diversion Channel approximately 240 m east of Trafalgar Road; and,
- Lower Morrison Creek approximately 150 m south of QEW.

The analysis completed during this study has demonstrated that it is feasible to implement new crossings that meet Conservation Halton's criteria. During subsequent detailed design phases, crossing sizes would be optimized to maximize cost efficiencies while meeting all appropriate criteria.

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1. Introduction and Background

The Midtown Oakville Class Environmental Assessment (EA) Study proposes a practical, long-term strategy to guide the development of the transportation and municipal stormwater network needed to accommodate the planned growth in Midtown Oakville to 2031, as identified in the Livable Oakville Plan, the town’s official plan.

Midtown Oakville is outlined as a designated urban growth centre in the province’s growth plan — *Places to Grow* and a mobility hub within the Metrolinx regional transportation plan *The Big Move*. When completed, the preferred solution will be implemented through an amendment to the Livable Oakville Plan.

This project is a continuation of the Transportation Master Plan Study (Switching Gears) to further assess the infrastructure needs in Midtown Oakville to meet Phase 3 and 4 of the Class EA planning and design process, as outlined in the Municipal Engineers Association “Municipal Class Environmental Assessment”, (October 2000, as amended in 2007 and 2011).

Cole Engineering Group Ltd. was retained by the Town of Oakville in 2012, following completion of the town’s Transportation Master Plan Study to complete this Class EA study for Midtown Oakville.

1.1. Study Objectives

Midtown Oakville is a provincially designated urban growth centre and there is an opportunity for this area to develop into a complete urban community, as identified in the Livable Oakville Plan, including improving the existing transportation network to enhance growth and economic development opportunities. Stormwater system improvements to support the proposed transportation network may also be required to help ensure Midtown Oakville has a balanced, accessible and sustainable transportation network for all modes of travel (walking, cycling, transit service and vehicles).

1.2. Study Area and Location

Midtown Oakville is centred on Trafalgar Road and the QEW as shown in **Figure 1-1**. Midtown Oakville is characterized by several unique and highly desirable features, including a large wooded ravine, natural heritage, and large-scale public land ownership. It is approximately 100 hectares in size and bounded by the QEW to the north, Cornwall Road to the south, Chartwell Road to the east, and Sixteen Mile Creek valley to the west. For purposes of this Class EA, the study area also encompasses areas to the north and east of the urban growth centre limits.

The QEW / Trafalgar Road interchange and the Oakville GO station are major entry points to the town and distinguish Midtown Oakville as a prime location to accommodate both population and employment growth. Trafalgar Road provides vital links to the Downtown, Midtown, Uptown Core, and North

Oakville areas, Oakville GO station, town hall, and Sheridan College. The Oakville GO station is a major transit station, and the railway line also provides vital freight connections.

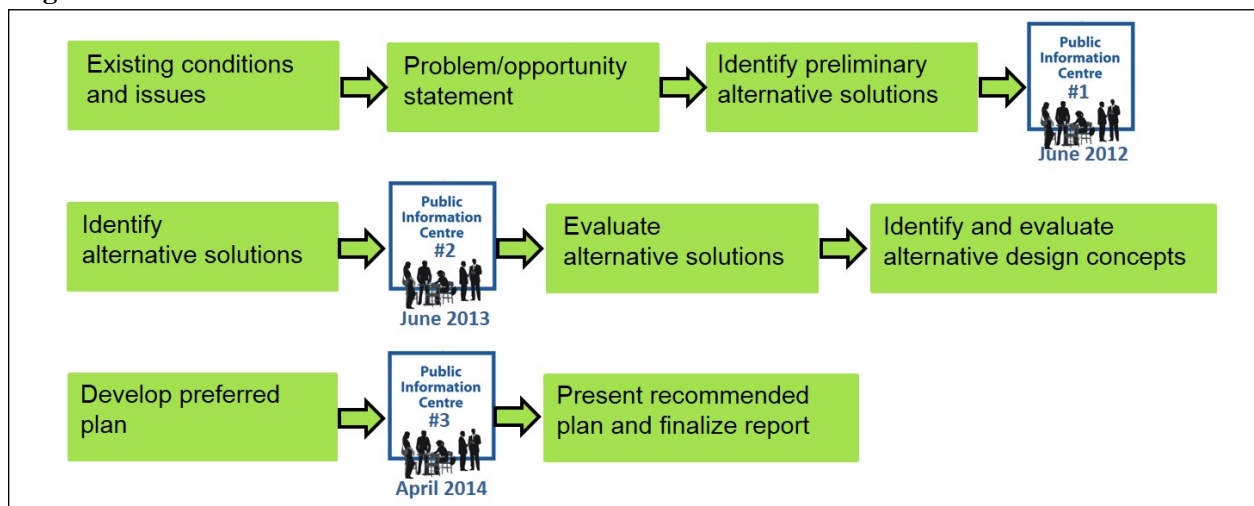
Figure 1-1: Study Area



1.3. Class Environmental Assessment Process

This study is being carried out as a ‘Schedule C’ Municipal Class Environmental Assessment as outlined in the Municipal Class Environmental Assessment document (2000, amended 2007 & 2011). **Figure 1-2** summarizes the process followed in conducting the study.

Figure 1-2: Midtown Oakville Environmental Assessment Process



1.4. Study Organization and Team

1.4.1. Core Team

Management of the Midtown Oakville EA was led by a Core Team of Town of Oakville staff as presented below.

- Dan Cozzi, P.Eng., Director, Engineering and Construction
- Chris Clapham, Sustainable Transportation Program Co-ordinator, Engineering and Construction
- Tricia Collingwood, MURP, MCIP, RPP, Senior Planner, Current Planning – Central District, Planning Services
- Philip Kelly, P.Eng., M.Sc., Manager, Development and Environmental Engineering, Development Engineering
- Kristina Parker, P.Eng., M.A.Sc., Water Resources Engineer, Development Engineering
- Joanne Phoenix, MES, MCIP, RPP, Manager, Planning and Accessible Services, Oakville Transit
- Lin Rogers, P.Eng., Transportation Engineer, Transportation Planning & Engineering, Engineering and Construction

1.4.2. Project Team

The project team, which consisted of town staff from various departments, was formed at the onset of the study to provide input and guidance at key stages throughout the study. Minutes of the project team meetings are provided in **Appendix A1**. Members of the project team are listed below.

- Paul Allen, Engineering and Construction
- Dana Anderson, Planning Services
- David Bloomer, Engineering and Construction
- Gabe Charles, Planning Services
- Jane Clohecy, Community Development Commission
- Barry Cole, Oakville Transit
- Lesley Gill Woods, Planning Services
- Ray Green, CAO's Office
- Catharine Hewitson, Financial Planning
- Darnell Lambert, Development Engineering
- Jill MacInnes, Strategy, Policy and Communications
- Chris Mark, Parks and Open Space
- Scott McMillan, Engineering and Construction
- Mary Jo Milhomens, Strategy, Policy and Communications
- Nancy Sully, Financial Planning
- Dorothy St. George, Economic Development
- Cindy Toth, Environmental Policy
- Erik Zutis, Engineering and Construction

1.4.3. Consultant Team

The EA study was carried out on behalf of the Town of Oakville by a consultant team led by Cole Engineering in association with Archaeological Services Inc., GLPi, Golder Associates, LGL Limited, Remisz Consulting Engineers Ltd., SolidCAD and Water's Edge.

1.5. Consultation

Consultation with the public and technical agencies was a key component of the EA process. For this study, an intensive consultation program was followed. The study team met with various stakeholders and technical agencies throughout the duration of the study to gather valuable input and varying opinions. The following sections briefly present the consultation program.

1.5.1. Technical Agencies Committee

The Technical Agencies Committee (TAC) was formed at the project initiation stage. The agencies which were invited to the TAC included:

- Aboriginal Affairs and Northern Development Canada
- Allstream
- AT & T Canada
- Bell Canada
- Canadian Environmental Assessment Agency
- City of Mississauga
- CN Rail
- Cogeco Cable Systems Inc.
- Conservation Halton
- CP Rail
- Department of Indian and Northern Affairs
- Enbridge Pipelines Inc.
- Environment Canada
- Halton District School Board
- Halton Region
- Halton Region Ambulance Services
- Halton Regional Police Service
- Halton Student Transportation Services
- Hydro One Networks Inc.
- Metrolinx / GO Transit
- Microcell
- Ministry of Municipal Affairs and Housing, Central Municipal Services Office
- Ministry of Natural Resources
- Ministry of the Environment
- Ministry of Tourism and Culture, Programs and Services Branch
- Ministry of Transportation
- MPP Office – Oakville
- Oakville Hydro
- Ontario Growth Secretariat, Ministry of Infrastructure
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Provincial Police
- Ontario Realty Corporation, Ministry of Energy and Infrastructure (Infrastructure Ontario)
- Peel Region
- Rogers Communications Partnership
- Telus
- Town of Oakville
- Trans Canada Pipelines Limited
- Trans-Northern Pipelines Inc.
- Transport Canada
- Union Gas

TAC Meeting #1

The first Technical Agencies Committee (TAC) meeting was held on July 17, 2012, from 1:30 PM to 3:00 PM to present various elements of the study, including transportation needs, future traffic volumes, road concept screening options and alternatives, stormwater management design, and constraints such as utility conflicts and property impacts.

Questions and comments from the attendees were invited to stimulate discussion and determine the main issues and concerns that would need to be addressed through the Midtown Oakville EA study. Detailed meeting minutes can be found in **Appendix A2**.

TAC Meeting #2

The second Technical Agencies Committee (TAC) meeting was held on March 27, 2014, from 2:30 PM to 4:00 PM to present the study background and update, and details of the preferred plan and next steps.

Questions and comments from the attendees were invited to determine any remaining concerns that would need to be addressed before completion of the Midtown Oakville EA study. Detailed meeting minutes can be found in **Appendix A2**.

Consultation with Conservation Halton

Consultation with Conservation Halton (CH) involved a number of meetings, teleconferences, and site visits to identify and develop mitigation for stormwater, environmental, and ecological impacts of the alternatives. During the course of the study, two site visits were arranged between CH and the study team. The first site visit was held on August 23, 2012, with the main purpose of identifying concerns and constraints at seven specific pre-identified sites. The second site visit was held on October 22, 2013 with the main purpose of reviewing issues at the Morrison/Wedgewood Diversion Channel. Additional meetings and teleconferences were scheduled to facilitate further discussions. Correspondence with CH can be found in **Appendix A3**.

Consultation with MTO

During the course of the study, the study team met regularly with MTO in order to present and refine the design concepts related to the QEW interchanges. The preferred concept was presented to senior management in March 2014. Detailed meeting minutes, related documents, and other correspondence can be found in **Appendix A4**.

1.5.2. Agency Stakeholders Workshop

A two-day Agency Stakeholders Workshop was held in March 2013. The Workshop was split into two all-day sessions to provide sufficient time to accommodate the volume of material to be reviewed as well as a working session to develop network alternatives. The first session was held on March 1, 2013, and the second session was held one week later, on March 8, 2013.

The agencies which were invited to attend and provide input at this Workshop consisted of representatives from:

- Conservation Halton
- Halton Region
- Hydro One Networks Inc.
- Metrolinx / GO Transit
- Ministry of Transportation
- Oakville Hydro
- Town of Oakville
- Urban Strategies (consultants for Midtown Urban Design Study for the Town of Oakville)

The Workshop was held in order to collaborate with the larger project team and key players from various agencies that contribute to the overall development of Midtown Oakville. The meeting built upon decisions and work completed to date, and allowed participants to work in groups in a design charrette format to layer pedestrian, transit, and road improvements onto aerial maps to determine preferred solutions. Advantages and disadvantages of various improvements were discussed, and the evaluation criteria assessing the improvements were also presented. A detailed summary of the Workshop can be found in **Appendix A5**.

1.5.3. Stakeholders

A Stakeholders Advisory Group comprising of representatives from various associations was formed at the project initiation stage. The associations which attended the stakeholders meetings included:

- GreenTrans
- Oakvillegreen Conservation Association Inc.
- West Kerr Village Residents Association
- Chartwell-Maple Grove Residents Association
- Rob Boak, Oakville resident

Stakeholders who did not attend the formal stakeholders meetings also had the opportunity to provide input to the study through the public consultation process.

Stakeholders Meeting #1

The first stakeholders meeting was held on July 17, 2012, from 7:00 PM to 8:30 PM. Various elements of the study, including transportation needs, future traffic volumes, road concept screening options and alternatives, stormwater management design, and constraints, such as utility conflicts and property impacts were presented. Questions and comments from the attendees were invited to stimulate discussion and determine the main issues and concerns that would need to be addressed. Detailed meeting minutes can be found in **Appendix A6**.

Stakeholders Meeting #2

The second stakeholders meeting was held on March 27, 2014, from 6:30 PM to 8:00 PM to present the study background and update, and details of the preferred plan and next steps. Questions and comments were invited to determine any remaining concerns that would need to be addressed before completion of the Midtown Oakville EA study. Detailed meeting minutes can be found in **Appendix A6**.

1.5.4. Public

A series of three Public Open Houses (POH) were held for the study which are described below. Additional correspondence with members of the public is documented in **Appendix B4**.

Public Open House #1

The first POH was held at town hall on June 13, 2012, from 6:30 to 9:00 PM. This POH was the first point of contact with the general public to present an overview of existing conditions, conceptual plans for the future, and to request input on issues, concerns and suggestions for consideration during the study.

A panel discussion led by members of the study team commenced at 7:00 PM to actively involve the public in discussion. This approach was taken to gather input on transportation-related concerns and priorities from the public by allowing attendees to participate constructively.

Information was also provided on display boards in an informal open house format to solicit feedback from attendees and to offer the opportunity to interact with the study team. Attendees who arrived before 7:00 PM were given the opportunity to review the display boards before the panel discussion. Following the panel discussion, which lasted approximately 1 hour, additional time was allotted for the public to review the display boards, fill out comment cards, and discuss concerns with study team members. A detailed summary of POH #1 can be found in **Appendix B1**.

Public Open House #2

The second POH was held at town hall on June 19, 2013, from 7:00 to 9:00 PM. The purpose of the second POH was to present the study background and context, the road, active transportation and transit needs, the main priorities and evaluation criteria, the alternative improvements, the preliminary evaluation, and to gather public input.

A formal presentation by the study team began at 7:00 PM. Attendees were encouraged to ask questions and/or provide feedback following the presentation. An information package was distributed as attendees departed the room after the presentation. The information package included background information and additional details about the various improvements and options discussed.

The POH also involved seven roving stations, facilitated by members of the study team, for attendees to visit so they could gain a better understanding of the various options going forward for evaluation. Questions and comments were also invited at these stations.

Comment cards were provided for attendees to record any additional concerns during the POH. Attendees were also informed that they could mail, fax, or email their comments and questions to the study team. A detailed summary of POH #2 can be found in **Appendix B2**.

Public Open House #3

The third POH was held at town hall on April 2, 2014, from 6:30 to 8:30 PM. The purpose of this POH was to review the project details, present the preferred solution to the public, and address public comments.

Attendees began arriving at 6:30 PM and were presented with an information package, which contained background information and details about the elements of the preferred plan. They were also informed that display boards were available to review, and a formal presentation would begin at 7:00 PM.

Questions from attendees were invited immediately following the presentation. Attendees were then again invited to review the display boards and direct any further questions to various members of the study team. Comment cards were also provided for attendees to record any additional comments relating to the study. Attendees were also informed that they could mail, fax, or email their comment cards to the study team at a later date. A detailed summary of POH #3 can be found in **Appendix B3**.

Public Correspondence

Correspondence was received from members of the public throughout the study. A summary of this correspondence can be found in **Appendix B4**.

1.5.5. Impacted Landowners

A series of meetings were held in March 2014 with the impacted landowners. The meetings allowed landowners to discuss individually with town staff any concerns regarding the property requirements for the proposed transportation improvements in Midtown Oakville.

Meetings with the following groups were held on Wednesday, March 19, 2014:

- Group 1 - Cross Avenue (west of Trafalgar Road)
- Group 2 - Cross Avenue (east of Trafalgar Road)
- Group 3 - South Service Road (west of Trafalgar Road)
- Group 4 - South Service Road (west of Argus Road)
- Group 5 - Cross Avenue (west of Argus Road)

Meetings with the following groups were held on Wednesday, March 26, 2014:

- Group 6 - Cross Avenue / Chartwell Road (east of North-South Corridor)
- Group 7 - Iroquois Shore Road
- Group 8 - North Service Road (Royal Windsor Drive Interchange)
- Group 9 - White Oaks Boulevard

Additionally, separate meetings were held with several major landowners, including:

- Sheridan College
- Ford Canada
- General Electric
- Metrolinx

2. Guiding Principles and Study Context

Midtown Oakville is envisioned to be a vibrant, transit-supportive, mixed-use urban community, which would accommodate a significant portion of future population growth and employment in the Greater Golden Horseshoe – 20,000 residents and jobs by 2031.

Midtown Oakville is one of 25 areas identified as an urban growth centre¹ in the Province’s *Growth Plan for the Greater Golden Horseshoe: Places to Grow*. It has also been identified as an anchor mobility hub² under *The Big Move*, as well as one of three primary growth areas within the Town of Oakville that is planned to achieve mixed use, higher density development as per the Official Plan, *Livable Oakville*. The objectives of these plans and their associations with Midtown Oakville are summarized in the following sections.

2.1. Growth Plan for the Greater Golden Horseshoe: Places to Grow

The *Growth Plan for the Greater Golden Horseshoe: Places to Grow* (2006) was prepared under the Places to Grow Act (2005). It is a framework for implementing the Government of Ontario’s vision for building stronger, more prosperous communities by better managing growth in the region to 2031. The plan is intended to guide decisions on a wide range of issues including transportation, infrastructure planning, land-use planning, urban form, housing, natural heritage, and resource protection, in the interest of promoting economic prosperity.

The plan designates Midtown Oakville as one of 25 urban growth centres (see **Figure 2-1**), and is planned to achieve a minimum gross density target of 200 residents and jobs combined, by 2031 or earlier.

2.2. The Big Move, Regional Transportation Plan

The Big Move is the Regional Transportation Plan (RTP) which was adopted in November 2008. It is expected to transform transportation in the Greater Toronto and Hamilton Area (GTHA), by revitalizing communities so that residents can take transit, cycle, or walk to fulfill their daily activities.



Over 7,000 km of new lanes, trails and pathways for pedestrians and cyclists will make walking and cycling safer and encourage healthy lifestyles, while reducing greenhouse gas emissions and improving air quality. The RTP also supports intensification of corridors, including new transit service along several corridors, one of which is Trafalgar Road in Oakville.

¹ Urban growth centres are to be transit-supportive regional focal areas that accommodate a significant portion of future population and employment growth in the Greater Golden Horseshoe (Source: Ministry of Ontario – *Growth Plan for the Greater Golden Horseshoe: Places to Grow* (2006))

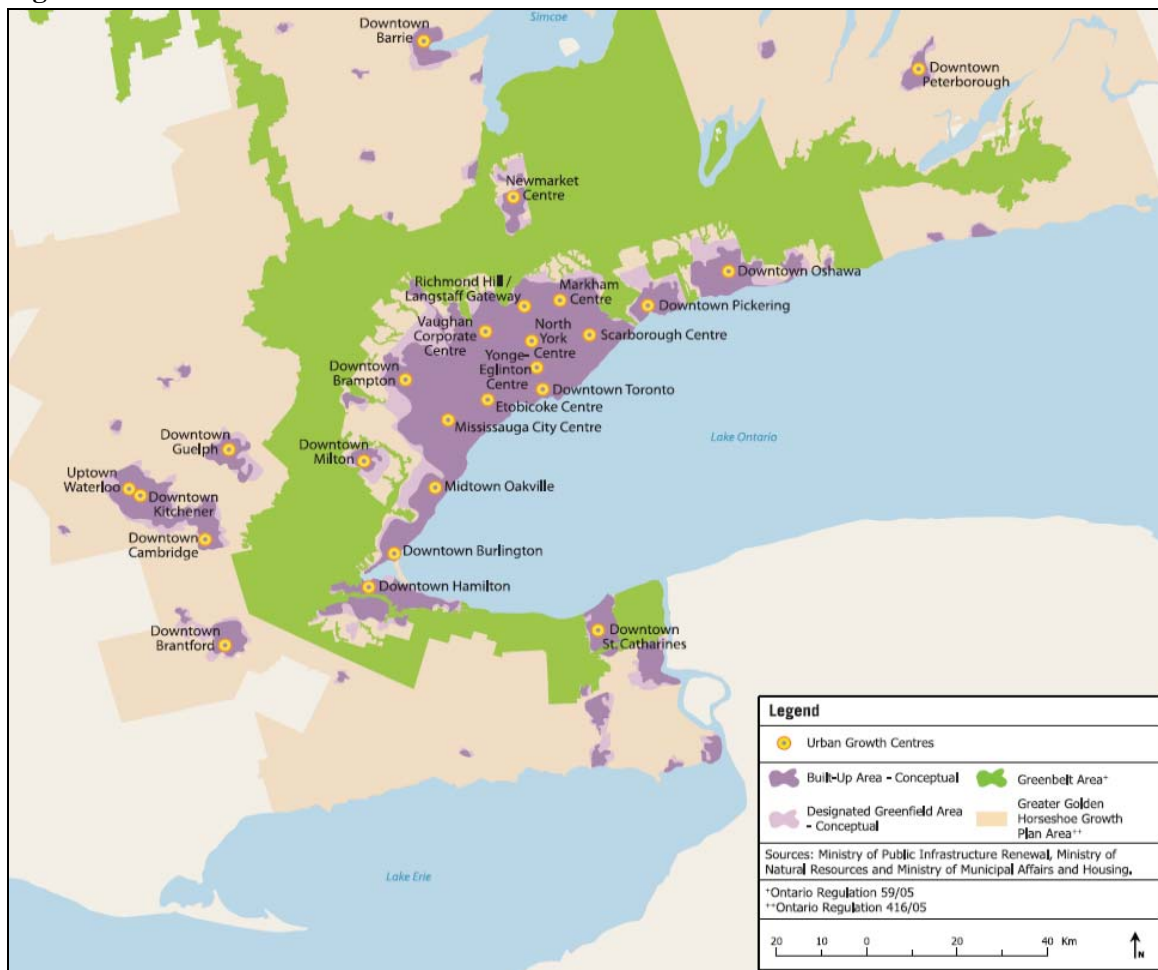
² Anchor mobility hubs are primary major transit station areas within the urban growth areas (Source: Metrolinx – *The Big Move* (2008))

The RTP identifies 51 mobility hubs³ in the GTHA (see **Figure 2-2**). Two types of mobility hubs have been identified in the RTP:

- Anchor hubs – These are major transit station areas associated with an urban growth centre (as defined in the Province’s Growth Plan for the Greater Golden Horseshoe).
- Gateway hubs – These are major transit station areas that are located at the interchange of two or more current or planned regional rapid transit lines.

Midtown Oakville is identified as an anchor hub, and includes the Oakville GO station on the Lakeshore West Line and a station terminal for Oakville Transit. As defined in the RTP, Midtown Oakville is planned to integrate express rail, regional rail, rapid transit, and local bus service.

Figure 2-1: Urban Growth Centres



Source: *Growth Plan for the Greater Golden Horseshoe: Places to Grow (2006) – Schedule 4*

³ Mobility hubs: places of connectivity between regional and rapid transit services, where different modes of transportation come together seamlessly. They have, or are planned to have an attractive, intensive concentration of employment, living, shopping and enjoyment around a major transit station.

Figure 2-2: Mobility Hubs



Source: Metrolinx (2013)

2.3. Switching Gears, Oakville’s Transportation Master Plan

Switching Gears is Oakville’s Transportation Master Plan (TMP) Update (2013). *Switching Gears* developed a practical, sustainable long-term plan to guide the town's transportation system to meet the needs of anticipated growth to 2031.

The TMP was a comprehensive master plan study that included the review of the existing transportation system within the town, incorporated future population and employment growth forecasts identified in the Livable Oakville Plan, and provided recommendations for the required evolution of the future transportation network that will be necessary to support the demand generated. In the TMP, a variety of options were investigated:

- Public transit system and network improvements.
- Active transportation (pedestrian and cycling) initiatives and network improvements.
- Road network capacity improvements that highlight public transit opportunities.
- Travel demand management practices and requirements.
- Transit-supportive land use planning and travel demand management policies.

The TMP identified infrastructure improvements in the Midtown Oakville growth area including:

- Chartwell Road (South Service Road to Cornwall Road) widen to 4 lanes.
- Cross Avenue Extension from Trafalgar Road to Royal Windsor Drive.
- Eighth Line (North Service Road to Iroquois Shore Road) widen to 4 lanes.
- Iroquois Shore Road (Trafalgar Road to Eighth Line) widen to 4 lanes.
- Priority lane / active transportation crossing of the QEW (Iroquois Shore Road to Cross Avenue) new road.
- QEW crossing (Iroquois Shore Road to Cross Avenue) new 4-lane road.
- Royal Windsor Drive / QEW interchange improvements.
- Trafalgar Road / QEW interchange improvements.

2.4. Livable Oakville



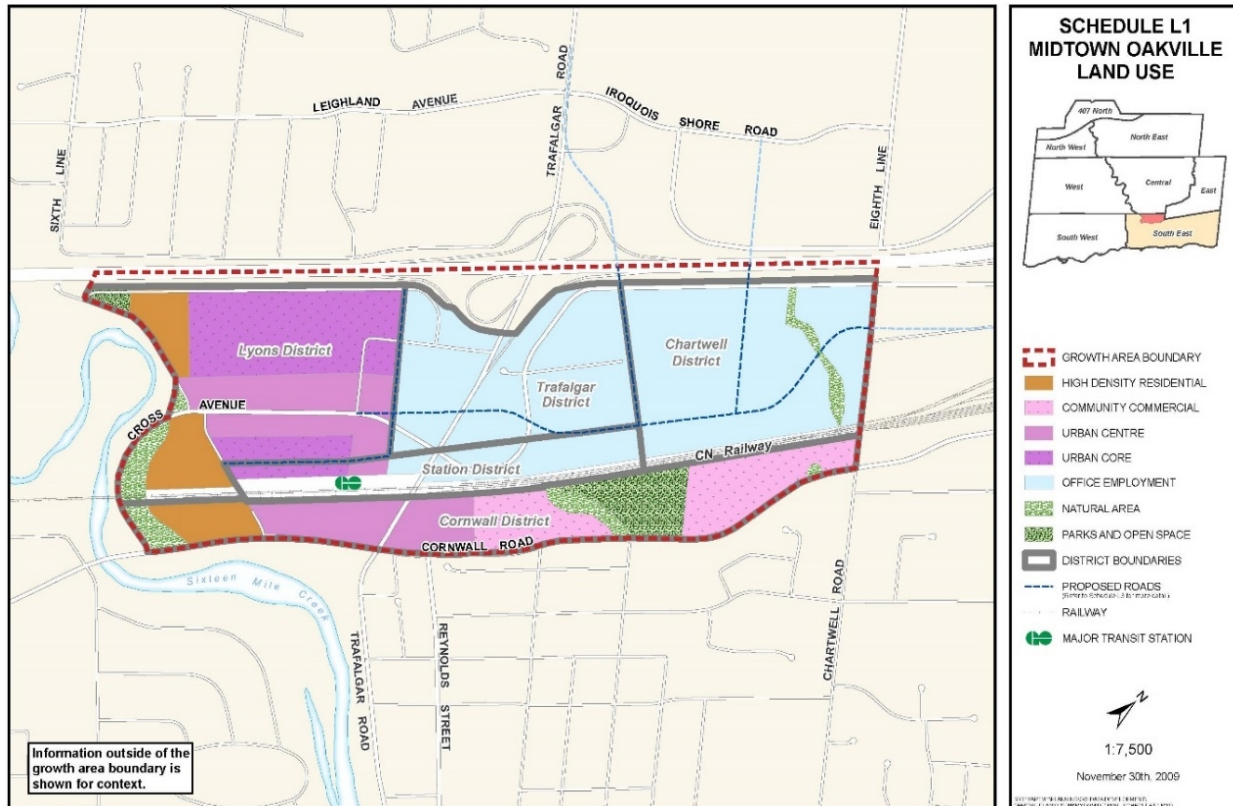
The Town of Oakville’s Official Plan (the Livable Oakville Plan, 2009), was prepared to conform to the Growth Plan for the Greater Golden Horseshoe, as required by the Places to Grow Act.

The Livable Oakville Plan identifies three primary areas for a concentration of mixed use, higher density development in Midtown Oakville, Uptown Core and Palermo Village. They are intended to be developed as mixed use centres with transit-supportive development focused around major transit station areas and along corridors.

It is expected that Midtown Oakville will provide for a minimum gross density of 200 residents and jobs combined, per hectare by 2031 (approximately 20,000 residents and jobs), within the entire growth area in

accordance with the Growth Plan. A mix of approximately 5,900 residential units and 186,000–279,000 m² of commercial and employment space is expected to accommodate an estimated 12,000 residents and 8,000 jobs. The proposed land uses within Midtown Oakville are shown in **Figure 2-3**.

Figure 2-3: Midtown Oakville Land Use



Source: Town of Oakville – Official Plan (2009) – Schedule L1

In creating a livable community, it is important to aim for sustainable development, including a mix of residential, employment and commercial uses, in order to attract different users throughout the day. Midtown Oakville is being planned to not only become an ideal location for mixed-use development, but also as a transit centre where accessibility, life and work come together.

The Midtown Oakville growth area is comprised of five development districts (Station District, Trafalgar District, Lyons District, Chartwell District, Cornwall District). These five development districts are planned to serve specific functions and feature distinct land uses. The Station District will be centred at the Oakville GO station and will be defined by major transit facilities. To the north of the station, Trafalgar District will be a landmark for the Town, with office, civic, cultural and recreational uses, a public plaza and event centre. Lyons District, to the west, will transform from strip malls and large format retail to a compact, mixed use community that includes high rise residential buildings along Sixteen Mile Creek and a new main street along Cross Avenue. Chartwell District, to the east, will develop as a

business campus, while south of the rail corridor/Station District, the Cornwall District will accommodate a mixture of uses that are compatible with existing adjacent residential neighbourhoods.

Station District

The Station District is planned to include the transportation facilities that define Midtown Oakville as a major transit station area, including the train platform, station buildings, bus terminal and parking areas. Land use designations for this district as per Schedule L1 include urban centre, urban core, office employment and railway lands. Buildings within this district have been identified to be 6 to 12 or 8 to 20 storeys high (eligible for bonusing) as per Schedule L2.

Trafalgar District

The Trafalgar District is planned to accommodate a mix of office, civic, cultural and recreational uses and public spaces. All land in the district has been designated office employment, and buildings are expected to be 6 to 12 storeys high (eligible for bonusing), as per Schedules L1 and L2. Livable Oakville identifies Trafalgar District to be the focus of Midtown Oakville, featuring a public plaza, at-grade retail spaces, offices located close to the Oakville GO station, providing easy and convenient connections for commuters, and an event centre that will provide recreational and leisure space. A major transitway for bus rapid transit is planned to operate along Trafalgar Road. As the transitway approaches the Midtown Oakville area, various options of connecting the transitway to the Oakville GO station were assessed as part of this study.

Lyons District

The Lyons District is planned to evolve from its current focus on strip malls and large format retail uses into a compact mixed use neighbourhood. Land use within this district has been designated to be high density residential, urban centre, urban core, natural area, parks and open space and railway lands, as per schedule L1. Cross Avenue is intended to be an attractive central spine with at-grade retail uses, cohesive streetscapes and open spaces. Taller residential buildings (8 to 20 storeys – eligible for bonusing) are planned in the vicinity of Sixteen Mile Creek and the railway, as well as south of the QEW, and buildings in the centre of the district are planned to be 6 to 12 storeys high (eligible for bonusing), as per Schedule L2.

Chartwell District

The Chartwell District is planned to provide space for employment activities that do not typically locate in high-rise office buildings. Land use designations identified in this area include office employment, natural area and railway lands, as per Schedule L1. Buildings are expected to be 2 to 6 storeys high in this district, as per Schedule L2. Cross Avenue is planned to be extended and will link this district to the rest of Midtown Oakville.

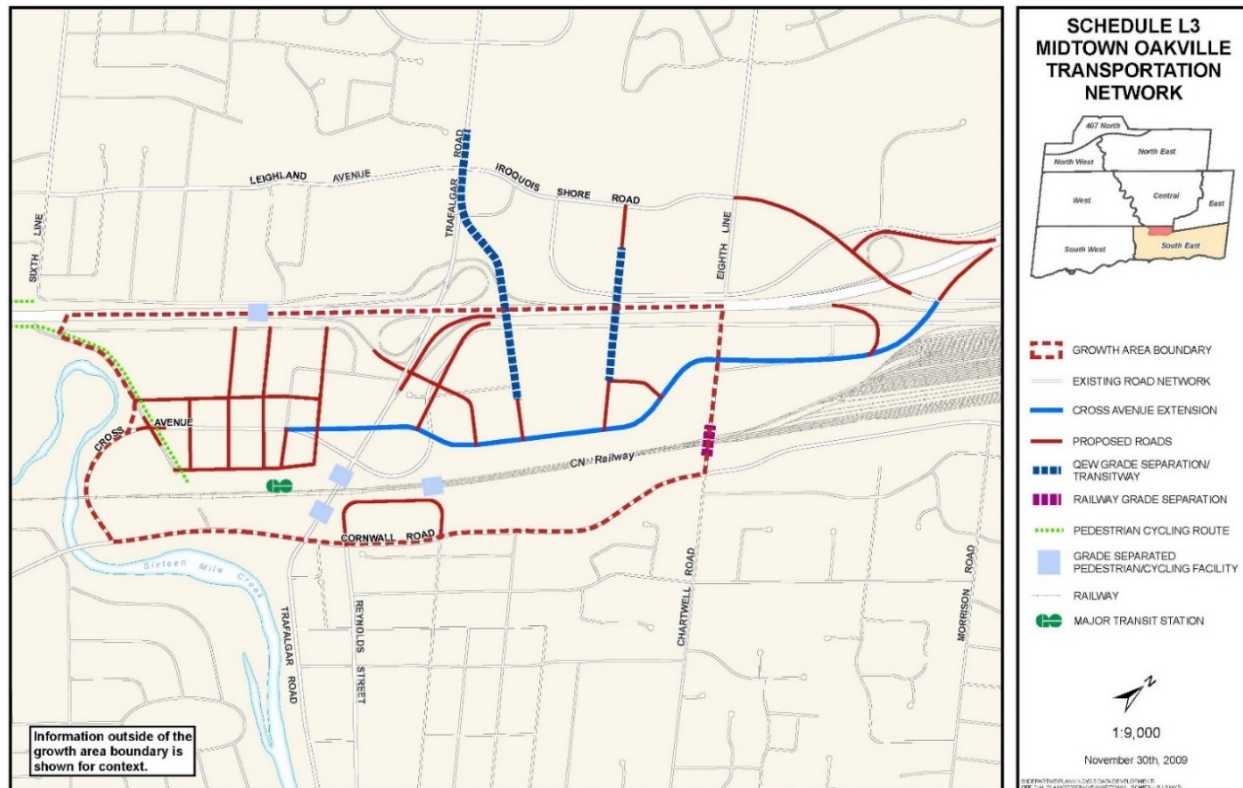
Cornwall District

The Cornwall District, located south of the railway and north of Cornwall Road is planned to accommodate high density residential, community commercial, urban centre, natural area and park and open space land uses, as per Schedule L1. Commercial areas and active parkland will serve the needs of residents and workers in Midtown Oakville and the surrounding area. Building heights are planned to be 6

to 12 storeys, 4 to 10 storeys and 2 to 6 storeys from west to east of the district, as per Schedule L2. Taller residential and mixed use buildings are planned to be located in the vicinity of Sixteen Mile Creek and Trafalgar Road. This area also features a large natural area and parks and open space area.

The conceptual transportation network, as envisioned in Livable Oakville is presented in **Figure 2-4**.

Figure 2-4: Midtown Oakville Transportation Network (Schedule L3)



Source: Town of Oakville – Official Plan (2009) – Schedule L3

2.5. Related Studies

The following sections summarize both recently completed and ongoing studies within, and/or applicable to the study area.

2.5.1. Midtown Oakville Mobility Hub Study

Metrolinx completed the Midtown Oakville Mobility Hub Study in October 2012. The study developed a long-term vision for the Oakville GO station and surrounding lands, by building on the Livable Oakville Plan (June 2009) and the Draft Midtown Business and Development Plan (June 2008). It involved investigations into redeveloping lands surrounding the Oakville GO station, and expanding the Oakville GO station to ensure it can best accommodate significant growth planned for the area and the future Trafalgar Bus Rapid Transit.

2.5.2. Trafalgar Road Bus Rapid Transit Corridor Study

Halton Region is currently undertaking a study to improve traffic operations along Trafalgar Road, between Highway 407 and Cornwall Road. The study focuses on the implementation of high occupancy vehicle (HOV) lanes which would be converted to bus rapid transit (BRT) lanes, with signal priority measures along the vital north-south corridor.

2.5.3. Urban Design and Parking Strategy

The Town of Oakville retained Urban Strategies to provide guidance and direction regarding the appropriate evolution to the area to achieve the vision set forth in the Midtown Business and Development Plan. The urban design study presented a number of recommendations to guide the shape of public spaces, buildings, sidewalks, and roads, to meet the objectives of Midtown Oakville, including putting transit-oriented development first, creating a new place, achieving growth targets, and emphasizing sustainability. Additionally, BA Group conducted a parking study on behalf of the town to review management principles, estimate parking demand, and identify methods to address demand and financial implications as part of the study.

2.5.4. Midtown Core – QEW Crossing Environmental Assessment

An EA was completed in 1999 to identify needs for improvement or additional transportation facilities in Midtown Oakville. The technical analysis showed that Trafalgar Road operates as the main north-south spine in central Oakville. Travel demands and access across and to the QEW is concentrated along the corridor as a result of discontinuities elsewhere in the network. With future growth in population and employment in Oakville and through the GTA, the associated travel demand into the area will result in capacity breakdown on Trafalgar Road and high potential for neighbourhood traffic infiltration. Given the need for additional capacity, alternative crossing and access to the QEW was evaluated. The preferred crossing location is the extension of Iroquois Shore Road to Royal Winsor Drive with a full interchange at the QEW, based on the technical review and comments from the public.

3. Needs and Opportunities

Low-density development, drive-through restaurants, non-street related strip mall retail, big box stores, and stand alone commercial buildings, all supported by an abundance of surface parking are typical in the existing Midtown Oakville area. The arrangement of buildings and streets in the area is conducive to the light industrial and warehouse-type uses which have dominated the area in the past. This has resulted in a landscape that is dominated by large, low-rise buildings setback from the street.

It is envisioned that the growth area of Midtown Oakville will provide for a minimum gross density of 200 residents and jobs (combined) per hectare by 2031 in accordance with the Province's Growth Plan. A mix of approximately 5,900 residential units and 186,000 to 279,000 m² of commercial and employment space is expected to accommodate an estimated 12,000 residents and 8,000 jobs.

This chapter identifies the needs and challenges in the existing conditions for accommodating the planned growth.

3.1. Existing Transportation Network

3.1.1. Road Network

Currently the road network for Midtown Oakville is made up of one key north-south arterial – Trafalgar Road. The existing road network consists of provincial, regional and town facilities. **Figure 3-1** illustrates the existing road network in the study area and an overview of the key features follows.

Provincial Highway Network

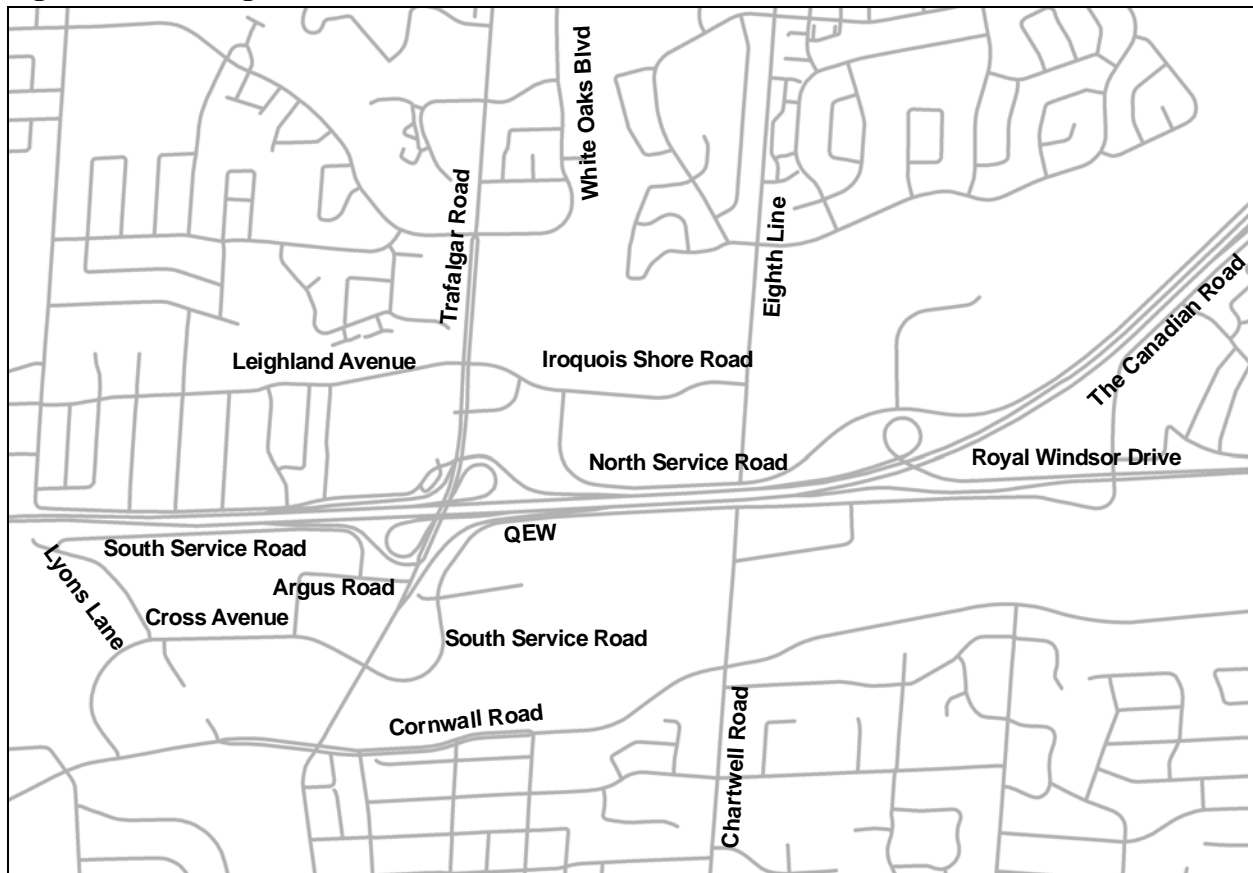
Queen Elizabeth Way Under the jurisdiction of the Ministry of Transportation, the Queen Elizabeth Way (QEW) is a major highway serving Toronto, Mississauga, Oakville, Burlington, Hamilton, St. Catharines, Niagara Falls and Fort Erie.

Within the study area along the QEW, a full interchange at Trafalgar Road and a partial interchange at Royal Windsor Drive exist. The adjacent interchanges include Dorval Drive to the west and Highway 403 / Ford Drive to the east.

Regional Road Network

Trafalgar Road Trafalgar Road is a major north-south arterial road under the jurisdiction of Halton Region (Halton Road 3) within the study area. Trafalgar Road has six lanes and no on-street parking within the study area. The posted speed limit within the study area is 60 km/h.

Figure 3-1: Existing Road Network



Municipal Road Network

- Argus Road** Argus Road is a local road that intersects with Trafalgar Road at a right-in/right-out intersection and connects to Cross Avenue. Argus Road has two lanes and a speed of 50 km/h.
- Chartwell Road** Chartwell Road is a north-south minor arterial between South Service Road and Cornwall Road, and a minor collector between Cornwall Road and Lakeshore Road. Chartwell Road has two lanes and a posted speed of 50 km/h.
- Cornwall Road** Cornwall Road is an east-west multi-purpose arterial road between Cross Avenue and just east of Ford Drive. Cornwall Road has four lanes with a posted speed limit of 60 km/h.
- Cross Avenue** Cross Avenue is an east-west arterial road that connects Speers Road and Trafalgar Road. Cross Avenue has four lanes and a posted speed limit of 50 km/h.

Eighth Line	Eighth Line is a north-south minor arterial road from Dundas Street East to North Service Road with two lanes and a posted speed limit of 50 km/h.
Iroquois Shore Road	Iroquois Shore Road is an east-west multi-purpose arterial road between Trafalgar Road and Eighth Line. Iroquois Shore Road has four travel lanes with a centre turning lane and a speed limit of 50 km/h.
Leighland Avenue	Leighland Avenue is an east-west minor arterial road located between Trafalgar Road and Sixth Line. Leighland Avenue has four lanes for a portion of the roadway in front of the Oakville Place mall and is reduced to two lanes through the residential neighbourhood with a posted speed limit of 50 km/h.
North Service Road	North Service Road is an east-west minor arterial road located in two sections on the north side of the QEW between Joshuas Creek Drive and Iroquois Shore Road, and between Sixteen Mile Creek and Trafalgar Road. North Service Road has two lanes and a posted speed limit of 50 km/h.
Royal Windsor Drive	Royal Windsor Drive is an east-west multi-purpose arterial road between its partial interchange with the QEW to its intersection with South Service Road. Royal Windsor Drive has a posted speed limit of 50 km/h.
South Service Road	South Service Road is an east-west arterial road located in two sections on the south side of the QEW between Royal Windsor Drive and Trafalgar Road, and between Sixteen Mile Creek and Trafalgar Road. South Service Road has two lanes and a posted speed limit of 60 km/h.
The Canadian Road	The Canadian Road is a north-south private road which intersects with Royal Windsor Drive. The Canadian Road has four lanes and a speed limit of 50 km/h.
White Oaks Boulevard	White Oaks Boulevard is a major collector that runs north-south from its intersection with Trafalgar Road and McCraney Street East to Trafalgar Road at Sheridan College. White Oaks Boulevard has two lanes with dedicated bicycle lanes in each direction. The speed limit is 50 km/h.

3.1.2. Transit Network

Midtown Oakville is well serviced by Oakville Transit, GO Transit and VIA Rail. Oakville Transit is the local transit service provider in the town, while GO Transit provides inter-regional commuter-based transit service for the Greater Toronto and Hamilton area (GTHA). VIA Rail is an inter-city rail service that connects major cities and destinations across Canada.

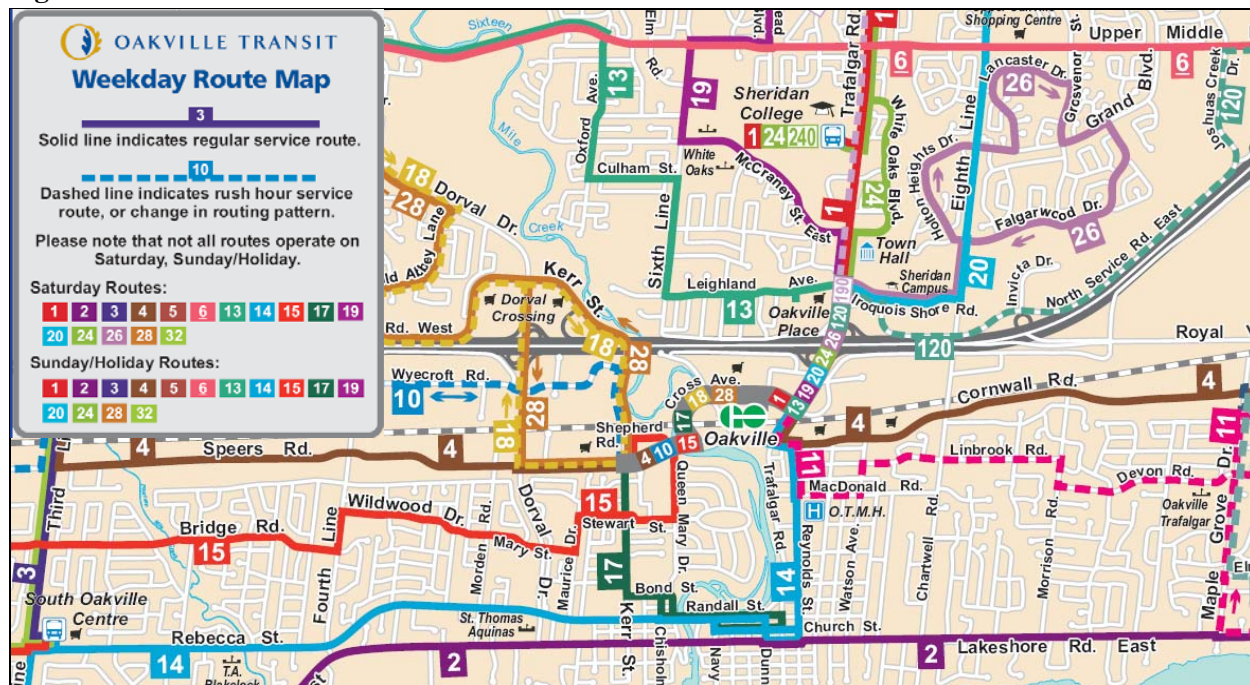
Oakville Transit

Many transit routes provide service to and from Midtown Oakville as the Oakville GO station is one of the town’s major transfer stations. Routes that serve Midtown Oakville, as shown in **Figure 3-2**, include:

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

These services are provided at a frequency of 20-45 minutes on weekdays and at 30-60 minutes on weekends and holidays. Routes are coordinated with the GO Rail schedule.

Figure 3-2: Transit Routes in and around Midtown Oakville



Source: Oakville Transit (Effective September 1, 2013)

GO Transit

Midtown Oakville is served by the following four GO Transit services:

- Route 1 – Lakeshore West GO Rail: A daily commuter rail service, supplemented by GO Bus service during off-peak periods, connecting Toronto Union Station and Aldershot Station, with some weekday peak period service to Hamilton Station. During the summer months, additional weekend rail service is provided to/from Niagara Falls (Route 12).
- Route 19 – Oakville / North York GO Bus: A weekday, peak period, limited-stop bus service between Oakville GO station and Finch GO Terminal in North York.
- Route 20 – Milton / Oakville GO Bus: A weekday bus service between Oakville GO station and Milton GO Station in the Town of Milton, operating primarily along Trafalgar Road, Highway 407 and Bronte Road.
- Route 46 – Highway 407 West GO Bus: A weekday, limited-stop, express bus service between Oakville GO station and York University primarily on Highway 407. Route 46 also stops at Sheridan College and at the Trafalgar Road carpool lot at Highway 407.

3.1.3. Pedestrian and Cycling Networks

There are five types of facilities to accommodate pedestrians and cyclists in the Town of Oakville:

- Concrete sidewalks (off-road, pedestrian-use only)
- Asphalt multi-use trails (off-road, in boulevard)
- Granular major trails (off-road, parks and open space)
- Cycle lanes (on-road, cycle-use only)
- All public roadways (with the exception of provincial highways)

Within Midtown Oakville, there is limited existing pedestrian and cycling infrastructure, as illustrated in **Figure 3-3** and **Figure 3-4**. Sidewalks and paths are provided on only a few roads. Multi-use trails are provided in the boulevards along Leighland Avenue and Eighth Line. On-road cycle lanes are provided on White Oaks Boulevard. Along the western edge of Midtown Oakville is the Sixteen Mile Creek Trail and to the northeast is the Morrison Valley Trail.

Figure 3-3: Existing Pedestrian Network

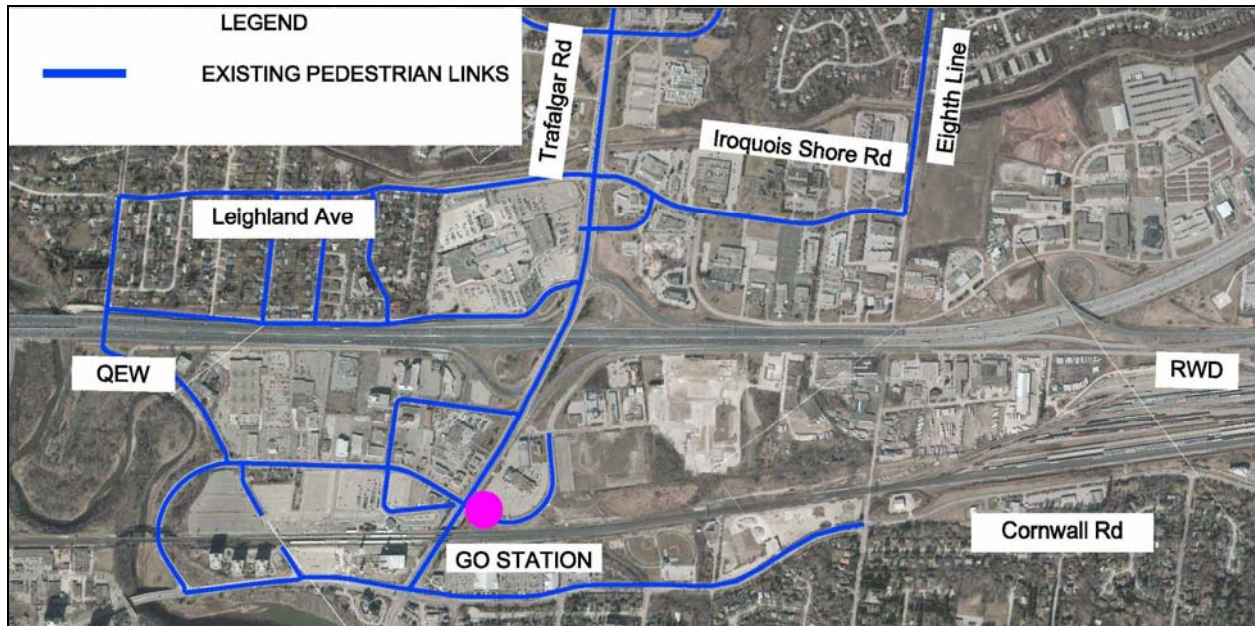


Figure 3-4: Existing Cycling Network



3.2. Traffic Conditions

Intersection capacity analysis was undertaken for the existing traffic conditions. The capacity analysis of an intersection indicates how well the intersection operates, based on calculations of volume-to-capacity (v/c) ratios and delays experienced by individual movements at the intersection.

Through discussions with the MTO, a VISSIM microsimulation model was developed to assess the operations of the QEW mainline and ramp terminals at the interchanges that provide access to Midtown Oakville – Trafalgar Road and Royal Windsor Drive. The existing conditions were simulated to calibrate the model to observed conditions in the weekday AM and PM peak periods. Documentation of the calibration and validation of the microsimulation model is included in **Appendix C2**.

3.2.1. Existing Traffic Conditions

Existing traffic counts were provided by the MTO, Halton Region and Town of Oakville for the freeway, arterial and local roads within the study area.

In the AM peak hour, the QEW serves about 7,600 vehicles in the eastbound direction and 7,100 vehicles in the westbound direction. In the PM peak hour, the magnitude of volumes on the QEW are similar with 7,500 vehicles in the eastbound direction and 7,500 vehicles in the westbound direction.

AM peak hour volumes on Trafalgar Road crossing the QEW reach 2,300 northbound vehicles and 1,900 southbound vehicles. In the PM peak hour, volumes reach 2,100 northbound vehicles and 2,700 southbound vehicles.

Intersection Operations

The observed traffic in the Midtown Oakville area indicates capacity constraints and congestion at peak times. **Figure 3-5** and **Figure 3-6** show that most signalized intersections within the study area operate at acceptable levels of service. However two intersections on the western boundary of the study area experience capacity constraints during the peak hours under existing conditions. This may be attributable to the high demand at the Oakville GO station, including the new GO parking garage, in Midtown Oakville.

The study area intersections were analyzed using Synchro 7.0 software, which utilizes the Highway Capacity Manual 2000 methodology, and following the Halton Region's Guidelines for the Preparation of Traffic Impact Studies, dated August 2001. The intersection capacity analysis details are provided in **Appendix C1**.

Figure 3-5: Existing AM Intersection Operations

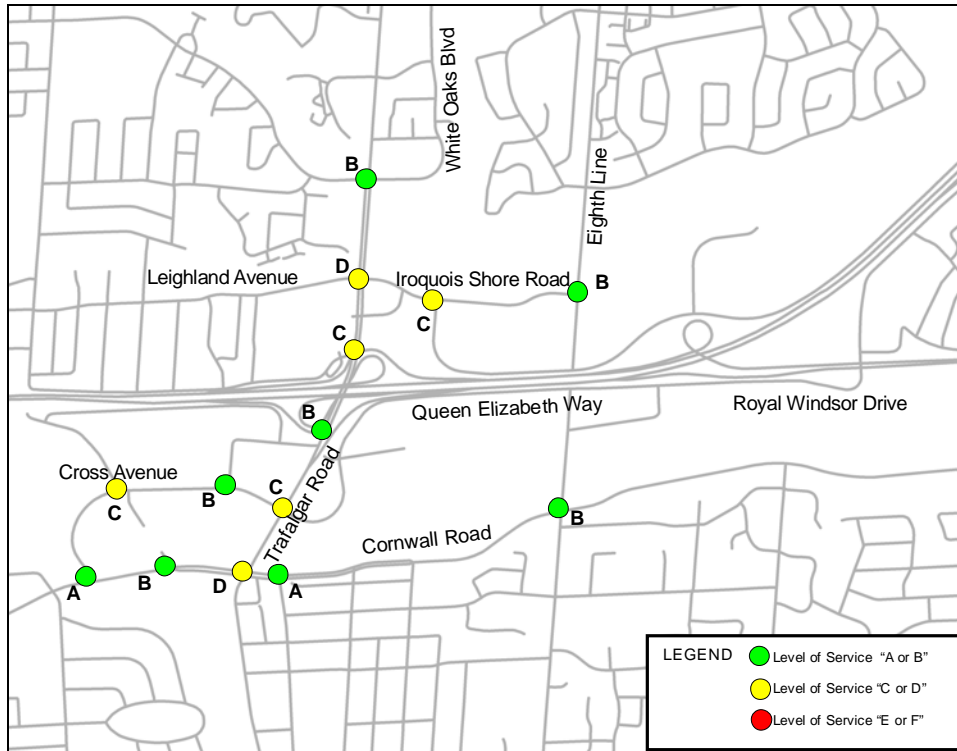
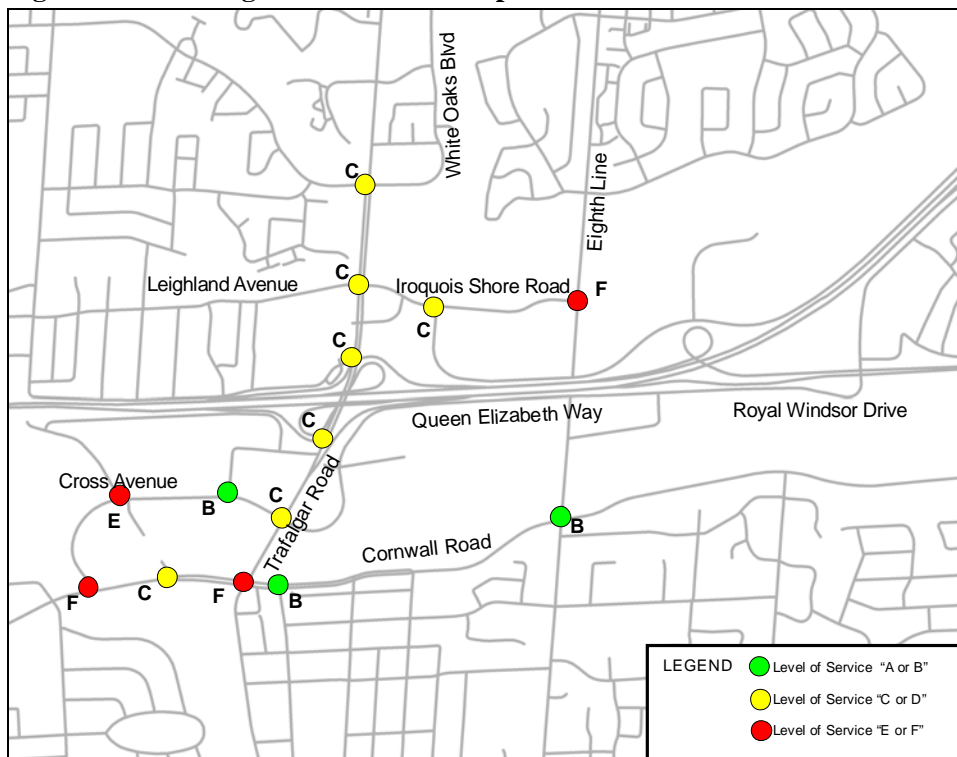


Figure 3-6: Existing PM Intersection Operations



Freeway Operations

Operational constraints were identified in AM peak for eastbound traffic around the Dorval Drive interchange and westbound at the Royal Windsor Drive interchange. In the PM peak a westbound constraint occurs between Ford Drive and Trafalgar Road interchanges due to high volumes and weaving manoeuvres. Further details on the analysis undertaken on Provincial highway network can be found in **Appendix C2**.

3.2.2. Future “Do Nothing” Conditions

As discussed in earlier sections of the report, the planned future growth of Midtown Oakville will consist of approximately 12,000 residents and 8,000 jobs. The mix of this planned growth is 5,900 residential units, up to 279,000 m² of commercial and employment space. Traffic volumes for the future redevelopment within Midtown Oakville were calculated using trip generation rates based on the Institute of Transportation Engineers, Trip Generation Manual 8th Edition. The distribution of future site traffic in Midtown Oakville is based on the *Oakville GO Station Parking Expansion Feasibility and Transportation Impact Study* (IBI Group, July 2009). Full details of Midtown Oakville traffic generation and traffic distribution can be found in **Appendix C1**.

An assessment of the transportation network within the study area without any new Midtown Oakville transportation infrastructure improvements was undertaken to identify the operational performance of the “Do Nothing” network in accommodating Midtown Oakville growth.

Although the “Do Nothing” scenario assumes no improvements to the transportation infrastructure within Midtown Oakville, it does include a number of planned and committed transportation improvements by region and town as per the 2031 Base Case in the town’s TMP. Additionally, through consultation with MTO, planned provincial improvements documented in MTO’s *Transportation Environmental Study Report for Highway 403 and Queen Elizabeth Way from Trafalgar Road to Winston Churchill Boulevard* (TESR) are explicitly modelled in the Do Nothing scenario. These include:

- Extension of the existing HOV lanes on QEW from Trafalgar Road to Winston Churchill Boulevard.
- North to East (Highway 403 SB to QEW EB) and East to North (QEW WB to Highway 403 NB) ramps at the Highway 403 / Ford Drive interchange.
- Core-collector system along QEW to facilitate movements between Ford Drive and Winston Churchill Boulevard and to accommodate the new North to East / East to North ramps.

Intersection Operations

Overall, during the AM and PM peak hour, most signalized intersections within the study area will operate with significant capacity constraints and intersection operations will fail as shown in **Figure 3-7** and **Figure 3-8**. The “Do Nothing” road network will not have enough reserve capacity to accommodate full build-out of Midtown Oakville.

Figure 3-7: AM “Do Nothing” Intersection Operations

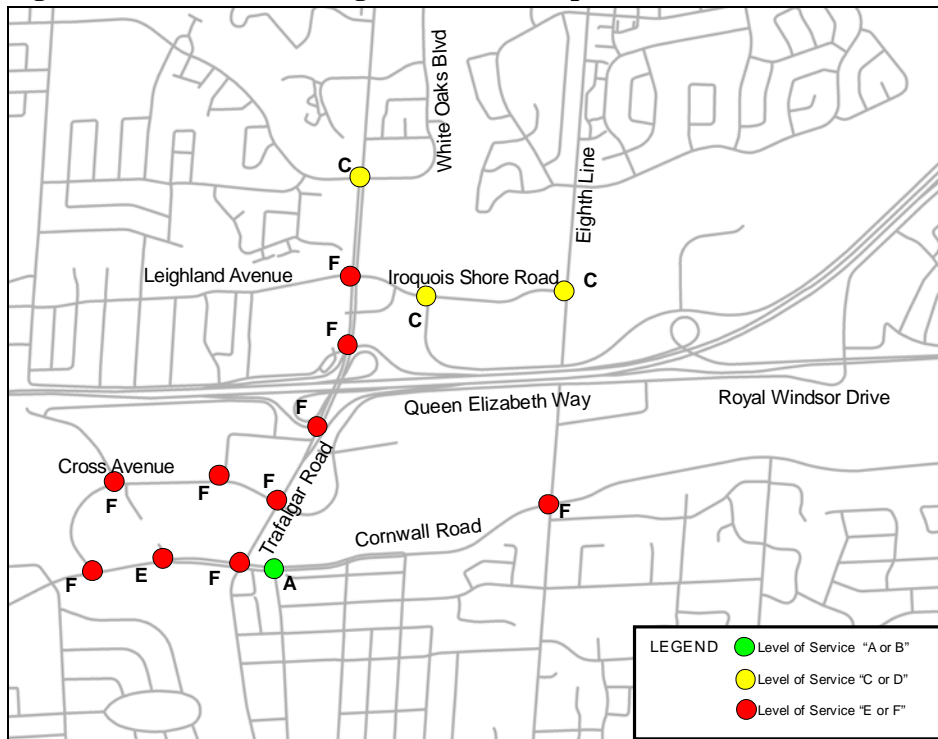
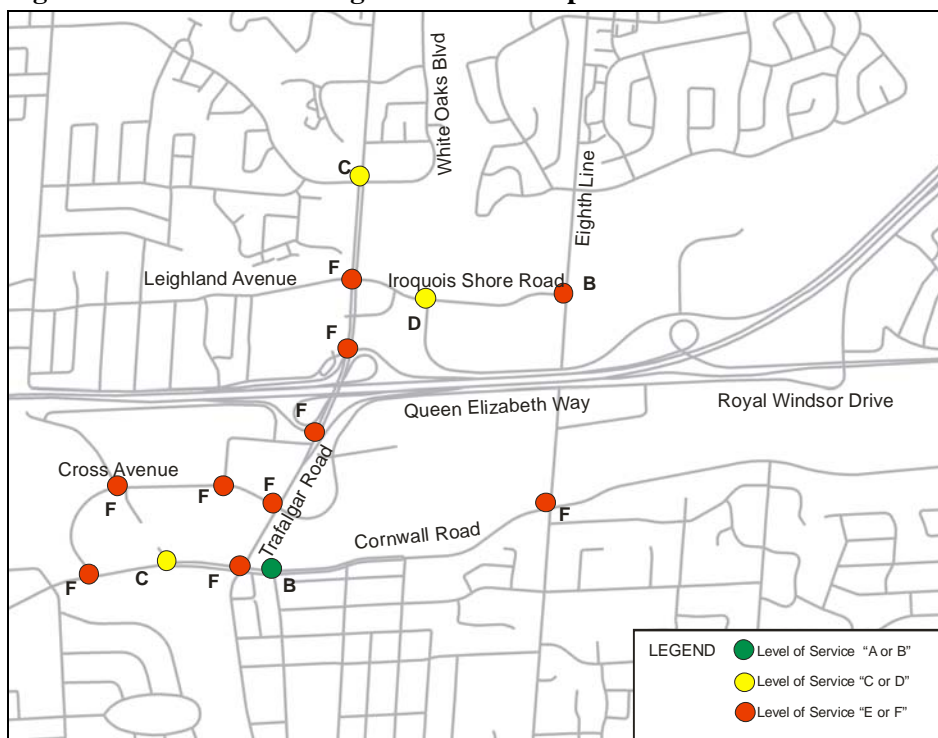


Figure 3-8: PM “Do Nothing” Intersection Operations



Freeway Operations

Using the microsimulation model, the QEW was found to have significant operational constraints at the Trafalgar Road interchange in both the AM and PM peaks, with the interchange ramp terminals being unable to serve the demand placed, and queues spilling back onto the QEW mainline. Details on the forecasted freeway operations under the “Do Nothing” scenario are included in **Appendix C2**.

3.3. Drainage Conditions

Major drainage areas within the Midtown Oakville study area were determined using 1 m contour data provided by the town. The drainage areas were further refined based on plan and profile information received from the town for roads and highways within the study area. The drainage area plan for existing conditions is shown on **Figure 3-9**. The drainage catchments within the Midtown Oakville study area contribute flow to the following four watercourses:

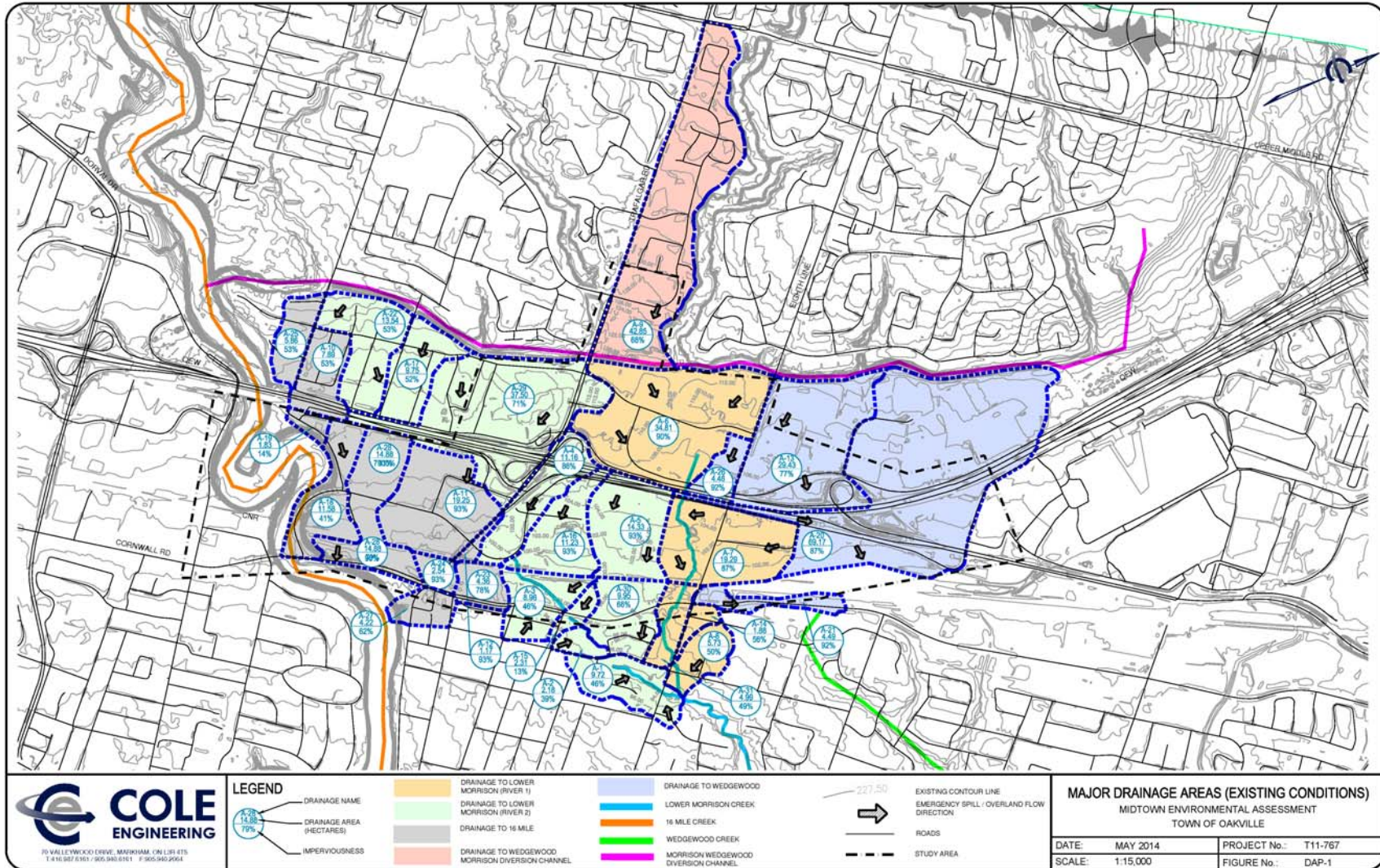
- Lower Morrison Creek
- Wedgewood Creek
- Morrison/Wedgewood Diversion Channel
- Sixteen Mile Creek

The existing drainage conditions of the Midtown Oakville study area were simulated using a Visual OTTHYMO (VO2) hydrology model. The hydrologic parameters were determined for each drainage catchment within the Midtown Oakville study area, including the assessment of current imperviousness determined based on the land use of each catchment. Further details on drainage and stormwater management are provided in **Appendix J**.

As per the *Lower Morrison/Wedgewood Creeks – Flood, Erosion and Master Drainage Plan Study* prepared by R. V. Anderson Associates Ltd. (January 1993), there are downstream hydraulic capacity constraints which must be considered when establishing allowable discharge rates from all new developments within the Lower Morrison Creek and Wedgewood Creek subwatersheds. As per the R. V. Anderson creek study, peak runoff rates from all new developments within the Lower Morrison Creek and Wedgewood Creek watersheds are to be controlled to 50% of pre-development levels in order to mitigate potential erosion and flooding.

The *Morrison/Wedgewood Diversion Channel – Spill Control Class Environmental Assessment*, prepared by AMEC Environment & Infrastructure (May 2012), indicates that there is a current potential for a spill of flood waters during extreme storm conditions which potentially affect those lands within the vicinity of the diversion channel, as well as properties further downstream. Work is currently being undertaken on behalf of Conservation Halton in order to mitigate these flood impacts of the diversion channel. As part of the stormwater management analysis completed for this Class EA, it is recommended that peak runoff rates from any future development within the Morrison/Wedgewood Diversion Channel be controlled to existing conditions. Peak runoff rates from all future developments within the Sixteen Mile Creek watershed are to be controlled to existing flow rates as there are no existing flood concerns for Sixteen Mile Creek in the study area.

Figure 3-9: Major Drainage Areas



3.4. Natural Heritage Environment

The Natural Heritage Report, including physiography and soils, aquatic habitat and communities, vegetation and vegetation communities, wildlife and wildlife habitat and Designated Natural Areas for the study area was prepared by LGL Limited. The full report is provided in **Appendix D1**. The following sections summarize the findings of the above report.

3.4.1. Physiography and Soils

The study area is located primarily within two distinct physiographic regions including the South Slope and partially within the Iroquois Plain (Chapman and Putnam 1984). The South Slope predominantly consists of shale and till plains and the Iroquois Plain predominately consists of flat, sandy lowlands. The soils vary between imperfectly drained, moderately well-drained, to poorly drained members of the Oneida catena.

3.4.2. Aquatic Habitat and Communities

The study area is located within the Sixteen Mile Creek and Oakville East Urban Creeks watersheds, under the jurisdiction of CH and the Ministry of Natural Resources (MNR) Aurora District. Four main watercourses including Tributary 1 of Lower Morrison Creek, Tributary 2 of Lower Morrison Creek, the Morrison-Wedgewood Diversion Channel, Lower Wedgewood Creek (Tributary 1 QEW ditch system, Tributary 1, Tributary 2, Tributary 3 and Tributary 4 of Lower Wedgewood Creek) have been identified as affected or within close proximity of the study area.

Lower Morrison Creek and Lower Wedgewood Creek are located within the Oakville East Urban Creeks watershed. The Morrison/Wedgewood Diversion Channel occurs within the Sixteen Mile Creek watershed.

A fish survey was undertaken to identify the fish habitat approximately 50 m upstream and 100 m downstream of the impacted area. None of these fish habitat species are listed in the Ontario *Endangered Species Act* or the Canada *Species at Risk Act*.

3.4.3. Vegetation and Vegetation Communities

The study area consists a mixture of cultural and wetland vegetation communities, including portions of vegetation communities that are already in a disturbed state having been negatively impacted by existing roadways, commercial, industrial and residential land use developments. Five Ecological Land Classification for Southern Ontario (ELC) vegetation community types were identified within the study limits during the botanical survey. All of the vegetation communities identified are considered widespread and common in Ontario and are secure globally.

A total of 152 plant species were recorded within the study area. Of the 145 plant species identified, 59 plant species are native to Ontario and 86 plant species are considered introduced and non-native to

Ontario. The remaining seven species could only be identified to genus due to a lack of property access at certain locations. No plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were identified during the botanical investigation within the study area. No native provincially rare plant species were discovered. One species, common juniper (*Juniperus communis*) is considered rare in Halton Region which was found in one vegetation community. One species, eastern redcedar (*Juniperus virginiana*) is considered uncommon which was found in five different communities.

3.4.4. Wildlife and Wildlife Habitat

Wildlife and wildlife habitat were found to be distributed across the entire study area, however given the mix of land uses, e.g. urban development, agricultural, highways and rail, natural heritage features were generally restricted to drainage features, marsh communities, cultural thicket and old field meadow habitat. No significant wildlife movement or passage corridors were documented in the study area. However, all culverts conveying water across highway infrastructure may offer some opportunity for wildlife movement. No nests of migratory bird species were identified with culverts/bridges. Overall, natural areas within the study area are restricted to several locations, and where present, support a low diversity of wildlife species. Wildlife species identified within the study area are generally considered urban or tolerant of anthropogenic features and disturbance. No Significant Wildlife Habitat, as identified by the Town of Oakville Official Plan (Town of Oakville 2009) or based on criteria outlined in the Ontario Ministry of Natural Resources Significant Wildlife Habitat Technical Guide (OMNR 2000) has been identified.

Based on field observations, a total of 14 species of wildlife were verified in the study area. The majority of these recordings came from identification (through calls and sightings) of bird species and mammalian signs. An additional 20 species of wildlife have been recorded as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions.

A single herpetofauna species, an Eastern Gartersnake (*Thamnophis sirtalis*) and three additional species including Northern Leopard Frog (*Lithobates pipiens*), Green Frog (*Rana clamitans*) and American Toad (*Bufo americanus*) were identified within the study area based on a review of secondary data sources and an analysis of existing habitat conditions.

Fourteen bird species and an additional 12 bird species bird were identified as present within the study area based on a review of secondary data sources and an analysis of existing habitat conditions. Bird species identified within the study area are species that typically inhabit open country, forest edge, agricultural and urban/anthropogenic habitat types.

Five priority species for conservation (as identified by *Bird Studies Canada*) were identified as present within the study area based on field observations and a review of secondary data sources and an analysis of existing habitat conditions. Priority species for conservation identified within the study area include:

Spotted Sandpiper (*Actitis macularius*), Black-capped Chickadee (*Poecile atricapillus*), American Goldfinch, Northern Mockingbird and Savannah Sparrow.

Three mammal species were identified during field investigations within the study area. Northern raccoon (*Procyon lotor*) and coyote (*Canis latrans*) tracks and scats were noted along riparian habitats of Morrison Creek. No significant mammal movement corridors were identified within the study area. However, several culverts which convey water across existing highway infrastructure may offer some opportunity for wildlife movement.

Fifteen species of bird are protected under the *Migratory Birds Convention Act* (MBCA) and a single bird species is protected under the *Fish and Wildlife Conservation Act* (FWCA). Five bird species identified within the study area are recommended by Bird Studies Canada as priority species for conservation. Five of seven species of mammal identified within the study area are offered protection under the FWCA. One wildlife species, the Northern Mockingbird, is ranked “uncommon” by CH. Despite the “uncommon” classification by CH, the Northern Mockingbird population is considered secure. The remaining wildlife species documented within the study area are ranked “common” or “abundant” by CH.

Of the 34 wildlife species recorded within the study area, none are regulated under the Ontario *Endangered Species Act, 2007* (ESA) or the federal *Species at Risk Act* (SARA). A number of species at risk have been identified as historically present within the Town of Oakville, based on records from the Natural Heritage Information Centre (NHIC) Biodiversity Explorer database. The highly disturbed nature of the natural heritage features present within the Midtown Oakville study area result in only limited potential for presence of species at risk. Four species at risk have been identified as potentially present within the Midtown Oakville study area. The species, their respective habitat requirements and likelihood of each species at risk being present within the study area is discussed below.

3.4.5. Designated Natural Areas

A review of the Halton Region Official Plan (2006) and the Town of Oakville Official Plan (2009) indicate that there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area. Several of the study area’s natural features exist within the HRCA Regulation Limit, including watercourses and riparian communities associated with Lower Morrison Creek Tributaries 1 and 2, Lower Wedgewood Creek Tributaries 1 to 4, the Morrison-Wedgewood Diversion Channel, and components of the QEW Ditch System.

CH GIS mapping (obtained from Halton Region) depicts a candidate significant woodland adjacent to Morrison Creek north of the Morrison-Wedgewood Diversion Channel that is present within the impact area (CUW1d).

3.5. Socio-Economic Environment

Midtown Oakville is characterized by several unique and highly desirable features, including a large wooded ravine, natural heritage, and large-scale public land ownership. The interchange of Trafalgar Road and the QEW and the Oakville GO station are major entry points to the Town of Oakville and distinguish Midtown Oakville as a strategic location to accommodate both population and employment growth. Trafalgar Road provides vital links to the Downtown, Midtown, Oakville GO station, current town hall site, Sheridan College, Uptown Core and North Oakville. The rail corridor at the south provides passenger and freight connections, as well as a critical link to the GTA transit network.

The accessibility by major roads and local and inter-regional transit, combined with a large amount of vacant and underutilized land, provide the infrastructure and development opportunity to create a complete urban community comprised of a mix of residential, commercial/retail and employment uses.

Currently, there are approximately 3,300 residents and 3,900 jobs located within an 800 m radius of the Oakville GO station. The Oakville GO station is currently served by 3,031 parking spaces, bicycle racks and shelters, a taxi stand, a kiss and ride area, and nearby retail. Approximately 72% of people arriving at Oakville GO station do so by car, with 89% of riders living within 5 km of the station.

Currently, the entire Midtown Oakville area is surrounded by three stable residential communities: Iroquois Ridge South and College Park to the north and Old Oakville to the south. These neighbourhoods are characterized by medium to low density single-family homes. Major shopping and commercial districts include the Oakville Place, which is a regional shopping destination and the Kerr Street Corridor and Village, which is west of Midtown Oakville.

Pedestrian mobility is challenging (with respect to safety) along existing facilities and limited by restricted access across the QEW, the rail corridor and Sixteen Mile Creek, as well as the lack of a street grid network or sidewalks in some areas, and degraded streetscaping.

3.6. Cultural Heritage Environment

Archaeological Services Inc. (ASI) was retained to undertake an assessment of impacts as part of the Cultural Heritage Resource Data Collection Study for the study area. For the purposes of this assessment, the term cultural heritage resources was used to describe both cultural landscapes and built heritage features. The full report is provided in **Appendix D2**.

An initial data collection identified cultural heritage resources within a large study which was subsequently refined. Six cultural heritage resources were identified in the larger study area. Only one of these resources, CHR 6 a former industrial General Electric (GE) plant on 420 South Service Road remains within the study area. CHR 6 is designated under Part IV of the *Ontario Heritage Act*. Specific, identified heritage attributes include (but are not limited to) the overall massing and form of the structure and all walls and also specific features on the east, west and north walls. The industrial complex dates

back to the first half of the twentieth century and is considered significant to the industrialization of the Town of Oakville. This cultural heritage resource is historically, architecturally and contextually associated with twentieth century land use patterns in the Town of Oakville.

3.7. Archaeological Environment

Archaeological Services Inc. (ASI) was retained to conduct a Stage 1 Archaeological Assessment (Background Study and Property Inspection) for the study area. The full report is provided in **Appendix D3**. The Stage 1 background study concluded that no previously registered archaeological sites are located within 1 km of the study area. A review of the geography and history of the study area indicated that the study area has potential for the identification of Aboriginal and Euro-Canadian archaeological resources. The Stage 1 property inspection determined that the majority of the study area has been disturbed by previous construction activity of the urban development surrounding the study area or of the existing right-of-ways.

As some archaeological potential occurs in sections of the study area (refer to **Figures 8 to 10** in **Appendix D3**), a Stage 2 archaeological assessment will be required for these lands using a combination of test-pit survey at 5 m intervals. This work may be undertaken at the detailed design stage.

Due to the extensive and deep land alterations that have severely damaged the integrity of any potential archaeological resources, the remainder of the study area does not retain any archaeological potential and does not require further archaeological assessment.

3.8. Subsurface Conditions (Foundations)

Golder Associates Ltd. (Golder) was retained to provide foundation engineering services for the study area. The recommendations are based on interpretation of the factual data obtained from existing borehole information completed from previous investigations in the study area. The full report is provided in **Appendix D4**.

Generally, the subsurface conditions in the area consist of variable fill materials overlying a relatively thin deposit of clayey silt to silty clay till/residual soil. The cohesive native soils are inferred to represent both glacial till and residual soil deposits. In some boreholes, residual soil and/or till deposits were encountered separately while at other boreholes the till deposits transition into the underlying residual soils. The till/residual soil contains varying amounts of shale fragments and is underlain by shale bedrock. The shale bedrock contains limestone, siltstone and sandstone interbeds that are generally stronger and less weathered than the surrounding shale.

Measured groundwater levels across the study area obtained from previous 1979 to 1999 investigations ranged between 0.6 m to 4.2 m below ground surface (at the time of these investigations) and generally indicate that the groundwater elevation slopes towards the south to Lake Ontario. Most existing boreholes were dry during drilling and where water was encountered measurements were taken in open boreholes

after completion of drilling. Shallow groundwater measurements, less than 1 m below ground surface was typically encountered within or just below the fill materials. Groundwater is anticipated to occur from “perched” water within existing fills.

Additional investigation will be required within the footprint of the new structure foundations and in embankment widening areas to further assess and/or confirm the subsurface conditions. Further investigation work at the detail design stage should be undertaken in accordance with the MTO’s *Guidelines of Foundation Engineering – Geotechnical Speciality for Corridor Encroachment Permit Application, April 2008*.

3.9. Noise Conditions

Golder Associates was also retained to prepare a noise assessment for the project. The full Noise Assessment Report is provided in **Appendix D5**. The assessment identified potential noise impacts due to road traffic noise on neighbouring sensitive areas and applicable noise by-laws.

The noise assessment included roadways within the Midtown Oakville that are proposed to be modified, as well as other nearby major and local roads to provide a better characterization of the acoustic environment in the vicinity of Midtown Oakville. Noise from the QEW and Trafalgar Road dominated noise levels at most of the identified receptor locations.

Future noise levels without the project (ambient) were modelled using noise prediction modelling software to provide a basis for comparison. With QEW traffic included as a noise source, almost all receptor locations will have future daytime noise levels above 60 dBA, an assessment threshold in MTO’s *Environmental Guide for Noise* (2006) at which mitigation is required.

3.10. Utilities

A number of significant gas, oil and water utilities have been identified within the study area. These utilities include:

Gas

A high pressure gas transmission pipeline (8”) is located along Eighth Line and Royal Windsor Drive within the study area.

Hydro

Hydro One Networks transmission corridor with three overhead transmission lines is located within the study area.

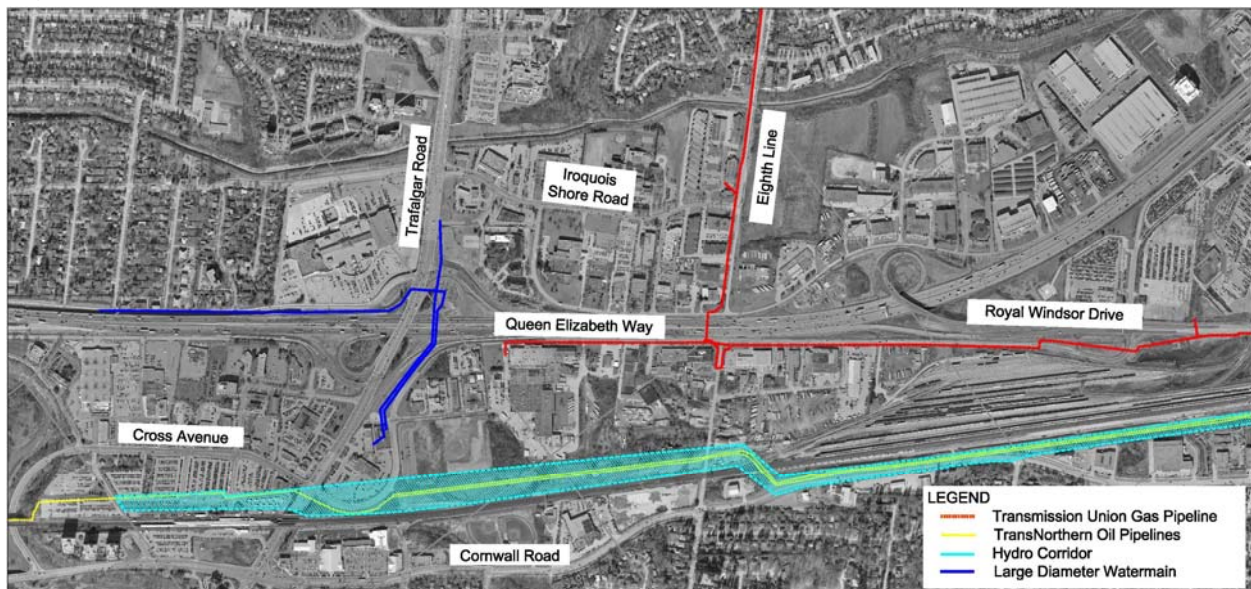
Oil

High pressure Trans-Northern oil pipelines (16” and 12”) are located within the Hydro Corridor to the south of the study area.

Water

Two 30” feeder mains that run from Eighth Line and McCraney reservoirs to the Halton Region Booster Station at 320 Davis Road are located within the study area.

Figure 3-10: Utilities



3.11. Problem and Opportunity Statement

The following problem / opportunity statement was developed for the Midtown Oakville Municipal Class EA study by considering existing conditions and input from the project team, technical agencies, and various stakeholders:

Midtown Oakville is a provincially designated Urban Growth Centre and there is an opportunity for this area to develop into a “complete urban community”, as identified in Livable Oakville. For Midtown Oakville to achieve these policy objectives, there is a need to improve the existing transportation network to enhance growth and economic development opportunities. Stormwater system improvements to support the proposed transportation network may also be required to help ensure Midtown Oakville has a balanced, accessible and sustainable transportation network for all modes of travel (walking, cycling, transit service and vehicles).

4. Alternative Network Solutions

Given the needs for the Midtown Oakville area (presented in Section 3), a number of opportunities for improving connectivity, accessibility and livability have been identified to accommodate pedestrians, cyclists, transit users, and drivers, such as improving connections, enhancing the public realm, and establishing a mix of uses. Potential infrastructure improvements range from revised road alignments to new road, transit, and active transportation connections, including additional crossings of the QEW. This EA study focused on developing transportation solutions to achieve the following:

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

4.1. Network Improvement Elements

A range of alternatives were identified and assessed through consultation with the public and technical agency stakeholders for each network improvement considered as part of this study. These network improvements are discussed below.

Improvement A: North / South QEW Road Crossing and

Improvement C: North / South QEW Active Transportation / Priority Crossing

The QEW was identified to be a major barrier for north-south travel through the area. Trafalgar Road is the only existing crossing for cars, buses, trucks, cyclists, and pedestrians. Traffic analysis under existing and future “Do Nothing” conditions show that intersections along Trafalgar Road operate with capacity constraints during the during peak periods. The safety of cyclists and pedestrians on Trafalgar Road has also been identified as an issue since this group of road users is more negatively impacted by the crossing options of the QEW on/off ramps, where drivers are accelerating on to a ramp or checking for gaps in traffic in order to merge and cyclists or pedestrians may be overlooked.

Improvement A considered an additional crossing of the QEW east of Trafalgar Road, which would accommodate all modes of transportation, while also providing a safer option for crossing the QEW for pedestrians and cyclists.

Improvement C considered an additional crossing of the QEW east of Trafalgar Road for transit and active transportation only, which would improve the efficiency of transit operations and also provide pedestrians and cyclists with a safer option for crossing the QEW. This improvement was considered in conjunction with Improvement A.

Improvement B: Trafalgar Road Interchange

With the anticipated growth and development in Midtown Oakville, and the need for improved connectivity and accessibility, a direct off-ramp from eastbound QEW to Midtown Oakville was considered. Improvements to the existing at-grade intersection of the eastbound QEW off-ramp at Trafalgar Road including an additional through movement and related road works were also considered.

Improvement D: Cross Avenue Extension

Improvement D considered various options for extending Cross Avenue / Davis Road easterly through Midtown Oakville. A continuous east-west road through Midtown Oakville will provide greater connectivity on both sides of Trafalgar Road and can be designed to accommodate all modes. Direct access can be provided to/from the QEW via Trafalgar Road and Royal Windsor Drive interchanges.

Improvement E: Iroquois Shore Road Widening

Improvement E considered widening Iroquois Shore Road to provide four travel lanes plus a centre turning lane, as well as bike lanes and sidewalks on both sides of the road.

Improvement F: Royal Windsor Drive Interchange

With the anticipated growth and development in Midtown Oakville, and need for improved connectivity and accessibility, improvements to Royal Windsor Drive interchange were considered as Iroquois Shore Road and Royal Windsor Drive are connected to create another crossing of the QEW east of Trafalgar Road.

Improvement G: East Active Transportation Crossing and Improvement H: West Active Transportation Crossing

Improvements G and H involved consideration of additional crossings of the QEW both east and west of Trafalgar Road, for pedestrians and cyclists only. New crossings for pedestrians and cyclists can encourage more active, sustainable modes of travel, while increasing the safety of this group of road users. In anticipation of a pedestrian crossing to the west of Trafalgar Road, a pier within the QEW right-of-way was constructed as part of previous works on the QEW corridor that were completed in 2010. The location of the pier dictates the location of the pedestrian crossing west of Trafalgar Road and various alignment options for the bridge crossing were assessed.

4.2. Combination Options

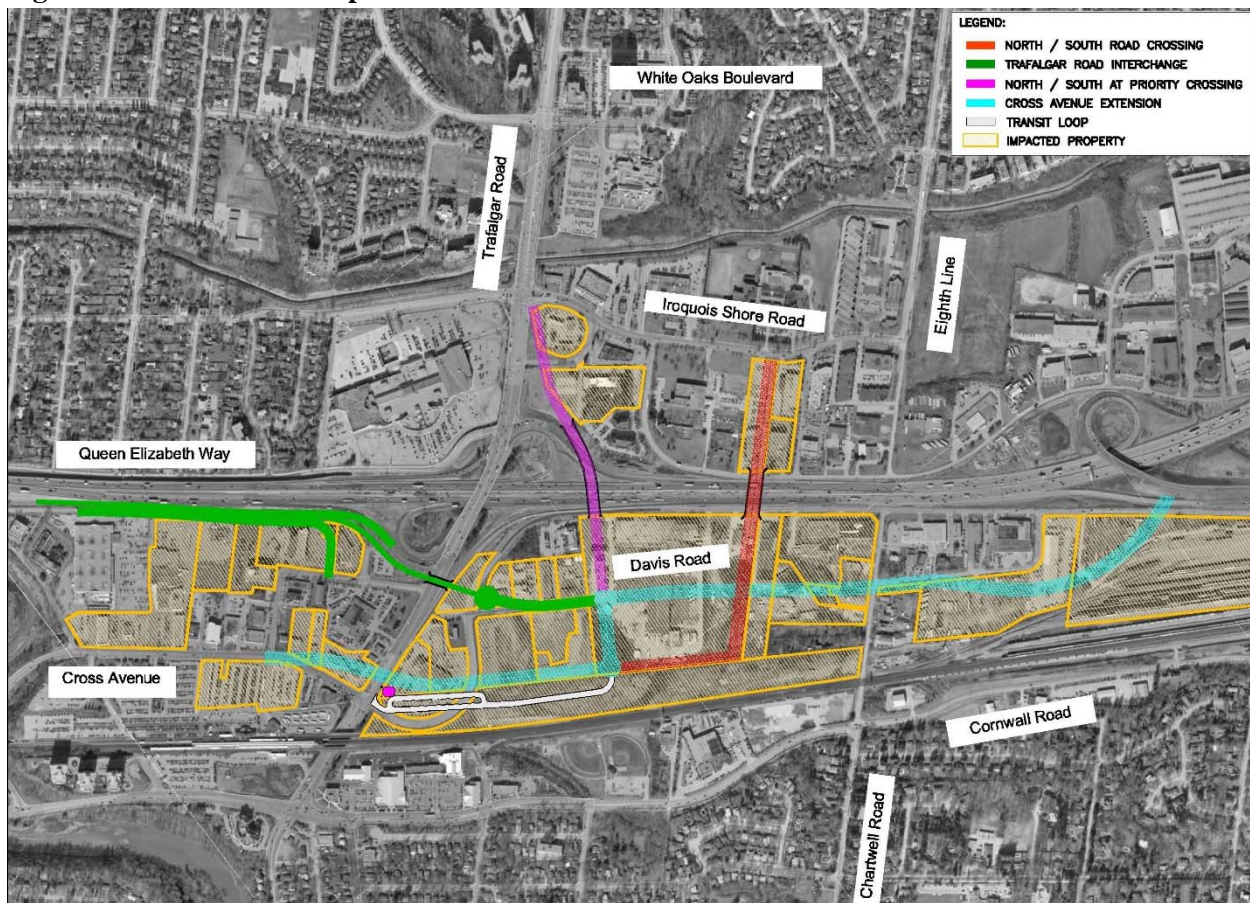
Through the development of alternatives for the above improvements, it was found that Improvements A, B, C and D were closely inter-related. Alternatives for these four improvements were developed in combination through consultation with the public and technical agency stakeholders. Information on the identification of the alternatives for the individual improvements is presented in **Appendix E**. Of the various alternatives, four combination options were formulated.

Option #1, shown in **Figure 4-1**, features two new crossings of the QEW (one crossing for transit and active transportation only, and one crossing for general purpose traffic). The active transportation / priority crossing intersects Trafalgar Road at Iroquois Shore Road and creates a five-legged intersection at

this location. At the south end, the active transportation / priority crossing intersects the Cross Avenue extension. The second QEW crossing connects Iroquois Shore Road with the Cross Avenue extension at a mid-block location between the active transportation / priority crossing and Eighth Line-Chartwell Road.

The eastbound QEW off-ramp to Trafalgar Road is realigned to accommodate an additional direct underpass of Trafalgar Road into Midtown Oakville which meets the Cross Avenue extension at the existing South Service Road / Davis Road intersection. The existing signalized intersection of the eastbound QEW off-ramp at Trafalgar Road is maintained for vehicles destined northbound or southbound on Trafalgar Road. The Cross Avenue extension provides opportunities to accommodate development on both sides of the road.

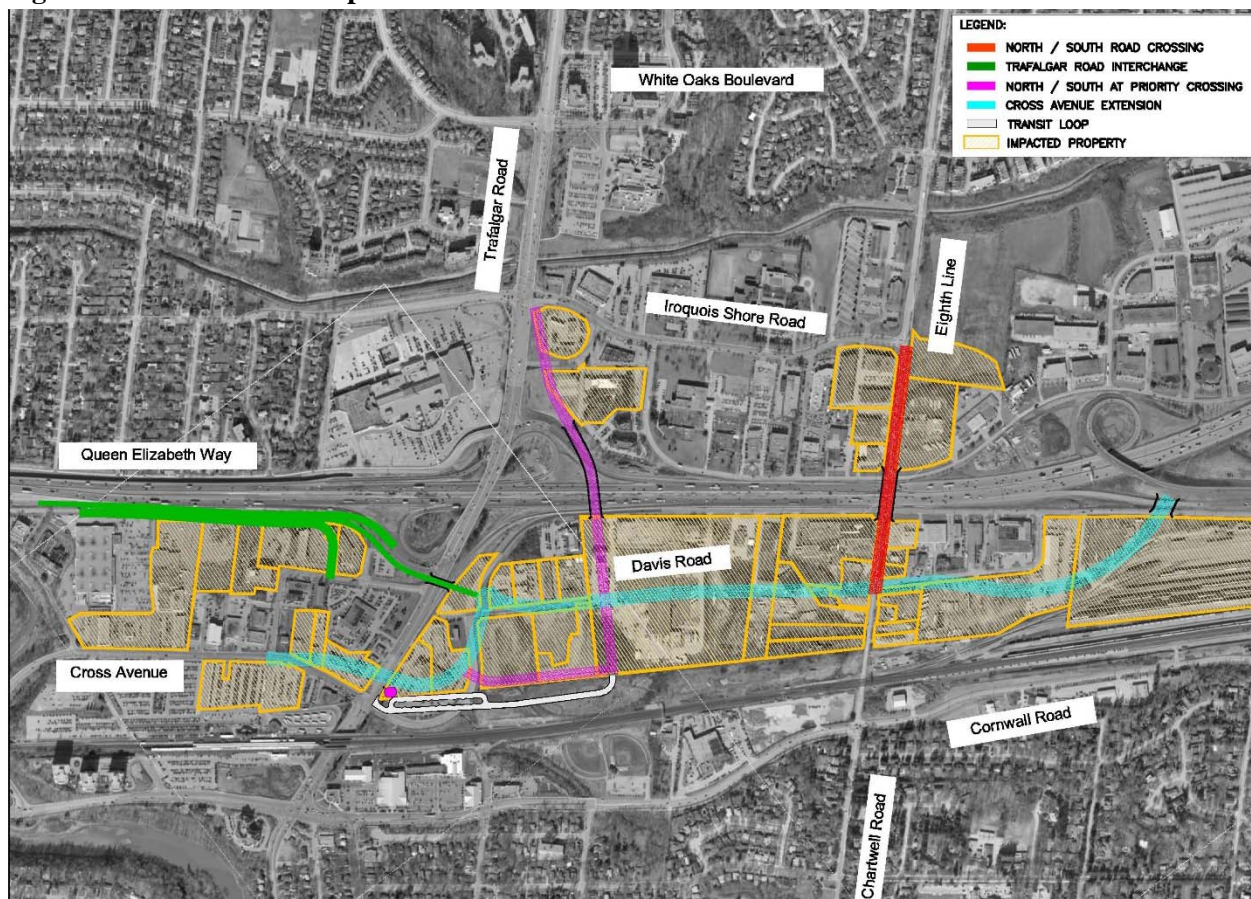
Figure 4-1: Combination Option #1



Option #2, shown in **Figure 4-2**, features two new crossings of the QEW (one crossing for transit and active transportation only, and one crossing for general purpose traffic). The active transportation / priority crossing intersects Trafalgar Road at Iroquois Shore Road and creates a five-legged intersection at this location. At the south end, the active transportation / priority crossing intersects the Cross Avenue extension. The second QEW crossing connects Iroquois Shore Road to Cross Avenue extension along the Eighth Line-Chartwell Road alignment.

The eastbound QEW off-ramp to Trafalgar Road is realigned to accommodate an additional direct underpass of Trafalgar Road into Midtown Oakville which meets the Cross Avenue extension at existing South Service Road / Davis Road intersection. The existing signalized intersection of the eastbound QEW off-ramp at Trafalgar Road is maintained for vehicles destined northbound or southbound on Trafalgar Road. The Cross Avenue extension provides opportunities to accommodate development on both sides of the road.

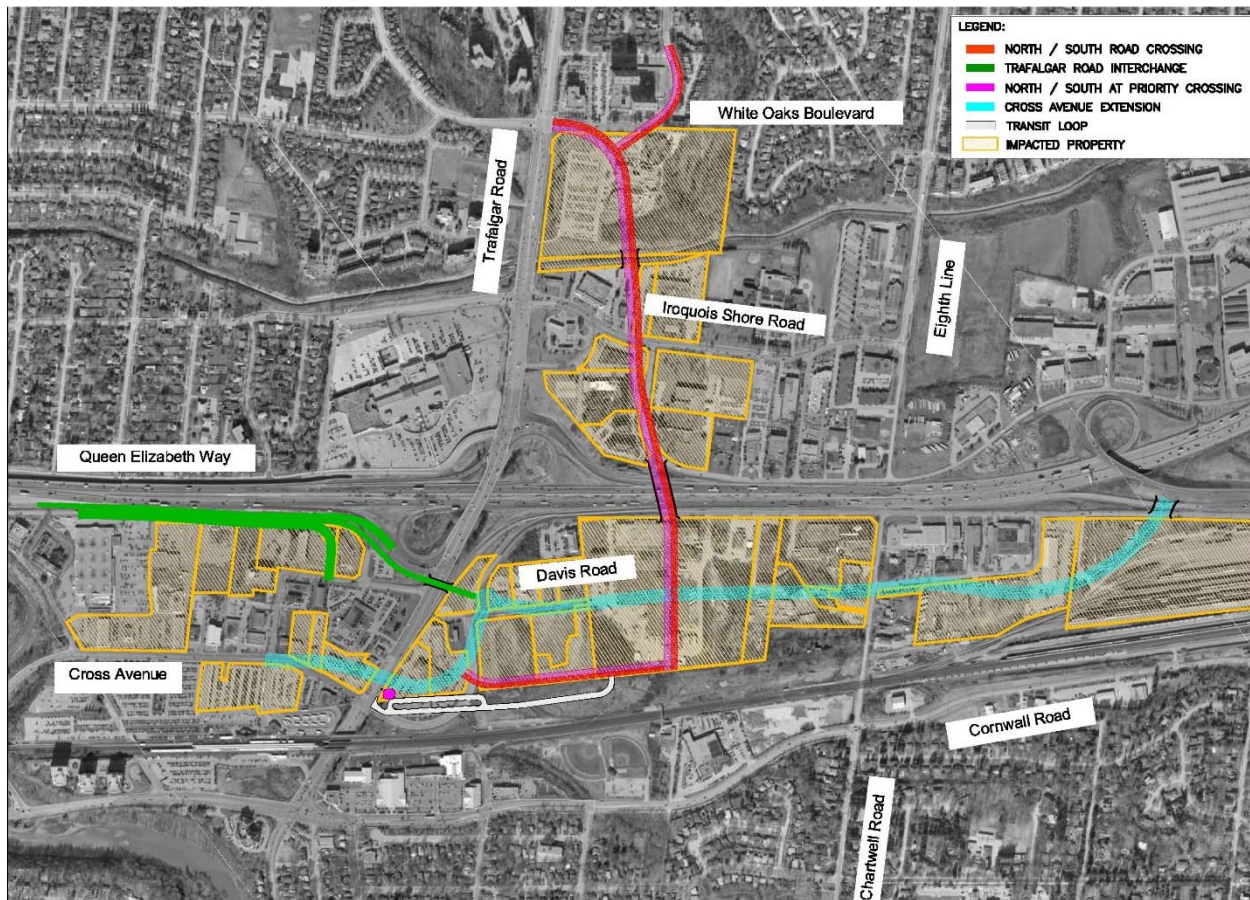
Figure 4-2: Combination Option #2



Option #3, shown in **Figure 4-3**, features one new crossing of the QEW, which accommodates all modes (transit, active transportation, and other vehicles). At the north end, the crossing intersects Trafalgar Road at White Oaks Boulevard. At the south end, the crossing intersects the Cross Avenue extension. This crossing provides additional opportunities to accommodate development between Iroquois Shore Road and White Oaks Boulevard.

The eastbound QEW off-ramp to Trafalgar Road is realigned to accommodate an additional direct underpass of Trafalgar Road into Midtown Oakville which meets the Cross Avenue extension at the existing South Service Road / Davis Road intersection. The existing signalized intersection of the eastbound QEW off-ramp at Trafalgar Road is maintained for vehicles destined northbound or southbound on Trafalgar Road. The Cross Avenue extension provides opportunities to accommodate development on both sides of the road.

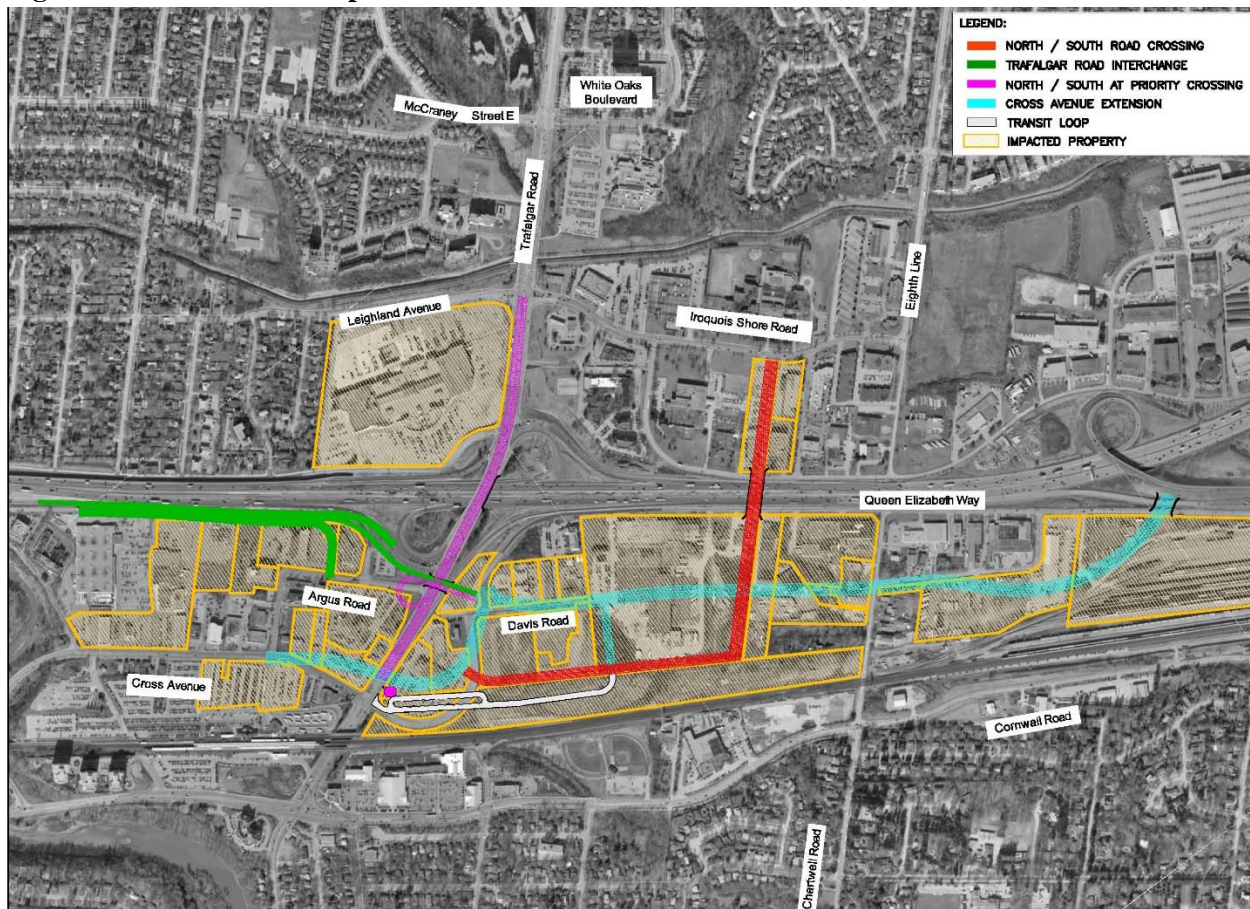
Figure 4-3: Combination Option #3



Option #4, shown in **Figure 4-4**, featured one new crossing of the QEW that accommodates general purpose traffic only (including active transportation). The crossing connects Iroquois Shore Road with Cross Avenue, and is situated at a mid-block location between Trafalgar Road and Eighth Line-Chartwell Road. To accommodate transit vehicles on Trafalgar Road various road improvements are introduced to increase capacity on the corridor.

The eastbound QEW off-ramp to Trafalgar Road is realigned to accommodate an additional direct underpass of Trafalgar Road into Midtown Oakville which meets the Cross Avenue extension at the existing South Service Road / Davis Road intersection. The existing signalized intersection of the eastbound QEW off-ramp at Trafalgar Road is maintained for vehicles destined northbound or southbound on Trafalgar Road. The Cross Avenue extension provides opportunities to accommodate development on both sides of the road.

Figure 4-4: Combination Option #4



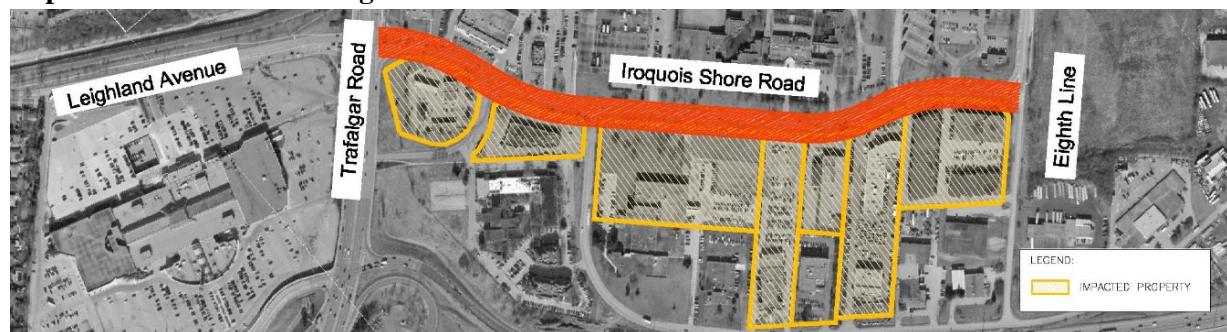
4.3. Iroquois Shore Road Widening Options (Improvement E)

Improvement E consisted of three alternatives to widen the existing road to accommodate a 4-lane cross-section plus a centre turning lane, as well as bike lanes and sidewalks on both sides of the road.

Improvement E1 involved widening Iroquois Shore Road to the south, while Improvement E2 involved widening along the centreline, and Improvement E3 involved widening to the north. These alternatives are shown in **Figure 4-5**.

Figure 4-5: Improvement E Iroquois Shore Road Widening

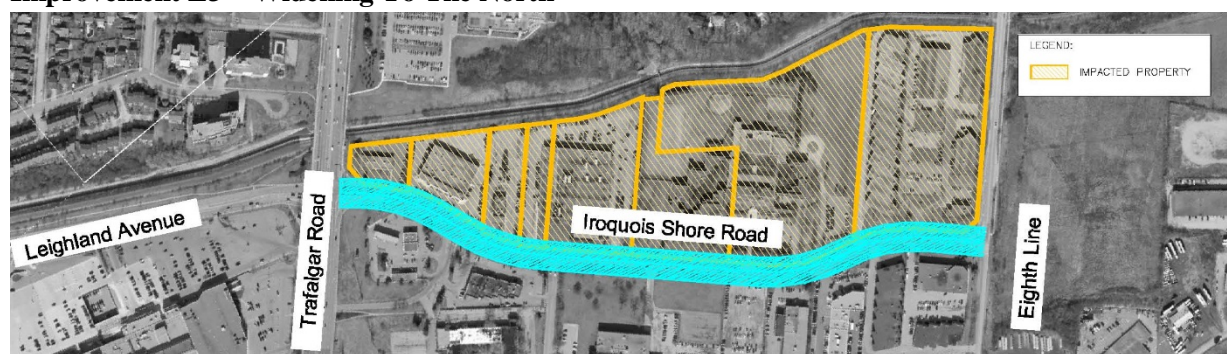
Improvement E1 – Widening To The South



Improvement E2 – Widening Along The Centreline



Improvement E3 – Widening To The North



4.4. Royal Windsor Drive Interchange Options (Improvement F)

Improvement F consisted of four alternatives to improve access to/from the QEW at Royal Windsor Drive.

Improvement F1 provides direct access to Royal Windsor Drive from eastbound and westbound QEW. It also provides direct access from Midtown Oakville to eastbound QEW, but does not provide direct access to Midtown Oakville from eastbound QEW.

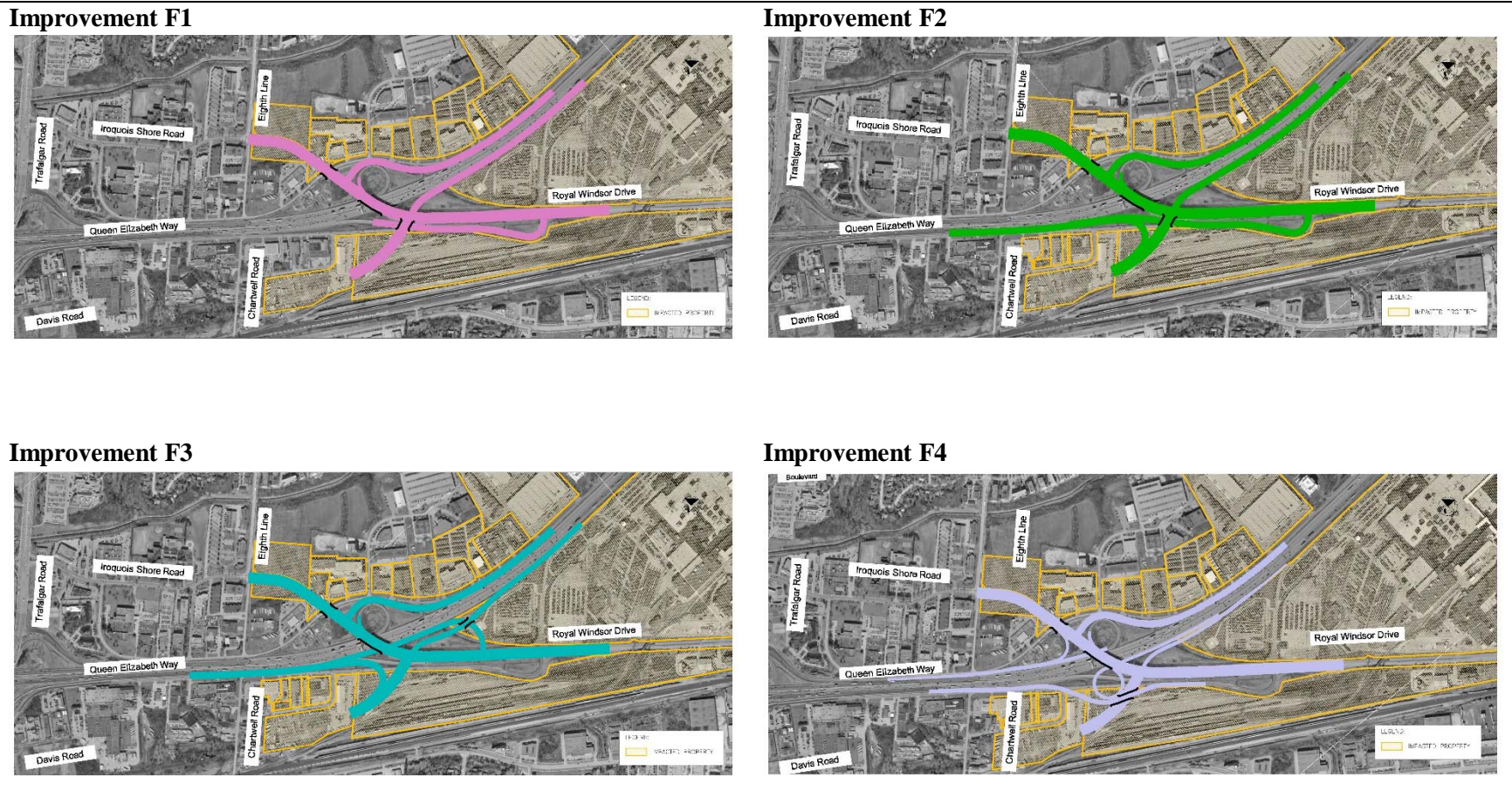
Improvement F2 provides direct access to Royal Windsor Drive from eastbound and westbound QEW. It also provides direct access from Midtown Oakville to eastbound QEW, as well as direct access to Midtown Oakville from eastbound QEW via a buttonhook ramp.

Improvement F3 provides direct access to Royal Windsor Drive from eastbound and westbound QEW. It also provides direct access from Midtown Oakville to eastbound QEW, as well as direct access to Midtown Oakville from eastbound QEW via a buttonhook ramp. Improvements F2 and F3 are essentially identical, with the exception that the eastbound QEW off-ramp intersects Royal Windsor Drive on the south side in Improvement F2 but on the north side in Improvement F3.

Improvement F4 accommodates all movements to and from the QEW and Royal Windsor Drive. It also provides direct access from Midtown Oakville to eastbound QEW, but does not provide direct access to Midtown Oakville from eastbound QEW.

These improvements are shown in **Figure 4-6**.

Figure 4-6: Improvement F Royal Windsor Drive Interchange



4.5. East Active Transportation Crossing Options (Improvement G)

Improvement G consisted of four alternatives to enhance the QEW crossing experience of pedestrians and cyclists on the east side of Trafalgar Road.

Improvement G1 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that enables these users to cross safely for the length of the crossing. It extends to a point just north of the QEW, requiring pedestrians and cyclists to traverse across conflict situations with drivers at the westbound QEW on-ramp and the westbound QEW off-ramp, similar to existing pedestrian facilities. It also provides a direct connection to the Oakville GO station.

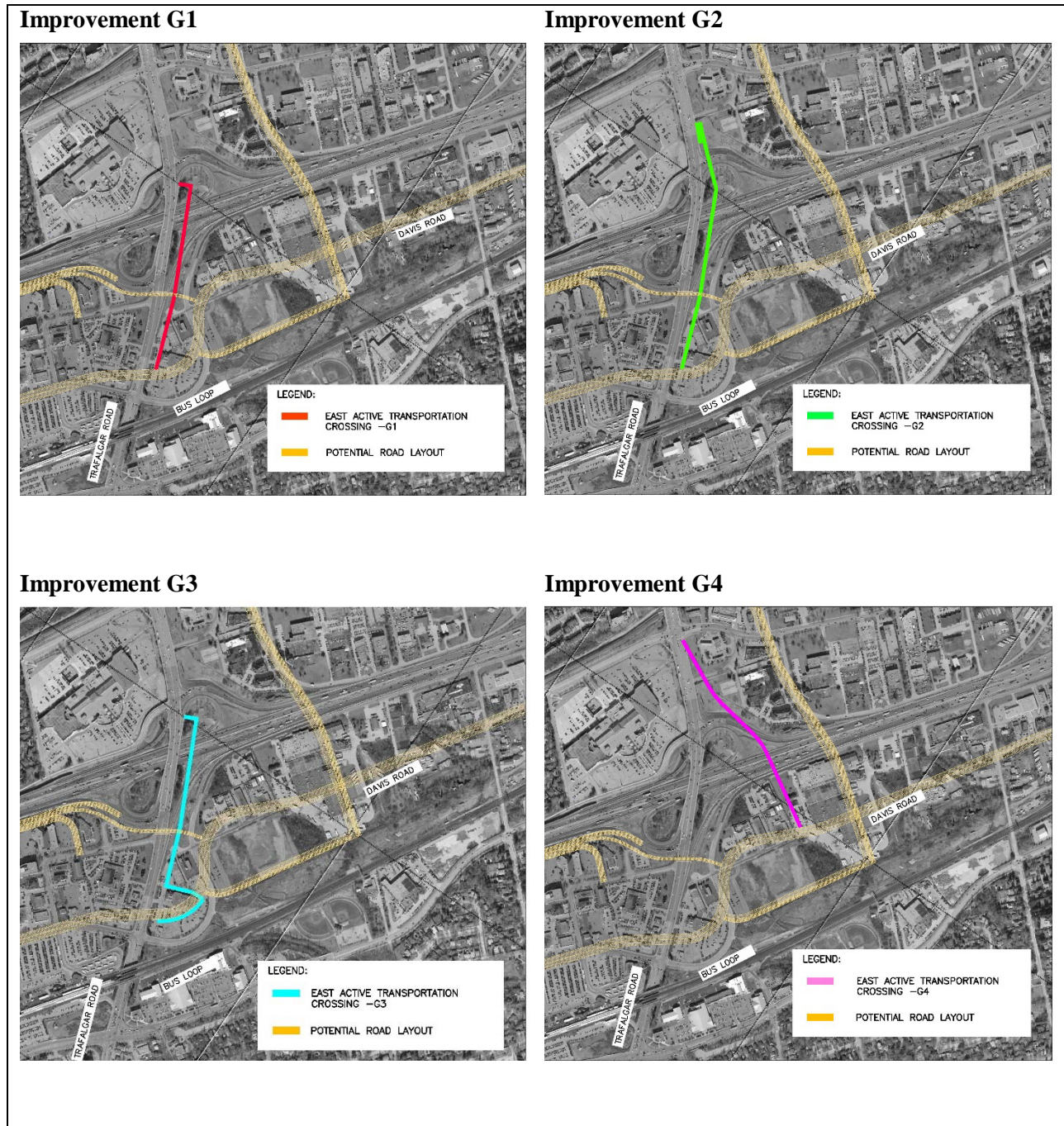
Improvement G2 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that enables these users to cross safely for the entire length of the crossing. It is continuous over all interchange ramps, eliminating potential conflict situations with drivers at the QEW on and off-ramps. It also provides a direct connection to the Oakville GO station.

Improvement G3 is very similar to Improvement G1. It features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that enables these users to cross safely for the length of the crossing. It extends just north of the QEW, requiring pedestrians and cyclists to still deal with conflict situations with drivers at the westbound QEW on-ramp, and the westbound QEW off-ramp. It also provides a direct connection to the Oakville GO station. At the southern end, it gives pedestrians and cyclists a choice to continue on to Trafalgar Road, or to venture further east to Cross Avenue extension and the Oakville GO station.

Improvement G4 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that enables these users to cross safely for the entire length of the crossing. It extends from the intersection of Trafalgar Road at Iroquois Shore Road and is continuous over all interchange ramps, eliminating potential conflict situations with drivers at the QEW on and off-ramps. Unlike Improvements G1, G2 and G3, it deviates further east of Trafalgar Road on the approach to Cross Avenue extension, and does not provide a direct connection to the Oakville GO station.

These improvements are shown in **Figure 4-7**.

Figure 4-7: Improvement G East Active Transportation Crossing



4.6. West Active Transportation Crossing Options (Improvement H)

Improvement H consisted of four alternatives to enhance the QEW crossing experience of pedestrians and cyclists on the west side of Trafalgar Road. All of these crossings were located more than 300 m west of Trafalgar Road due to the location of the existing pier. This active transportation crossing provides a connection from the southwest corner of Oakville Place and the adjacent residential neighbourhood to Midtown Oakville and the Oakville GO station as well as other areas south of the QEW and west of Trafalgar Road.

Improvement H1 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that connects Pearson Park with Argus Road / South Service Road.

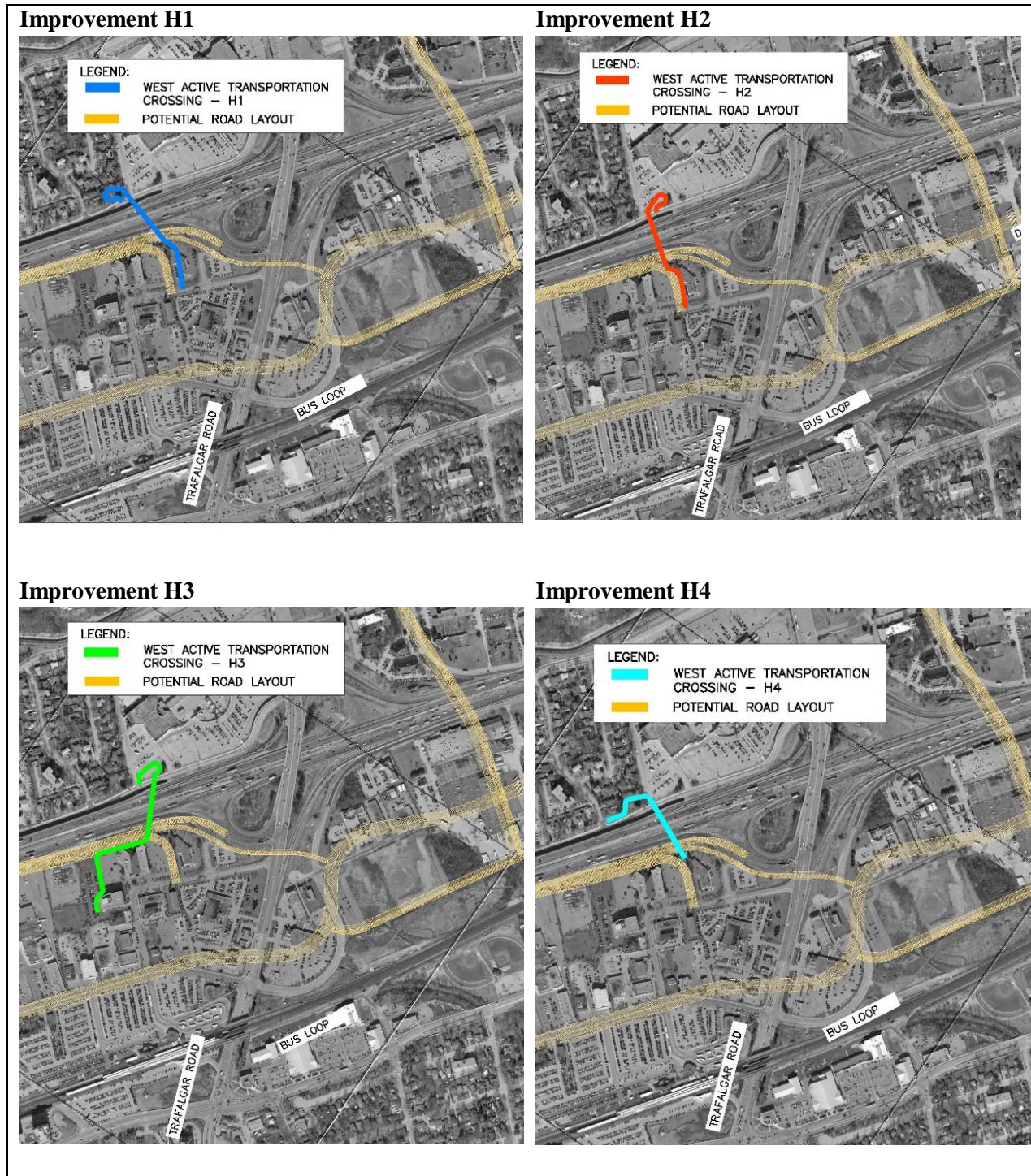
Improvement H2 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that connects Oakville Place with development lands west of Argus Road / South Service Road.

Improvement H3 features a QEW crossing within a separated right-of-way on the west side of Trafalgar Road for pedestrians and cyclists only that connects Oakville Place with Argus Road / South Service Road.

Improvement H4 features a QEW crossing within a separated right-of-way for pedestrians and cyclists only that connects Pearson Drive with Argus Road / South Service Road.

These improvements are shown in **Figure 4-8**.

Figure 4-8: Improvement H West Active Transportation Crossing



5. Evaluation of Alternative Network Solutions

5.1. Evaluation Criteria

Relevant evaluation criteria were developed to assess and compare the alternatives, and guide the selection of the preferred transportation solution. These criteria, including associated factors and measures, are presented in **Table 5-1**.

Table 5-1: Evaluation Criteria

Criteria	Factor	Measure
Natural Environment	Ecological Landscapes	<ul style="list-style-type: none"> • Landscape name and type (patch, corridor, matrix) • Landscape significance (high, moderate, low)
	Terrestrial Communities/Ecosystems	<ul style="list-style-type: none"> • Community name and type (ELC) • Area affected by new road right-of-way (ha) • Community significance (high, moderate, low)
	Aquatic Communities/Ecosystems	<ul style="list-style-type: none"> • Community name • Area affected by new road right-of-way (ha) • Community sensitivity (high, moderate, low, none)
	Species at Risk	<ul style="list-style-type: none"> • Species name • Number of species at risk affected by new road right-of-way (special concern, threatened, endangered)
	Designated Natural Areas	<ul style="list-style-type: none"> • Area name and type (ANSI, ESA, PSW, Significant Woodland, etc.) • Area affected by new road right-of-way (ha)
	Groundwater	<ul style="list-style-type: none"> • Groundwater recharge and discharge impacts / opportunities
	Stormwater	<ul style="list-style-type: none"> • Watershed drainage impacts / opportunities
Land Use / Social Environment	Land Use Planning Policies, Plans, Goals, Objectives	<ul style="list-style-type: none"> • Federal / provincial land use planning policies / goals / objectives • Municipal land use planning policies / goals / objectives
	Land Use / Community	<ul style="list-style-type: none"> • Residential (urban and rural) • Commercial / industrial • Community facilities / institutions • Impacts to existing uses • Quality of life
	Noise	<ul style="list-style-type: none"> • Receptors affected by transportation noise
	Air	<ul style="list-style-type: none"> • Air quality • Greenhouse gas emissions
	City Building	<ul style="list-style-type: none"> • Opportunities to fulfill development objectives

Criteria	Factor	Measure
Cultural Heritage Environment	Built Heritage and Cultural Heritage Landscapes	<ul style="list-style-type: none"> Buildings (i.e., standing sites of architectural or heritage significance, Ontario heritage properties, heritage bridges, cemeteries) and cultural heritage landscapes (i.e., areas of historic 19th century settlement)
	Archaeology	<ul style="list-style-type: none"> Archaeological sites or resources
Area Economy	Development Parcels	<ul style="list-style-type: none"> Creation of new development parcels
	Development Access	<ul style="list-style-type: none"> Access to development within Midtown Oakville Mobility across QEW
	Delay and Cost of Travel	<ul style="list-style-type: none"> Reduce delays and cost of travel in and through Midtown Oakville
	Goods Movement	<ul style="list-style-type: none"> Reduce delays to truck traffic
Transportation	Traffic Level of Service / Operations (Municipal)	<ul style="list-style-type: none"> Delay Reserve capacity Queuing Directness of road connections Emergency service access / network redundancy
	Traffic Level of Service / Operations (MTO)	<ul style="list-style-type: none"> Delay Reserve capacity Queuing Directness of road connections Emergency service access / network redundancy
	Accommodation of Cyclists and Pedestrians	<ul style="list-style-type: none"> Directness and number of AT routes Opportunities for accessible barrier crossings
	Transit	<ul style="list-style-type: none"> Transit delay Transit directness of routes Transit station catchment and operation
	Safety	<ul style="list-style-type: none"> Number of conflict points Human factors concerns (driver workload, positive guidance, accommodation of signage)
Cost / Constructability	Capital Cost	<ul style="list-style-type: none"> Cost of network infrastructure
	Contaminated Property	<ul style="list-style-type: none"> Identification and management of landfills, hazardous waste sites, brownfield areas, etc.
	Utilities	<ul style="list-style-type: none"> Impacts to utilities – Bell, Cogeco, Rogers, Union Gas, Oakville Hydro, municipal services, etc.
	Property Acquisition	<ul style="list-style-type: none"> Impacts to existing properties Property requirements
	Staging	<ul style="list-style-type: none"> Staging requirements
	Environmental Mitigation	<ul style="list-style-type: none"> Mitigation requirements for Creek, diversion channel, etc.

5.2. Evaluation of Alternative Network Solutions

A detailed assessment of the alternative network solutions (see **Section 4.0**) was completed based on the evaluation criteria. This section highlights only notable differences among alternatives. The complete evaluation matrix is provided in **Appendix F**.

5.2.1. Combination Options

Through the evaluation process, **Combination Option #3** (see **Figure 4-3**) was selected as the preferred option. Option #3 best addresses the Problem / Opportunity Statement to develop Midtown Oakville into a “complete urban community”, improve the existing transportation network to enhance growth and economic development opportunities (including creating new development parcels north of Iroquois Shore Road on the town hall lands), and provide a more balanced, accessible and sustainable transportation network for all modes of travel (walking, cycling, transit service and vehicles). By combining the North-South QEW Road Crossing and the North-South QEW Active Transportation / Priority Crossing, capital costs for this combination option are more efficiently utilized.

A brief discussion of the evaluation results for the three combination options that were not carried forward are summarized below.

Option #1 (see **Figure 4-1**) – This option was not preferred for the following reasons:

- Five-legged intersection at Trafalgar Road / Iroquois Shore Road / North-South Priority Crossing introduces traffic operations and safety issues at this location.
- Poor traffic operations are expected at the intersections of Trafalgar Road / Iroquois Shore Road / North-South Priority Crossing and Trafalgar Road / Cross Avenue extension.
- Provides only moderate improvements for transit operations.
- Does not create new development parcels north of Iroquois Shore Road.
- High capital costs.

Option #2 (see **Figure 4-2**) – This option was not preferred for the following reasons:

- Five-legged intersection at Trafalgar Road / Iroquois Shore Road / North-South Priority Crossing introduces traffic operations and safety issues at this location.
- Poor traffic operations are expected at the intersections of Trafalgar Road / Iroquois Shore Road / North-South Priority Crossing, Trafalgar Road / Cross Avenue extension and Eighth Line / Iroquois Shore Road.
- Provides only moderate improvements for transit operations.
- Does not create new development parcels north of Iroquois Shore Road.
- Impacts a stable neighbourhood (i.e. Falgarwood).
- Impacts the most properties of all four combination options.
- High capital costs.

Option #4 (see **Figure 4-4**) – This option was not preferred for the following reasons:

- Potential for delays along Trafalgar Road are expected due to the need to accommodate transit priority. Associated negative impacts to truck operations. Potential for higher conflicts between modes on Trafalgar Road.
- Poor traffic operations are expected at the intersections of Trafalgar Road / Iroquois Shore Road and Trafalgar Road / Cross Avenue extension.
- Provides only minor improvements for transit operations.
- Does not create new development parcels north of Iroquois Shore Road.

5.2.2. Iroquois Shore Road Widening

Through the evaluation process based on the established criteria, **Improvement E2** – widening Iroquois Shore Road along the centreline – was selected as the preferred alternative. Widening along the centreline will result in less severe property impacts to existing properties on both sides of the road and will not significantly impact the existing land uses and social environment.

A brief discussion of the evaluation results of the other alternatives that were not carried forward are summarized below.

Improvement E1 – This alternative was not preferred for the following reasons:

- Results in greater property impacts to existing properties on the south side of the road.
- Impact land uses / social environment more significantly than Improvement E2.

Improvement E3 – This alternative was not preferred for the following reasons:

- Result in greater property impacts to existing properties on the north side of the road.
- Impact land uses / social environment more significantly than Improvement E2.

5.2.3. Royal Windsor Drive Interchange

Through the evaluation process based on the established criteria, **Improvement F2** was selected as the preferred alternative as it best complied with land use planning goals and objectives given the environmental constraints, capital costs and staging requirements.

The evaluation results for the three Royal Windsor Drive interchange alternatives that were not carried forward are summarized below.

Improvement F1 – This alternative was not preferred for the following reasons:

- Impacts to aquatic communities/ecosystems.
- Higher impacts to drainage.
- Less connectivity and accessibility to / from Midtown Oakville than F2. Less potential to accommodate growth.
- Fewer opportunities for drivers to navigate the area when compared with other improvements.

Improvement F3 – This alternative was not preferred for the following reasons:

- High capital costs than F2 without significant advantages over F2.

Improvement F4 – This alternative was not preferred for the following reasons:

- Potential for weaving issues on QEW.
- Potential for increased conflicts between cyclists/pedestrians and vehicles.
- Higher capital costs than F2.

5.2.4. East Active Transportation Crossing

Improvement G2, which provides for a continuous connection for pedestrians and cyclists across all interchange ramps, was selected as the preferred alternative. This alternative eliminates conflicts between active transportation modes and vehicular traffic at the Trafalgar Road interchange.

The evaluation results for the three alternatives that were not carried forward are summarized below.

Improvement G1 – This alternative was not preferred for the following reasons:

- Pedestrians still need to cross traffic at the westbound QEW off-ramp and on-ramp at Trafalgar Road.

Improvement G3 – This alternative was not preferred for the following reasons:

- Pedestrians still need to cross traffic at the westbound QEW off-ramp and on-ramp at Trafalgar Road.

Improvement G4 – This alternative was not preferred for the following reasons:

- Pedestrians are directed away from Trafalgar Road at the south end, resulting in a longer walking/cycling distance, which reduces the desirability of the crossing for some users.

5.2.5. West Active Transportation Crossing

Improvement H2, which connects Oakville Place to Midtown Oakville, was selected as the preferred alternative. This alternative connects to Argus Road and the proposed multi-use trail adjacent to the new off-ramp under Trafalgar Road into Midtown Oakville. This alternative provides the least skewed crossing of the QEW providing the shortest crossing distance.

The evaluation results for the three alternatives that were not carried forward are summarized below.

Improvement H1 – This alternative was not preferred for the following reasons:

- Less direct route for pedestrians originating from or destined to Oakville Place which is potentially a large pedestrian generator.
- Impacts to trees/parklands in Pearson Park.

Improvement H3 – This alternative was not preferred for the following reasons:

- Less direct route for users originating from or destined to Trafalgar Road or the transit station.

Improvement H4 – This alternative was not preferred for the following reasons:

- Less direct route for pedestrians originating from or destined to Oakville Place.
- Impacts trees/parklands in Pearson Park.

5.3. Preferred Concept

The overall preferred concept, shown in **Figure 5-1**, is comprised of the various preferred elements described in the previous section including:

- A new north-south crossing of QEW with transit lanes and active transportation facilities
- Improvements to the Trafalgar Road QEW interchange
- Cross Avenue extension
- Iroquois Shore Road widening
- Improvements to Royal Windsor Drive QEW interchange and extension of Royal Windsor Drive
- New pedestrian/cycling connections and facilities, including two active transportation crossings of the QEW
- Improvements to transit connections and new transit facilities

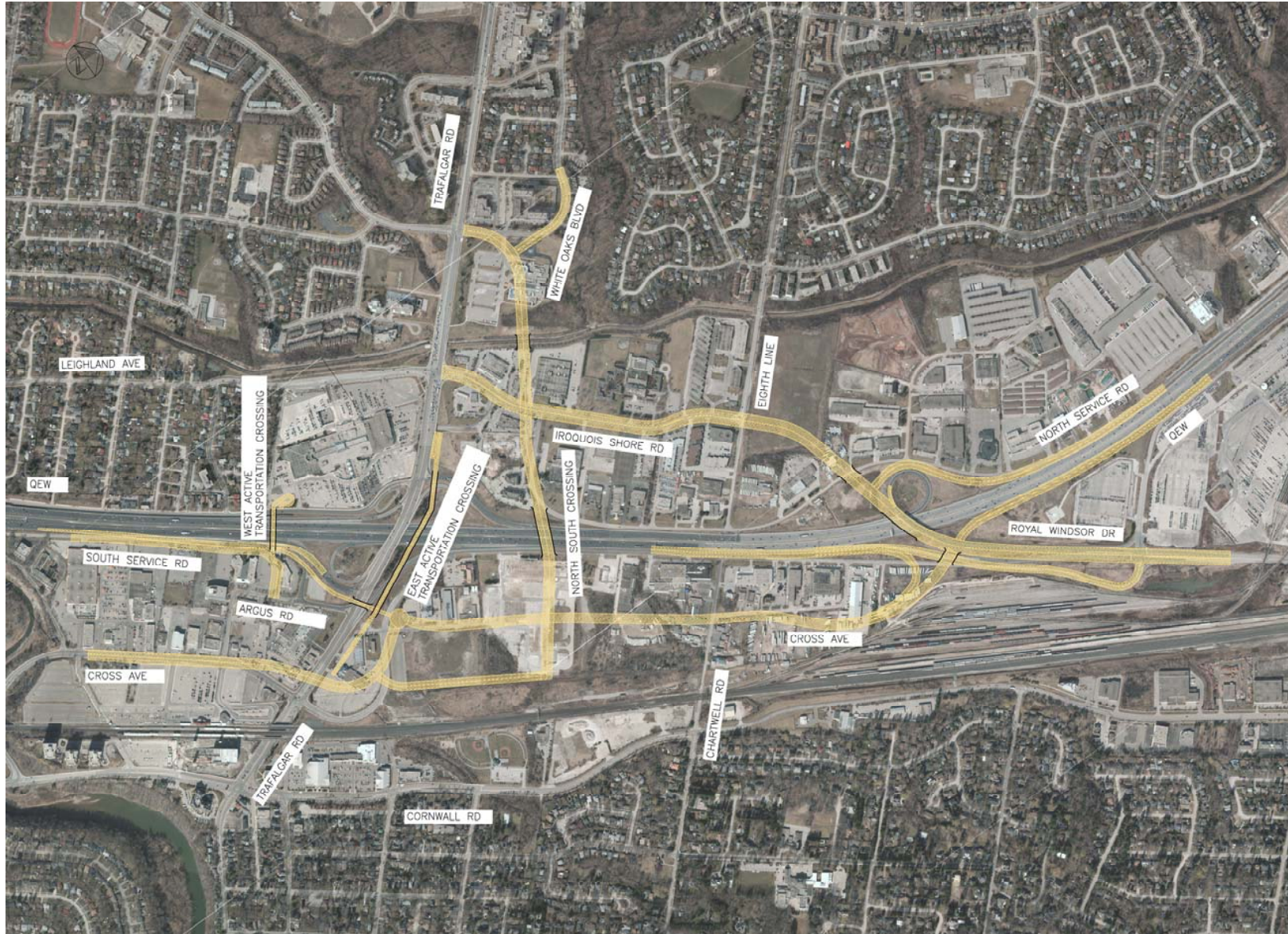
To meet the need for additional north-south crossing opportunities over the QEW, the preferred concept provides a new crossing of the QEW midblock between Trafalgar Road and Eighth Line and an extension of Royal Windsor Drive over the QEW to Eighth Line. The new North-South Crossing is intended to accommodate passenger vehicles, transit on dedicated bus lanes, pedestrians and cyclists.

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

- A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp that crosses under Trafalgar Road. This reduces the impacts of future traffic demand on the existing constrained intersections along Trafalgar Road at the off-ramp as well as at Cross Avenue. The underpass of Trafalgar Road also provides the opportunity for improved active transportation connections into Midtown Oakville.
- A direct route from eastbound QEW to Midtown Oakville is provided via a new off-ramp to Cross Avenue at the Royal Windsor Drive interchange. A direct route from Midtown Oakville to eastbound QEW is provided via a new on-ramp at Royal Windsor Drive opposite Cross Avenue. A new westbound QEW off-ramp at Royal Windsor Drive will provide an alternative route to Midtown Oakville and surrounding areas.

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

Figure 5-1: Preferred Concept Plan



Improved capacity is provided on Iroquois Shore Road by widening of the road to a 4-lane cross-section plus a centre-turning lane, with on-street bike lanes and sidewalks on both sides. Iroquois Shore Road connects with the extension of Royal Windsor Drive providing one continuous corridor.

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

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

5.4. Future Traffic Operations of Preferred Concept

Traffic analysis of the preferred concept was undertaken to refine the design and configuration of the preferred concept. Intersection analysis was undertaken to assess operations and queue storage needs. A microsimulation model was undertaken to assess the impacts of new interchange ramps on the QEW and at the ramp intersections.

Intersection Operations

The preferred concept will operate with improved levels of service compared to the “Do Nothing” scenario (see Section 3.2.2), however, some capacity constraints will persist. The intersections of Trafalgar Road / Cross Avenue and Trafalgar Road / Cornwall Road will both operate at capacity (LOS E) even with the proposed network improvements. It is noted that these intersections all failed (LOS F) in the “Do Nothing” scenario. On the whole, the preferred concept for Midtown Oakville provides much needed capacity to the transportation network.

Freeway Operations

The proposed improvements are not expected to significantly impact the QEW mainline operations with the refinements to the design to better accommodate weaving and merging. The new ramps at Royal Windsor Drive and Trafalgar Road will accommodate the additional travel demand from Midtown Oakville’s planned intensification thereby providing relief to the existing Trafalgar Road interchange.

Figure 5-2: AM Preferred Concept Intersection Operations

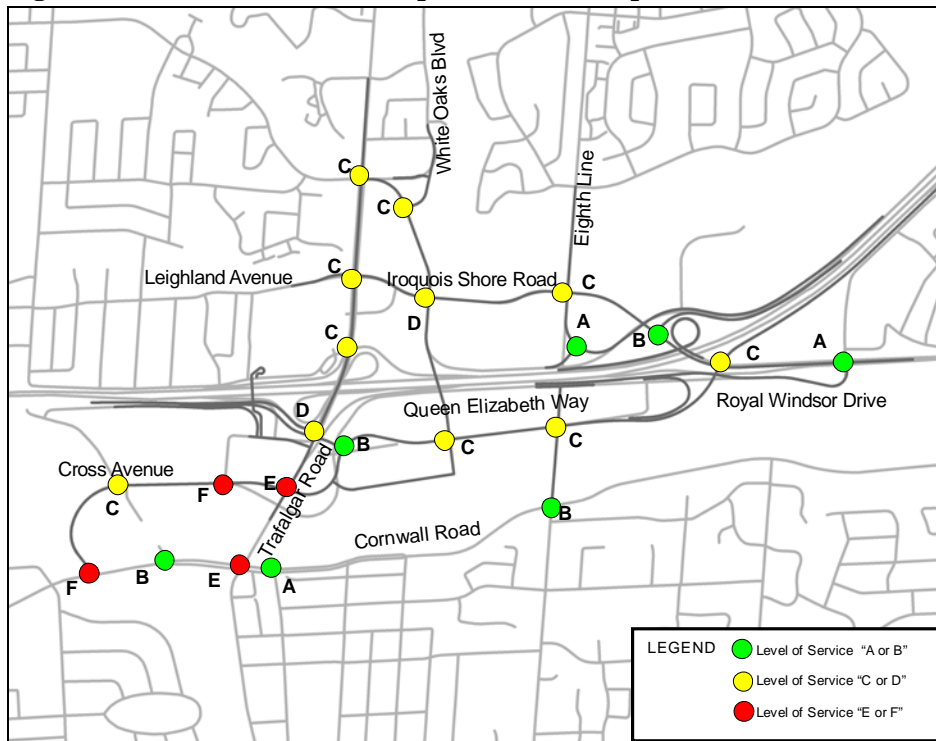
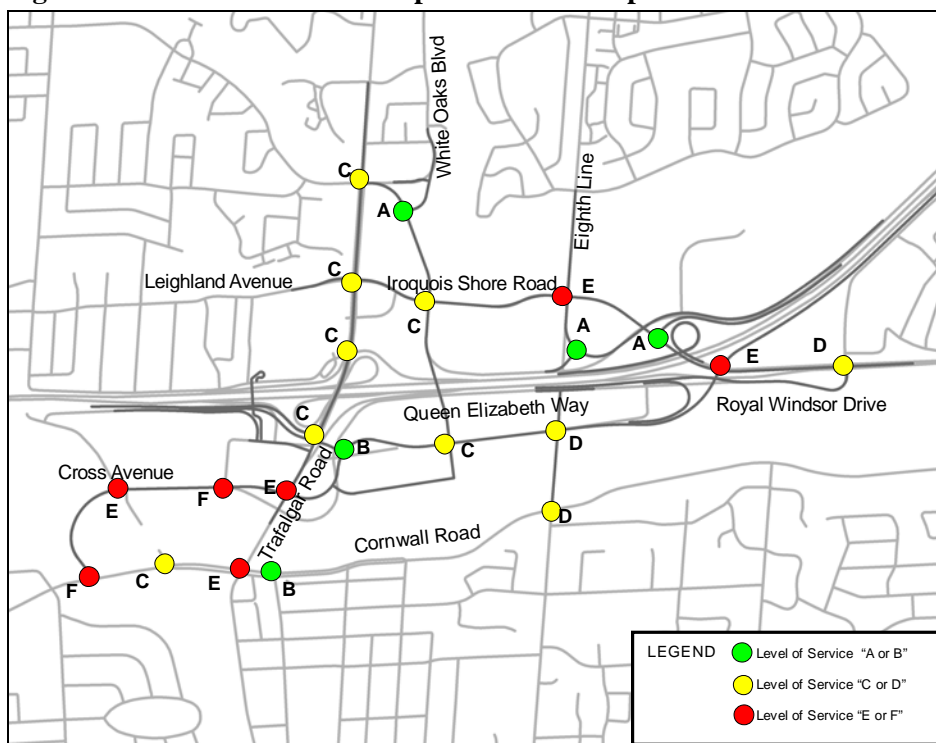


Figure 5-3: PM Preferred Concept Intersection Operations



5.5. Modifications to Preferred Concept

The preliminary design for the preferred concept (see **Section 6**) incorporates features that address traffic operations and a number of concerns brought forth by MTO regarding future operations on QEW mainline.

Through an iterative process using the microsimulation model and consultation with MTO, modifications and refinements related to the design of the provincial facilities in the preferred concept include:

- A full auxiliary lane from the new eastbound QEW on-ramp at Royal Windsor Drive to the off-ramp at Ford Drive.
- Increased acceleration lane where the eastbound QEW off-ramp to Cross Avenue (W-Cross Avenue Ramp) at the Royal Windsor Drive interchange merges with Cross Avenue.
- Widening of the westbound QEW off-ramp (E-NS ramp) at Royal Windsor Drive to provide sufficient sight distance to the bullnose.
- Addition of a channelized right-turn at the new westbound QEW off-ramp (E-NS ramp) at Royal Windsor Drive.
- Increased deceleration length for the eastbound QEW off-ramp to Cross Avenue (W-Cross ramp) at Trafalgar Road interchange.
- Turn lane configuration at the two signalized interchange intersections on Royal Windsor Drive.

Additional refinements to the preferred concept were adopted to accommodate traffic and transit operation needs, which include:

- Widening of Cross Avenue from Trafalgar Road extends westerly to Lyons Lane.
- Widening of Chartwell Road at Cross Avenue.
- Realignment of Leighland Avenue at Trafalgar Road to accommodate the widening of Iroquois Shore Road.
- Replacement of roundabout on Cross Avenue at the QEW off-ramp with a t-intersection that has Cross Avenue as the major road and the QEW off-ramp as the minor road.
- Transit-only access (right-in / right-out) on Cross Avenue providing access to the bus loop and transit station.
- Realignment of North Service Road to Eighth Line.
- Realignment of White Oaks Boulevard to intersect with the North-South Crossing at a location that accommodates a future four-legged intersection and potential for signalization.
- Realignment of North Service Road to accommodate the new westbound QEW off-ramp (E-NS ramp) at Royal Windsor Drive interchange.

The preliminary design of the preferred concept is discussed in detail in **Section 6**.

6. Design Elements of the Preferred Concept

This section describes the engineering features and mitigation measures for the preferred concept identified in **Section 5**. The preferred concept for Midtown Oakville was developed and refined with input from the project team, technical agencies, and various stakeholders, and includes the following:

Improvements to the QEW Trafalgar Road Interchange

- Realignment of the existing eastbound QEW off-ramp
- New eastbound QEW direct off-ramp to Cross Avenue
- New multi-use trail from Argus Road to Cross Avenue under Trafalgar Road
- Realignment of South Service Road
- Realignment of Argus Road

Improvements to the QEW Royal Windsor Drive Interchange

- New westbound QEW off-ramp
- New eastbound QEW on-ramp, including auxiliary lane to Ford Drive off-ramp
- Realignment of eastbound QEW off-ramp
- New eastbound QEW direct off-ramp to Cross Avenue
- Widening and extension of Royal Windsor Drive to to Iroquois Shore Road at Eighth Line
- Realignment of North Service Road
- Realignment of South Service Road

New North-South Crossing across QEW

- Provides pedestrian / cyclist facilities
- Provides dedicated bus lanes
- Provides general purpose lanes
- Accommodates potential widening of the QEW that may be contemplated by MTO

Extension of Cross Avenue

- New connection from Trafalgar Road to Royal Windsor Drive
- Provides pedestrian / cyclist facilities
- Accommodates general purpose lanes
- Accommodates lay-by parking where appropriate

Widening of Iroquois Shore Road

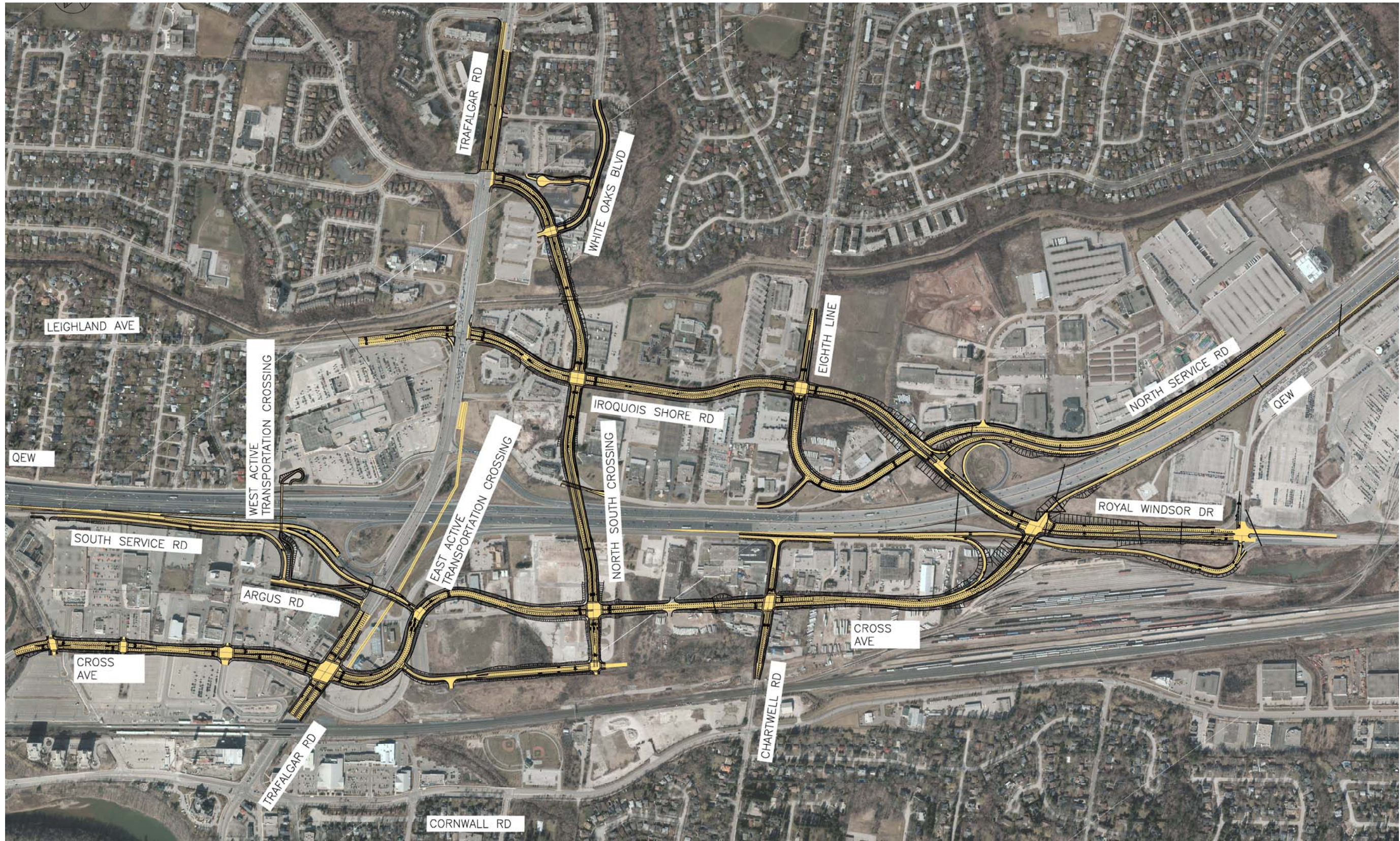
- Provides continuous pedestrian / cyclist facilities on both sides of the road
- Accommodates one additional general purpose lane in each direction plus a median turn lane

Active Transportation Crossings across QEW

- Active transportation crossing of QEW on the east side of Trafalgar Road
- Active transportation crossing of QEW on the west side of Trafalgar Road

Figure 6-1 shows the overall preliminary design of the recommended concept for Midtown Oakville.

Figure 6-1: Preliminary Design of Recommended Concept



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6.1. Road Characteristics and Typical Sections

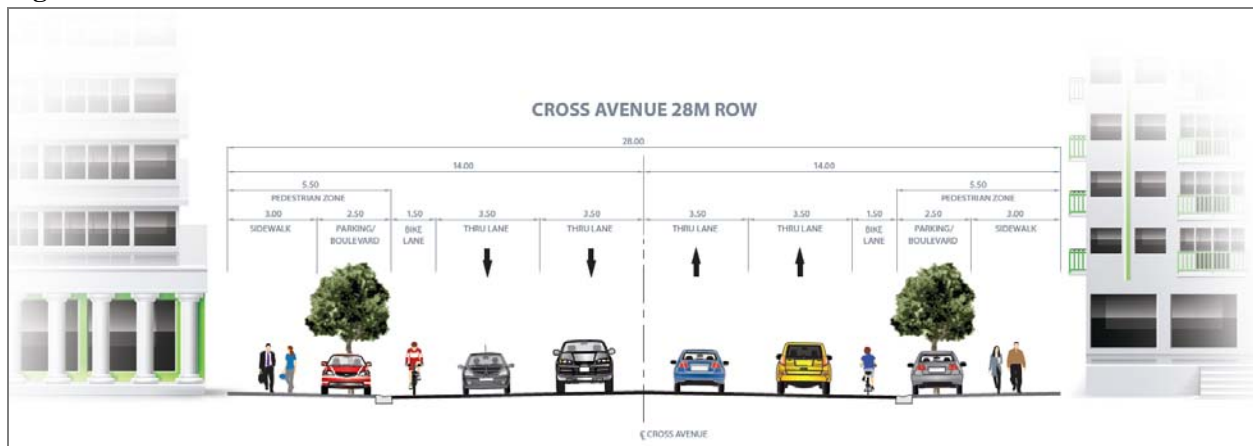
Midtown Oakville is to be transformed into a complete mixed use community with offices, condominiums, civic spaces, parks and plazas. Roadways are envisaged as main streets or commercial/employment corridors with accommodation for pedestrians, cyclists, public transit, and general purpose traffic. A description of the role and function of the roadways in Midtown Oakville are provided below.

6.1.1. Cross Avenue

Cross Avenue is proposed to be the “main street” for Midtown Oakville. It will be a multi-modal corridor serving pedestrians, cyclists, public transit, and general purpose traffic. West of Trafalgar Road, Cross Avenue will have more of a pedestrian-focused streetscape. East of Trafalgar Road, the extension of Cross Avenue will primarily serve commercial/employment lands.

Within the proposed right-of-way of 28 m, Cross Avenue will have four 3.5 m general purpose travel lanes, two 1.5 m bike lanes, and 5.5 m boulevards as shown in **Figure 6-2**. The 5.5 m boulevards are intended to include 3.0 m sidewalks and 2.5 m lay-by parking. In areas without lay-by parking, the full 5.5 m boulevard is designated as a pedestrian zone.

Figure 6-2: Cross Avenue Cross-section



6.1.2. North-South Crossing

The North-South Crossing is proposed to be a multi-modal corridor serving transit, cyclists, pedestrians, and general purpose traffic. Reserved bus lanes are proposed from Trafalgar Road to the proposed bus loop located on the east side of Trafalgar Road. North of Iroquois Shore Road, the North-South Crossing will have a 28 m right-of-way. South of Iroquois Shore Road, the North-South Crossing will need a 32 m right-of-way to accommodate median turn lanes.

Within the proposed 28 m right-of-way, the North-South Crossing will have two 3.5 m general purpose lanes, two 3.75 m transit lanes, two 1.5 m bike lanes, two 2.5 m boulevards, and a 3.0 m multi-use trail on one side, and a 1.5 m sidewalk on the other side as shown in **Figure 6-3**. Where a 32 m right-of-way is required, a 5.0 m median will be provided which is intended to accommodate exclusive turn lanes at the intersection with Cross Avenue as shown in **Figure 6-4**.

Figure 6-3: North-South Crossing Cross-section (North of Iroquois Shore Road)

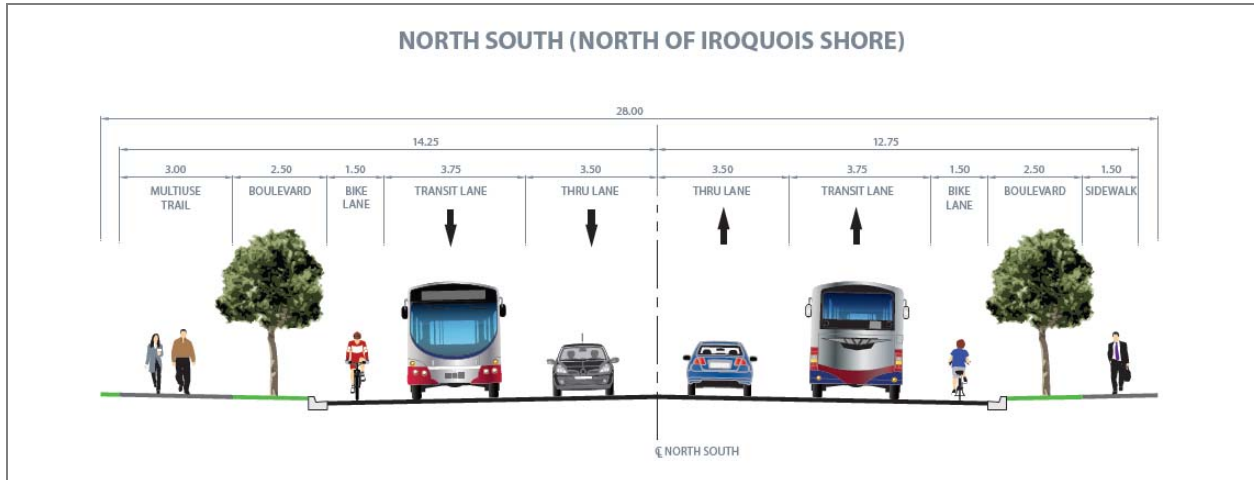
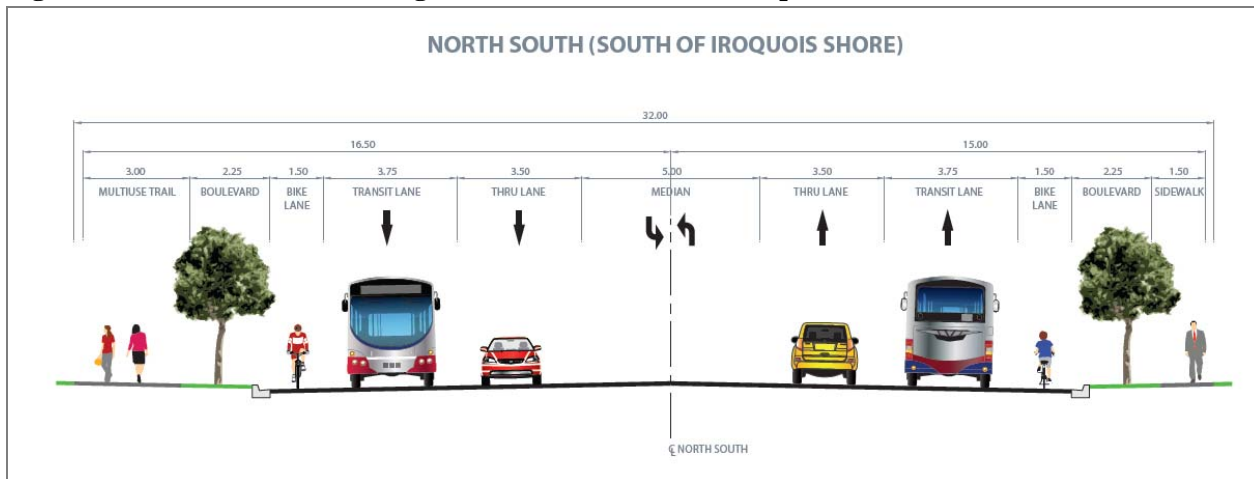


Figure 6-4: North-South Crossing Cross-section (South of Iroquois Shore Road)



6.1.3. Royal Windsor Drive

Royal Windsor Drive is a multi-modal corridor serving transit, cyclists, pedestrians, and general purpose traffic. The extension to Iroquois Shore Road provides new opportunities for all users. North of QEW, Royal Windsor Drive will have a 32 m right-of-way. South of QEW, Royal Windsor Drive will need a 36 m right-of-way to accommodate median turn lanes.

Within the proposed 32 m right-of-way, Royal Windsor Drive will have four 3.5 m general purpose lanes, two 3.0 m boulevards, and a 3.0 m bike trail and 2.0 m multi-use trail on one side as shown in **Figure 6-5**. Where a 36 m right-of-way is required, Royal Windsor Drive will have four 3.5 m general purpose lanes, 9.0 median, with a right turn lane on one side, and a 2.5 m boulevard, a 3.0 m bike trail and a 2.0 m multi-use trail on the other side as shown in **Figure 6-6**.

Figure 6-5: Royal Windsor Drive Cross-section (North of QEW)

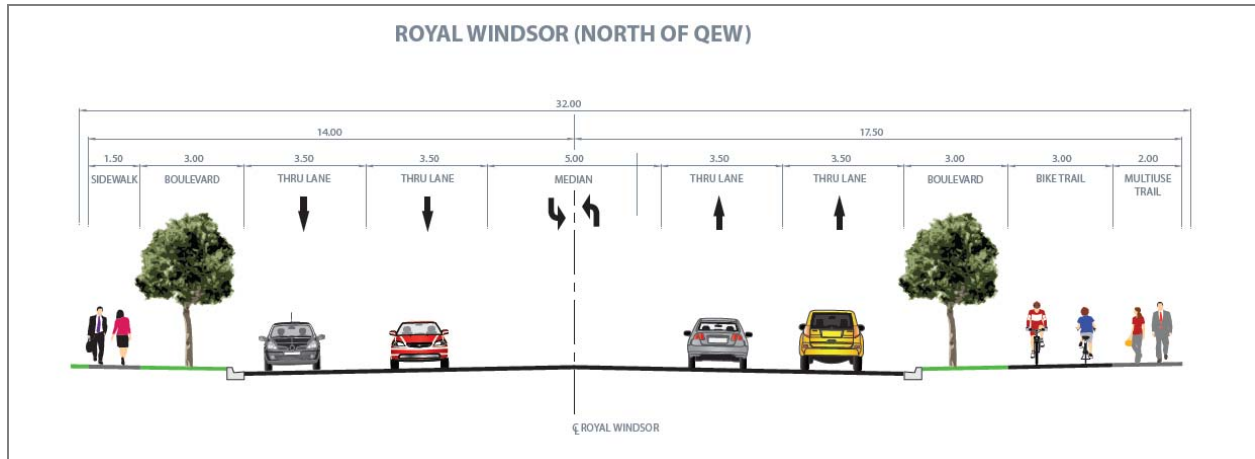
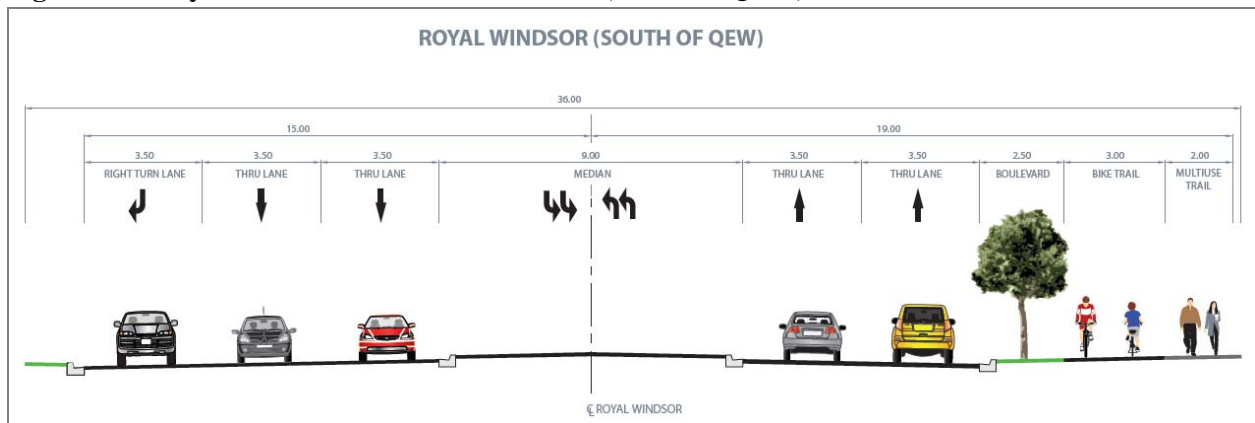


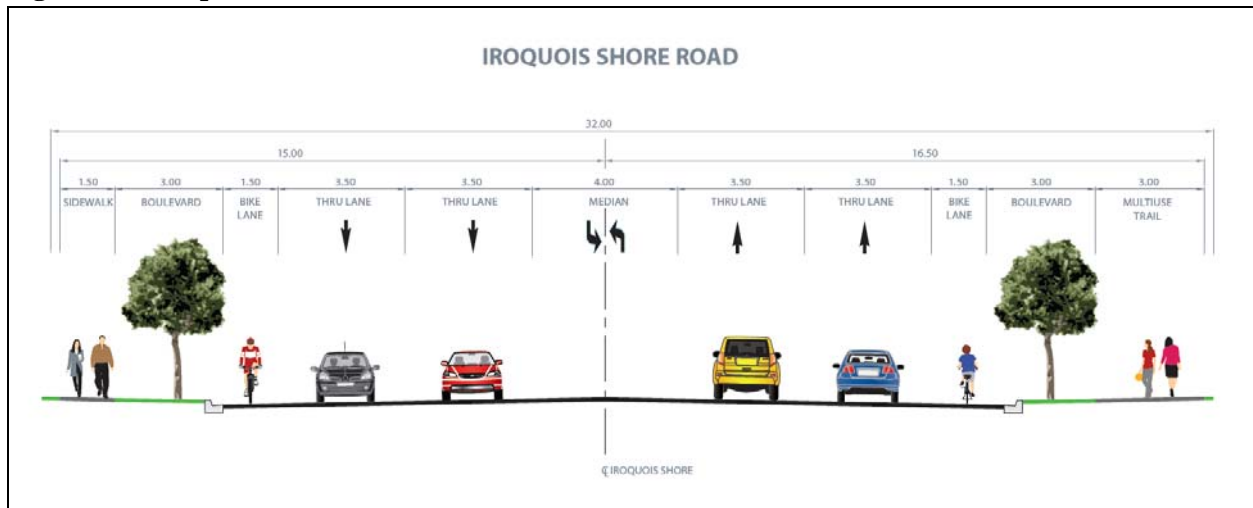
Figure 6-6: Royal Windsor Drive Cross-section (South of QEW)



6.1.4. Iroquois Shore Road

Iroquois Shore Road is a multi-modal corridor serving transit, cyclists, pedestrians, and general purpose traffic. The widening of Iroquois Shore Road will provide benefits to all users. Iroquois Shore Road will have a 32 m right-of-way, which will accommodate four 3.5 m general purpose lanes, two 1.5 m bike lanes, two 3.0 m boulevards, one 3.0 m multi-use trail, and one 1.5 m sidewalk as shown in **Figure 6-7**.

Figure 6-7: Iroquois Shore Road Cross-section



6.1.5. East Active Transportation Crossing

An active transportation crossing of the QEW is provided on the east side of Trafalgar Road which enables cyclists and pedestrians to cross the QEW and all associated ramps within a separated right-of-way. This crossing offers users a direct connection between Oakville Place Drive and the Oakville GO station along the east side of Trafalgar Road. The closeness of the crossing to Trafalgar Road makes it an ideal alternative for those wishing to walk or cycle northbound or southbound along Trafalgar Road which presents opportunities for conflicts between vehicles and cyclists and pedestrians. Due to the redevelopment of Midtown Oakville over the next decade or so, it is anticipated the crossing will accommodate many residents, visitors, and employees within the area.

This facility is contained within a separated right-of-way for cyclists and pedestrians only. It is equipped with stairs/ramps and resting areas for users on both the ascent and descent. At the highest point (i.e. across the QEW), cyclists and pedestrians would be allowed to travel without exerting substantial effort as the slopes are designed to be compliant with Accessibility for Ontarians with Disabilities Act (AODA) standards.

6.1.6. West Active Transportation Crossing

An active transportation crossing of the QEW is provided on the west side of Trafalgar Road which connects the southwest corner of Oakville Place and the adjacent residential neighbourhood to Midtown Oakville and the Oakville Gestation, as well as other areas south of the QEW and west of Trafalgar Road. The crossing was limited in terms of the flexibility of its location due to an existing pier which was previously constructed for this crossing (approximately 300 m west of Trafalgar Road). However, due to the redevelopment of Midtown Oakville over the next decade or so, it is anticipated the crossing will accommodate many residents, visitors, and employees within the area.

This facility is contained within a separated right-of-way for cyclists and pedestrians only. It is equipped with stairs/ramps and resting areas for users on both the ascent and descent. At the highest point (i.e. across the QEW), cyclists and pedestrians would be allowed to travel without exerting substantial effort as both the upward and downward slopes are designed to be compliant with AODA standards.

6.2. Preliminary Design

Preliminary horizontal and vertical alignment design drawings for the proposed improvements can be found in **Appendix K**.

6.2.1. Trafalgar Road Interchange

Figure 6-8 shows a rendering of the proposed improvements at the Trafalgar Road interchange looking from the south to the north including the West Active Transportation Crossing, the South Service Road realignment, the eastbound QEW off-ramp (W-NS ramp) realignment, the Argus Road realignment and the new eastbound QEW to Cross Avenue off-ramp (W-Cross ramp) which includes a new multi-use trail from Argus Road to Cross Avenue traversing underneath Trafalgar Road.

Figure 6-8: Trafalgar Road Interchange



South Service Road

The horizontal alignment of the existing South Service Road will be modified to accommodate the new eastbound QEW to Cross Avenue off-ramp (W-Cross ramp) at the Trafalgar Road interchange. The alignment of South Service Road will be shifted to the south at 166 South Service Road and will form a

new intersection with Argus Road opposite 603 Argus Road. A minimum horizontal radius of 75 m is proposed for the ramp (with a 6% super elevation).

The vertical alignment of South Service Road will match the existing road profile at 166 South Service Road. From this point easterly, the road profile will be reflective of the existing ground elevation and will tie into the existing Argus Road profile.

Eastbound QEW off-ramp to Trafalgar Road (W-NS ramp)

The horizontal alignment of the existing eastbound QEW off-ramp (W-NS ramp) will be modified to accommodate the new eastbound QEW off-ramp to Cross Avenue (W-Cross ramp) at the Trafalgar Road interchange. The two lane exit ramp terminal will be maintained and shifted to the west of its current location. The exit ramp will leave the eastbound QEW mainline and tie back into the existing off-ramp close to its intersection with Trafalgar Road. A minimum horizontal radius of 130 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the eastbound QEW off-ramp ramp will be reflective of the existing eastbound QEW mainline profile to the start of the ramp bullnose. From this point easterly, the ramp will be approximately 0.35 m above existing ground until it ties back into the existing W-NS ramp profile in advance of the intersection with Trafalgar Road.

Argus Road

The horizontal alignment of the existing Argus Road will be modified to accommodate the new eastbound QEW direct off-ramp to Cross Avenue at the Trafalgar Road interchange. The intersection of Argus Road and Trafalgar Road will be shifted to the south to provide the additional space required for the off-ramp to Cross Avenue underpass at Trafalgar Road. A minimum horizontal radius of 185 m is proposed for realigned Argus Road (with a 2% super elevation) in accordance with the requirements of the Transportation Association of Canada (TAC) Design Manual.

The vertical alignment of Argus Road will match the existing profile from 603 Argus Road to the intersection of Trafalgar Road.

Eastbound QEW off-ramp to Cross Avenue (W-Cross ramp)

The proposed eastbound QEW off-ramp to Cross Avenue (W-Cross ramp) alignment will facilitate direct access from eastbound QEW to Cross Avenue. The new ramp will leave the main Trafalgar Road off-ramp (W-NS ramp), travel beneath Trafalgar Road and form a new intersection with Cross Avenue. A minimum horizontal radius of 130 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the eastbound QEW off-ramp to Cross Avenue will be reflective of the eastbound QEW off-ramp profile to the start of the ramp bullnose. From this point easterly, the ramp profile will proceed beneath Trafalgar Road and rise again to meet the proposed Cross Avenue profile.

The close proximity of the eastbound QEW off-ramp will require retaining structures to overcome the grade differences between the eastbound QEW off-ramp profile and the direct off-ramp to Cross Avenue profile. A minimum vertical structural clearance of 4.8 m will be provided at the Trafalgar Road underpass in accordance with the MTO Geometric Design Manual.

6.2.2. Cross Avenue

Figure 6-9 shows a rendering of the proposed extension of Cross Avenue looking from the east to the west at the proposed intersection with the North-South Crossing.

Figure 6-9: Cross Avenue



The horizontal alignment of Cross Avenue from Lyons Lane to Argus Road will be consistent with the existing horizontal alignment to minimize impacts to existing properties along the corridor. From this point easterly, the alignment will traverse a new path through the Midtown Oakville study area towards Royal Windsor Drive. The realignment of Cross Avenue will facilitate the construction of a new bus terminal on the east side of Trafalgar Road. A minimum horizontal radius of 115 m is proposed for the ramp (with a 2% super elevation) in accordance with the requirements of the TAC Design Manual.

The vertical alignment of Cross Avenue will match the existing road profile from Lyons Lane to the intersection of Argus Road. From this point easterly to the QEW off-ramp intersection, the road profile will be reflective of the existing ground elevations. To accommodate the North-South Crossing and the new culvert crossing of the Lower Morrison Creek, the Cross Avenue profile will need to rise by 1.5 m above the existing ground. Chartwell Road will be matched at its existing elevation. From Chartwell

Road, the profile will match the existing ground elevation until 300 m west of Royal Windsor Drive. The road profile will need to rise by 12 m to match the existing Royal Windsor Drive road profile.

The close proximity of the CN rail yard will require retaining structures to overcome the grade differences between the Cross Avenue profile and the rail yard. The proposed profile will ensure a minimum 5 m clearance over the realigned eastbound QEW off-ramp at Royal Windsor Drive interchange in accordance with the MTO Geometric Design Manual. A maximum grade of 6% is proposed for the alignment.

6.2.3. North-South Crossing

Figure 6-10 shows a rendering of the proposed North-South Crossing looking from the south to the north at the proposed intersection with Cross Avenue.

Figure 6-10: North South Crossing



North-South Crossing

The horizontal alignment of the North-South Crossing extends from Station Road over the QEW to Iroquois Shore Road and then further north to Trafalgar Road across the Morrison/Wedgwood Diversion Channel. This alignment provides direct access for buses to the proposed bus station on the east side of Trafalgar Road. A minimum horizontal radius of 130 m is proposed for the alignment (with a 4% super elevation) in accordance with the requirements of the TAC Design Manual.

The vertical alignment of North-South Crossing will rise by 8.5 m above the existing ground over the QEW and fall again to match the existing Iroquois Shore Road profile. From this point northerly, the road

will rise over the existing Morrison/Wedgwood diversion channel and match the existing Trafalgar Road profile.

The proposed profile provides a 3 m clearance above the existing Morrison/Wedgwood channel bed. If during the course of the detailed design a greater clearance at the diversion channel is required the profile of the North-South Crossing can be raised up to approximately another 1.5 m.

The proposed profile will ensure a 5 m clearance over the QEW in accordance with the MTO Geometric Design manual. A maximum grade of 6% is proposed for the alignment.

Station Road

The horizontal alignment of Station Road extends from Cross Avenue to the North-South Crossing. This alignment provides direct access for buses to the proposed bus loop on the east side of Trafalgar Road. A minimum horizontal radius of 90 m is proposed for the alignment (with a 3.2% super elevation) in accordance with the requirements of the TAC Design Manual.

6.2.4. Royal Windsor Drive Interchange

Figure 6-11 shows a rendering of the proposed improvements at the Royal Windsor Drive interchange looking from the north to the south including Royal Windsor Drive, the eastbound QEW off-ramp realignment, the new eastbound QEW direct off-ramp to Cross Avenue, the new westbound QEW off-ramp, the new QEW eastbound on-ramp, and the North Service Road realignment.

Figure 6-11: Royal Windsor Drive Interchange



Royal Windsor Drive

The horizontal alignment of Royal Windsor Drive from The Canadian Drive to the westbound QEW loop on-ramp (S-W ramp) will be consistent with the existing horizontal alignment. From this point northerly, the alignment will traverse a new path towards Eighth Line. A minimum horizontal radius of 250 m is proposed for the ramp (with a 4% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of Royal Windsor Drive will match the Eighth Line profile. Southerly from this point, the profile will rise by 6.5 m above the existing ground over North Service Road and QEW to match the existing road profile of Royal Windsor Drive. The proposed profile will then match the existing road profile to the intersection of The Canadian Road.

The proposed profile will ensure a 5 m clearance over the North Service Road and QEW mainline in accordance with the MTO Geometric Design Manual. A maximum grade of 3.77% is proposed for the alignment.

Eastbound QEW off-ramp (W-NS ramp)

The horizontal alignment of the existing eastbound QEW off-ramp (W-NS ramp) will be modified to accommodate the new eastbound QEW direct off-ramp to Cross Avenue and Cross Avenue extension at the Royal Windsor Drive interchange. The two lane exit on the QEW will be maintained and the ramp terminal will be shifted to the west of its current location. The realigned ramp will travel beneath the Cross Avenue extension and form an intersection with Royal Windsor Drive at The Canadian Road. The existing South Service Road will be terminated at a cul-de-sac to accommodate the eastbound QEW off-ramp realignment. A minimum horizontal radius of 130 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the eastbound QEW off-ramp will be reflective of the existing eastbound QEW mainline profile to the start of the ramp bullnose. From this point easterly, the ramp will follow existing ground until it ties back into the existing South Service Road profile in advance of the intersection with Royal Windsor Drive.

The close proximity of Royal Windsor Drive will require retaining structures to overcome the grade differences between the eastbound QEW off-ramp profile and the Royal Windsor Drive profile. A minimum grade of 0.3% is proposed for the alignment. This is lower than the minimum 0.5% grade recommended in the MTO Geometric Design Manual but is reflective of the existing road profile.

Westbound QEW off-ramp (E-NS ramp)

The proposed westbound QEW off-ramp (E-NS ramp) alignment will facilitate direct access from westbound QEW to Royal Windsor Drive. The new single lane exit ramp will leave the QEW mainline and form a new intersection with Royal Windsor Drive on the north side of the QEW. A minimum horizontal radius of 130 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the westbound QEW off-ramp will be reflective of the existing westbound QEW mainline profile to the start of the ramp bullnose. From this point westerly the ramp profile will rise up to match the existing Royal Windsor Drive profile.

The close proximity of the North Service Road will require retaining structures to overcome the grade differences between the westbound QEW off-ramp profile and the North Service Road profile. A maximum grade of 4.1% is proposed for the westbound QEW off-ramp alignment.

Eastbound QEW on-ramp (NS-E ramp)

The proposed eastbound QEW on-ramp (NS-E ramp) alignment will facilitate direct access from Royal Windsor Drive to the eastbound QEW. The new single lane entry ramp will form a new intersection with Royal Windsor Drive on the south side of the QEW. An auxiliary lane on QEW will be provided from the ramp entry terminal to the Ford Drive interchange. A minimum horizontal radius of 130 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the eastbound QEW on-ramp will match the Royal Windsor Drive profile. Easterly from this point; the ramp profile will fall towards the eastbound QEW mainline profile. The ramp profile will be reflective of the existing eastbound QEW mainline at the start of the ramp bullnose to the Ford Drive interchange.

The close proximity of the QEW will require retaining structures to overcome the grade differences between the eastbound on-ramp profile and the QEW mainline. A maximum grade of 4% is proposed for the eastbound on-ramp alignment.

Eastbound QEW off-ramp to Cross Avenue (W-Cross ramp)

The proposed eastbound QEW off-ramp to Cross Avenue (W-Cross ramp) alignment will facilitate direct access from eastbound QEW to the west bound lane on Cross Avenue. The new ramp will leave the main Royal Windsor Drive off-ramp (W-NS ramp) and loop around to form a new parallel entry terminal with Cross Avenue. A minimum horizontal radius of 55 m is proposed for the ramp (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of the eastbound QEW direct off-ramp to Cross Avenue will be reflective of the eastbound QEW Royal Windsor Drive off-ramp profile to the start of the ramp bullnose. From this point easterly, the ramp profile will rise up and fall again to match the proposed Cross Avenue profile. A maximum grade of 6% is proposed for the eastbound QEW Cross Avenue off-ramp alignment in accordance with the MTO Geometric Design Manual.

North Service Road

North Service Road will be realigned to accommodate the new North-South Crossing alignment. North Service Road will traverse a new alignment from Eighth Line to the existing North Service Road alignment at the Royal Windsor Drive overpass. The alignment will follow the existing North Service

Road alignment to 1221 North Service Road. A minimum horizontal radius of 120 m is proposed for the road (with a 6% super elevation) in accordance with the requirements of the MTO Geometric Design Manual.

The vertical alignment of North Service Road will match the Eighth Line profile. Easterly from this point the ramp profile will fall towards the existing North Service Road profile near the Royal Windsor Drive overpass. The proposed road profile will follow the existing North Service Road profile to 1221 North Service Road.

The close proximity of the westbound QEW off-ramp will require retaining structures to overcome the grade differences between both profiles. A maximum grade of 2.1% is proposed for the North Service Road profile.

6.2.5. Iroquois Shore Road

Figure 6-12 shows a rendering of the widening of Iroquois Shore Road looking from the west to the east at the intersection with Trafalgar Road.

Figure 6-12: Iroquois Shore Road



The horizontal alignment of Iroquois Shore Road from Trafalgar Road to Eighth Line will be consistent with the existing horizontal alignment to minimize impacts to existing properties along the corridor. A minimum horizontal radius of 220 m is proposed for the alignment (with a 2% super elevation) in accordance with the requirements of the TAC Design Manual.

The vertical alignment of Iroquois Shore Road will match the existing road profile from Trafalgar Road to the intersection of Eighth Line. A minimum grade of 0.3% is proposed for the alignment. This is lower than the minimum 0.5% recommended in the TAC guidelines but is reflective of the existing road profile.

6.2.6. East Active Transportation Crossing

The horizontal alignment of the East Active Transportation Crossing is located east of Trafalgar Road. A new switchback ramp will be provided on the north side of the westbound QEW off-ramp (E-NS ramp) intersection with Trafalgar Road, cross the QEW and connect to Cross Avenue adjacent to its intersection with Trafalgar Road.

The vertical alignment of the East Active Transportation Crossing will match the existing Trafalgar Road profile. Southerly from this point, the profile will rise by 7.0 m above the existing westbound off-ramp at the Trafalgar Road interchange. The proposed profile will fall towards Cross Avenue across the eastbound QEW on-ramp (S-E ramp) and the new eastbound QEW off-ramp to Cross Avenue (W-Cross ramp). At this point, the proposed profile will match the existing road profile at the intersection of Cross Avenue and Trafalgar Road.

The proposed profile will ensure a 5 m clearance over the Trafalgar Road interchange ramp profiles and QEW mainline. This fulfills the minimum structural clearances required by the MTO Geometric Design Manual. A maximum grade of 4% for the profile is proposed in accordance with the Town Of Oakville's 2008 Guidelines for the Design of Accessible Facilities.

6.2.7. West Active Transportation Crossing

Figure 6-13 shows a rendering of the proposed West Active Transportation Crossing looking from the north to the south at Oakville Place.

The horizontal alignment of the West Active Transportation Crossing is restricted by the location of the existing pier installed as part of the QEW HOV widening project that was completed in 2010. A new ramp will be provided on the north side of the QEW in the Oakville Place parking lot, cross the QEW and join Argus Road adjacent to the realigned South Service Road.

The vertical alignment of the West Active Transportation Crossing will match the North Service Road profile. From this point, the profile will rise by 6.5 m above the existing South Service Road and QEW profiles. The proposed profile will fall towards Argus Road across the eastbound QEW off-ramp (W-NS ramp) and the new eastbound QEW off-ramp to Cross Avenue (W-Cross ramp). The proposed profile will match the existing road profile at the intersection of South Service Road and Cross Avenue.

Figure 6-13: West Active Transportation Crossing Exhibit



The close proximity of the realigned South Service Road will require retaining structures to overcome the grade differences with the proposed West Active Transportation Crossing profile. The profile will ensure a 5 m clearance over the Trafalgar Road interchange ramp profiles and QEW mainline. This fulfills the minimum structural clearances required by the MTO Geometric Design Manual. A maximum grade of 8.33% is proposed for the profile with landings at regular intervals is proposed for the north and south ramps in accordance with the Town of Oakville’s 2008 Guidelines for the Design of Accessible Facilities.

6.2.8. Design Criteria

The preliminary design for the proposed improvements was carried out in accordance with the TAC Design Manual and the MTO Geometric Design Manual as appropriate. While every effort was made to ensure the minimum requirements specified in these design guidelines are satisfied, there are some isolated locations where this was not possible due to financial and physical constraints. These locations include:

- Trafalgar Road
- White Oaks Boulevard
- Eastbound off-ramp at the Royal Windsor Drive interchange
- Westbound off-ramp at the Royal Windsor Drive interchange

For further details on the design criteria adopted and achieved in the preliminary design, refer to the completed Design Criteria sheets for the proposed improvements which are provided in **Appendix G**.

6.2.9. Pavement Structure Design

At the preliminary design stage of the study, no detailed geotechnical investigation was undertaken to assess the required pavement design structures for the proposed improvements. For the purposes of the design the following pavement design structures have been assumed.

High Volume Roads - total pavement make-up of 950 mm

- 100 mm HL1
- 150 mm HL8
- 150 mm Granular A
- 550 mm Granular B

Low Volume Roads - total pavement make-up of 750 mm

- 50 mm HL3
- 100 mm HL8
- 150 mm Granular A
- 450 mm Granular B

6.2.10. Structures

A summary of the structures that form part of the design is listed below and summarized in the following sections.

- S1 Trafalgar Road Underpass
- S4 North-South Crossing Overpass
- S5 Diversion Channel Crossing
- S6 W-NS Overpass
- S7 Royal Windsor Drive Widening
- S8 Royal Windsor Drive Overpass

The structural designs for the two proposed active transportation crossings were not completed as part of this EA study. Future structural designs will be undertaken by the Town of Oakville.

S1 Trafalgar Road Underpass

The new underpass is a reinforced concrete rigid frame structure crossing under Trafalgar Road aligned in the east-west direction, south of the QEW. The bridge deck accommodates six through lanes, an off ramp and sidewalks on the east and west sides of Trafalgar Road. The rigid frame structure has a span of 14.5 m and an overall width of 46 m. The multi-use trail passing under Trafalgar Road has a width of 4 m and is raised 2 m above the new eastbound Cross Avenue off-ramp separated by a retaining wall and guard rail. The reinforced concrete deck is 600 mm thick at mid-span with 90 mm of asphalt and waterproofing topping.

The new bridge foundation will be constructed with continuous spread footings measuring approximately 2 m in width and 0.8 m in depth founded on clayey silt to silty clay ground. The actual geotechnical

conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

S4 North South Overpass

The new overpass is a steel box girder superstructure and reinforced concrete substructure crossing over the QEW aligned in the north-south direction, east of Trafalgar Road. The bridge deck accommodates two through lanes, two transit lanes, a left turn lane, two bike lanes, a sidewalk along the east side of the structure and a multi-use trail along the west side of the structure. The steel box girders have a depth of 1600 mm and have two spans of 45 m and one span of 47 m (centre span). The bridge structure has a total width of 29.7 m. The multi-use trail along the west side of the structure has an overall width of 3 m. The reinforced concrete deck has a thickness of 225 mm with 90 mm of asphalt and waterproofing topping.

The new bridge foundation will be constructed with continuous spread footings at the abutments measuring approximately 6 m in width and 1.8 m in depth founded on clayey silt to silty clay ground. The pier foundations will consist of five caissons measuring 1500 mm in diameter with a depth of 5 m into the bedrock layer. The actual geotechnical conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

S5 Diversion Channel Crossing

The new crossing of the diversion channel will be an open bottomed reinforced concrete culvert aligned in the east-west direction. The culvert will accommodate two through lanes, two transit lanes, two bike lanes, a sidewalk along the east side of the structure and a multi-use trail along the west side of the structure. The culvert structure has a total width of 8 m and a 3 m clearance to the bottom of the diversion channel. The culvert walls will be 700 mm thick and the minimum cover to the top of the culvert will be 600 mm. The existing concrete channel will also be replaced as part of the new culvert construction.

The new culvert foundations will spread footings measuring approximately 1.5 m in width and 0.7 m in depth founded on clayey silt to silty clay ground. The actual geotechnical conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

S6 Eastbound QEW off-ramp at Royal Windsor Drive (W-NS) Overpass

The new overpass is a CPCI girder superstructure and reinforced concrete substructure crossing the eastbound off-ramp of Royal Windsor Drive interchange aligned in the north-south direction, south of Royal Windsor Drive. The bridge deck accommodates four through lanes, a left turning lane, bike lanes, a sidewalk along the west side of the structure and a multi-use trail along the east side of the structure. The CPCI girders have a span of 14.1 m from centre to centre of bearing and the bridge structure has a total width of 29.2 m. The multi-use trail along the east side of the structure has an overall width of 3m. The reinforced concrete deck has a thickness of 225 mm with 90 mm of asphalt and waterproofing topping.

The new bridge foundation will be constructed with continuous spread footings measuring approximately 4 m in width and 1.2 m in depth founded within the clayey silt to silty clay ground. The actual

geotechnical conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

S7 Royal Windsor Drive Widening

The existing structure is made of CPCI girders and crosses over the QEW in the east- west direction. The proposed widening is to be completed along the south side of the bridge and includes the approach slabs. A new parapet wall and sidewalk is to be added along the north side of the bridge.

In order to widen the existing Royal Windsor Drive bridge to accommodate the new roadway cross-section, the following existing bridge components have been identified as requiring removal:

- South barrier wall and sidewalk
- N011h barrier wall and sidewalk
- Median barrier wall
- South-east and south-west wing wall columns and recast panels
- Transition barrier tall wall at south end of pier bent along QEW

The widening of the bridge requires a total of 16 new CPCI 2300 girders with a maximum span of 46 m. The widened bridge deck includes a new concrete median, barrier, parapet walls and sidewalks/cycle track. It accommodates two 3.5 m wide through lanes, a left turning lane and a right turning lane. The overall width varies as the structure is fanned from east to west along its cross-section. A 3 m wide cycle track and 2 m wide sidewalk are located along the south side of the structure protected with a new barrier and parapet wall. A 1.5 m wide sidewalk is located along the north side of the structure with a new parapet wall. The existing vertical clearance below the bridge structure is maintained, and the deck surface is 225 mm of reinforced concrete with 90 mm asphalt and waterproofing.

The new abutments will be constructed with continuous spread footings founded on bedrock with dimensions approximately 8 m in width and 2 m in depth to match existing. The actual geotechnical conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

S8 Royal Windsor Drive Overpass

The new overpass is a reinforced concrete rigid frame structure crossing over the North Service Road aligned in the east-west direction. The bridge deck accommodates four 3.5 m wide through lanes, a median, an off ramp of variable width, and a multi-use trail along the south side. The rigid frame structure has a span of 21 m and an overall width of 39.88 m. The reinforced concrete deck is 800 mm thick at mid-span with 90 mm of asphalt and waterproofing topping. The North Service Road is being widened from the existing two lanes to four 3.5 m wide through lanes including two bike lanes and a sidewalk.

The new bridge foundation will be constructed with continuous spread footings measuring approximately 2 m in width and 0.8 m in depth founded on the clayey silt to silty clay ground. The actual geotechnical conditions and foundation design will be confirmed during the detailed design phase of the project. Further details of the structure can be obtained in **Appendix H**.

6.2.11. Illumination and Signals

It has been assumed illumination will be required on both sides of all new and realigned roadways. The types of illumination are to be confirmed at the detailed design, along with the relocation of existing illumination.

Full conventional illumination to Town of Oakville, Halton Region or MTO standards as appropriate is recommended. Should any of the existing light standards not be salvageable for reinstallation, new light standards should be installed. Illumination should be directed towards the roadway and away from any adjacent residences.

New traffic signals, installed to the Town of Oakville, Halton Region or MTO standards as appropriate, will be provided at the following locations:

Trafalgar Road Interchange

- Eastbound QEW direct off-ramp to Cross Avenue / Cross Avenue

Cross Avenue

- Cross Avenue / Lyons Lane
- Cross Avenue / Local Road A
- Cross Avenue / Local Road B
- Cross Avenue / Trafalgar Road
- Cross Avenue / Chartwell Road
- Cross Avenue / Royal Windsor Drive

North-South Crossing

- North-South Crossing / Cross Avenue
- North-South Crossing / Iroquois Shore Road

Royal Windsor Drive Interchange

- Royal Windsor Drive / E-NS Ramp
- Royal Windsor Drive / Eighth Line

Modifications to existing traffic signals will be required at the following locations:

- Trafalgar Road / White Oaks Boulevard
- Trafalgar Road / Iroquois Shore Road
- The Canadian Road / Royal Windsor Drive

There may be a future need for ramp metering on the eastbound QEW on ramp at Royal Windsor Drive interchange. The detailed design for this ramp will need confirm details for any future ramp metering, if required.

6.3. Property Impacts

The preliminary design for the preferred concept was prepared with the intent to minimize property impacts. However, given the scale and complexity of the proposed improvements, some property requirements are necessary. Some of the property impacts are minor in nature; however, some property impacts will include the demolition of existing buildings and reconfiguration of existing property access. The approximate new property requirements are illustrated in **Figure 6-14**. The property impacts listed does not include any properties currently in public ownership of the Town of Oakville, Halton Region, MTO or Metrolinx. The exact property requirements will be determined at the detailed design stage.

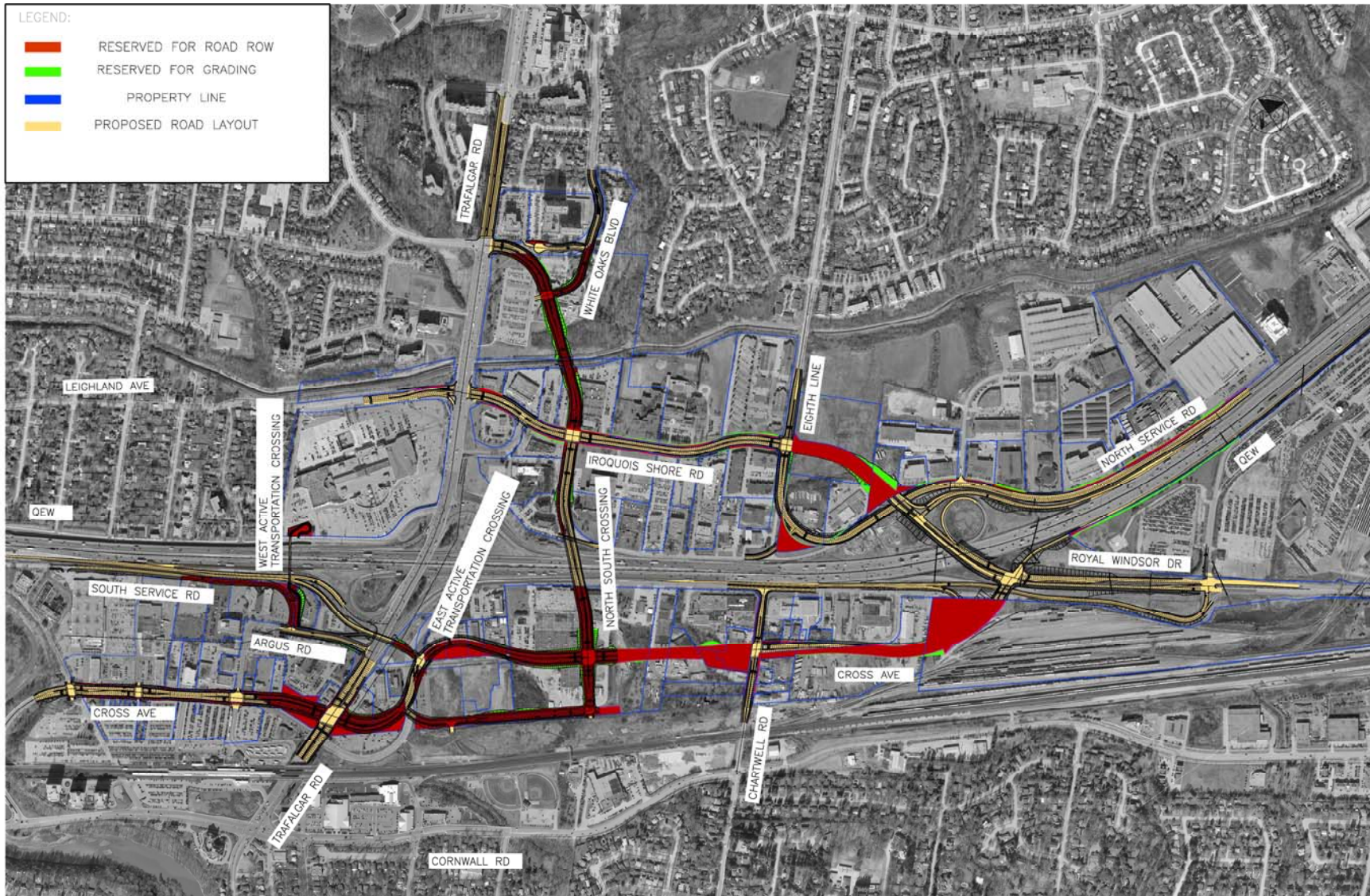
A summary of the potential impacts to existing properties for each of the planned road improvement is provided in **Table 6-1**.

Table 6-1: Potential Property Impacts

Improvement	Total (Existing) Properties Impacted	Area of Property Required
Trafalgar Road Interchange	7	6,260 m ²
Cross Avenue	37	62,830 m ²
North-South Crossing	11	31,090 m ²
Royal Windsor Drive Interchange	9	8,000 m ²
Iroquois Shore Road	13	6,150 m ²
East Active Transportation Crossing	0	0 m ²
West Active Transportation Crossing	3	3,400 m ²
Total for Midtown Oakville EA Improvements	-	117,730 m²

Note: The same property could be impacted by more than one improvement.

Figure 6-14: Property Requirements



6.4. Cost

Preliminary cost estimates for the various improvements are provided in **Table 6-2**. The cost estimates are based on rates from the Town of Oakville 2012 Capital Budget Material Unit Prices. The total preliminary estimated construction cost for all improvements associated with the Midtown EA is **\$164.2 million**. The fees include utility relocations, design fees and administrative costs, as well as assumed property costs. Detailed cost estimates for all of the improvements are provided in **Appendix I**.

Table 6-2: Preliminary Cost Estimates

Improvement	Estimated Cost (\$million)
Trafalgar Road Interchange	\$ 15.5
Cross Avenue	\$ 40.5
North-South Crossing	\$ 35.4
Royal Windsor Drive Interchange	\$ 48.3
Iroquois Shore Road	\$ 5.5
East Active Transportation Crossing	\$ 14.3
West Active Transportation Crossing	\$ 4.7
Total for Midtown Oakville EA Improvements	\$164.2

Note - Costs do not include applicable taxes.

6.5. Phasing / Timing

The cost and complexity of the proposed Midtown Oakville improvements means that not all of the proposed developments can be delivered at one time. A phasing plan has been developed to ensure that as Midtown Oakville develops into an urban growth centre, the required infrastructure improvements will be in place to meet the anticipated demand. The phasing plan was prepared in anticipation of future development in the study area to 2031. The proposed timing of the various improvements is as follows:

- West Active Transportation Crossing – 2017
- Cross Avenue – 2018
- Cross Avenue Extension – 2022
- Royal Windsor Drive Interchange – 2022
- Iroquois Shore Road – 2022
- Trafalgar Road Interchange – 2028
- North-South Crossing – 2029
- East Active Transportation Crossing – 2029

The proposed phasing of the Midtown Oakville improvements is dependent on a number of external factors including prevailing economic and social conditions. The town will further refine the phasing plans as part of future studies to ensure any changes in the prevailing conditions are incorporated.

6.6. Construction Staging

Given the scale and complexity of the proposed improvements extensive construction staging and detour plans will be required to construct the Midtown Oakville improvements. All detours and construction staging will focus on retaining key traffic movements and minimizing traffic disruption through the study area. To minimize the impacts of construction operations, the following measures may be applied:

- Maintain existing traffic capacity on roadways (as feasible).
- Maintain pedestrian and cycle facilities in construction zones.
- Provide safe and large work zone for construction.
- Minimize impacts on adjacent access roads.
- Maintain access to business and residents.
- Carry out works at night where possible.

Construction staging and detour plans are to be prepared and confirmed at the detailed design phase of the proposed improvements.

6.7. Utilities

As noted in **Section 3**, several utilities are located within the study area, including Bell, Cogeco, Rogers, Union Gas, Oakville Hydro, TransCanada and Municipal Services. Utility relocation will be a critical component to the detailed design and construction phase. Utility relocations will need to be coordinated with streetscape design (planters, furniture, and lighting) to ensure the implementation of those important elements is not impeded.

A relocation strategy for all existing services will be confirmed as part of detailed design for these improvements. Test excavations, as required, should be completed during detailed design to verify the existing depth of cover over the utilities.

A summary of the potential impacts to utilities for each of the planned road improvement is provided below:

Trafalgar Road Interchange

The proposed Trafalgar Road Interchange improvement will traverse a number of existing services on the QEW mainline, South Service Road and Trafalgar Road. These services include aerial Oakville Hydro, Bell ducts, aerial Rogers's fiber, buried Cogeco fiber, sanitary pipes, storm pipes and watermains.

The realignment of South Service Road will require the relocation of existing watermains outside of the MTO right of way. The new Cross Avenue eastbound off-ramp will cross under the existing Trafalgar Road. A number of buried services are located on Trafalgar Road at this location and will need to be relocated to accommodate the new Cross Avenue eastbound off-ramp underpass. Any valves, chamber or manholes impacted will need to be relocated.

In addition, the new W-Cross ramp will traverse two 30” feeder mains that are associated with the nearby Halton Region Booster Station. The proposed grade of the new ramp will be below existing ground. It is likely the existing mains will need to be lowered to accommodate the proposed improvements.

Cross Avenue

The proposed Cross Avenue improvements will traverse a number of existing services between Lyons Lane and Royal Windsor Drive. These services include aerial and buried Oakville Hydro, Union Gas distribution mains, Bell ducts, aerial and buried Rogers fiber, aerial and buried Cogeco fiber, storm pipes, sanitary pipes and watermains.

The widening of Cross Avenue between Lyons Lane and Chartwell Road will require the relocation of a number of services located in the existing boulevard. Any valves, chamber or manholes impacted will need to be relocated.

The extension of Cross Avenue to Royal Windsor Drive will traverse an existing high pressure gas transmission line on South Service Road. As Cross Avenue is elevated in this area, it is expected that sufficient cover to the existing main will be maintained. This will be reviewed further during the detailed design phase to ensure sufficient cover remains, or whether relocation or other works are necessary.

North-South Crossing

The proposed North-South Crossing improvement will traverse a number of existing services between the new bus loop and Trafalgar Road. These services include aerial Oakville Hydro, Union Gas distribution mains, Bell ducts, aerial and buried Rogers’s fiber, aerial and buried Cogeco fiber, sanitary pipes, storm pipes and watermains.

The construction of the North-South Crossing will require the relocation of a number of services located in the existing boulevard on White Oaks Boulevard, Iroquois Shore Road and North Service Road. Any valves, chamber or manholes impacted will need to be relocated.

Royal Windsor Drive Interchange

The proposed Royal Windsor Drive Interchange improvement will traverse a number of existing services at Royal Windsor Drive, North Service Road and South Service Road. These services include aerial Oakville Hydro, Union Gas transmission and distribution mains, Bell ducts, aerial Rogers’s fiber, aerial and buried Cogeco fiber, sanitary pipes and watermains. Any valves, chamber or manholes impacted will need to be relocated.

The realignment of the eastbound off-ramp and widening of Eighth Line will traverse an existing high pressure gas transmission line. As the existing road grade is not being altered in these areas, it is expected that sufficient cover to the existing main will be maintained. This will be reviewed further during the detailed design phase to ensure sufficient cover remains, or whether relocation or other works are necessary.

Iroquois Shore Road

The proposed Iroquois Shore Road widening improvement will traverse a number of existing services between Trafalgar Road and Eighth Line. These services include aerial Oakville Hydro, Union Gas distribution mains, Bell ducts, aerial and buried Rogers's fiber, aerial and buried Cogeco fiber, storm pipes, sanitary pipes and watermains.

The widening of Iroquois Shore Road requires the relocation of a number of services located in the existing boulevard. Any valves, chamber or manholes impacted will need to be relocated.

East Active Transportation Crossing

The proposed East Active Transportation Crossing will traverse a number of existing services on the east side of Trafalgar Road. These services include aerial and buried Oakville Hydro, Union Gas distribution mains, Bell ducts, sanitary pipes and watermains.

Given that significant portions of the active transportation crossing will be elevated and will not require any reduction in cover to existing services, it is expected only the relocation of aerial services will be required.

Any valves, chamber or manholes impacted will need to be relocated.

West Active Transportation Crossing

The proposed West Active Transportation Crossing will traverse a number of existing services on the west side of Trafalgar Road. These services include buried Oakville Hydro ducts, Union Gas distribution mains, sanitary pipes, storm pipes and watermains.

Given that significant portions of the active transportation crossing will be elevated and will not require any reduction in cover to existing services it is expected only the relocation of aerial services will be required.

Any valves, chamber or manholes impacted will need to be relocated.

7. Stormwater Management

Cole Engineering completed an assessment of the hydrologic and hydraulic impacts of the preferred alternative of transportation improvements as part of the Class EA study for Midtown Oakville. A Stormwater Management Report was prepared by Cole Engineering (May 2014), which is provided in **Appendix J**. The purpose of the Stormwater Management Report was to discuss the hydrologic and hydraulic impacts of the preferred concept, provide recommendations for stormwater management (SWM) within the Midtown Oakville study and advise on preliminary watercourse crossing requirements for the proposed transportation improvements within the study area. The hydrologic and/or hydraulic impacts of the proposed improvements were assessed for each of the following four subwatersheds within the Midtown Oakville study area:

- Lower Morrison Creek
- Wedgewood Creek
- Morrison/Wedgewood Diversion Channel
- Sixteen Mile Creek

Preliminary SWM criteria are recommended as part of this Class EA, with a predominant focus on setting peak flow targets for each of the subwatersheds within the Midtown Oakville study area, and a preliminary assessment of water quality, erosion control and water balance. CH was engaged during the study, and site visits were carried out to discuss any concerns regarding the various transportation improvement alternatives. CH was also part of the TAC and participated in the Agency Stakeholders Workshop.

7.1. Existing Conditions and Target Flows

The existing drainage conditions of the Midtown Oakville study area were simulated using a Visual OTTHYMO (VO2) hydrology model. The hydrologic parameters were determined for each drainage catchment within the Midtown Oakville study area, including the assessment of current imperviousness determined based on the land use of each catchment. The drainage area plan for existing conditions is shown in **Figure 3-9**.

As per the *Lower Morrison/Wedgewood Creeks – Flood, Erosion and Master Drainage Plan Study* prepared by R. V. Anderson Associates Ltd. (January 1993), there are downstream hydraulic capacity constraints which must be considered when establishing allowable discharge rates from all new developments within the Lower Morrison Creek and Wedgewood Creek subwatersheds. As per the R. V. Anderson creek study, peak runoff rates from all new development within the Lower Morrison Creek and Wedgewood Creek watersheds are to be controlled to 50% of pre-development levels in order to mitigate potential erosion and flooding. The existing flows resulting from the VO2 hydrologic model applied at 50% were compared to the existing (1993) flows provided in the R.V Anderson creek study. It was noted during the comparison of these flows that the existing flow results from VO2 for Lower Morrison Creek applied at 50% exceed the existing (1993) flows from the R.V. Anderson creek study. This is a result of the higher imperviousness values that were determined as part of the hydrologic analysis conducted for

this Class EA. Therefore the existing (1993) flows from the R.V. Anderson study will be used at the target flows for Lower Morrison Creek. The target flows for Wedgewood Creek will remain at 50% of the flows from the existing conditions VO2 model, as these target flows do not exceed the existing (1993) flows for Wedgewood Creek as per the R.V. Anderson creek study.

It is also indicated in the *Morrison/Wedgewood Diversion Channel – Spill Control Class Environmental Assessment*, prepared by AMEC Environment & Infrastructure (May 2012), that there is a current potential for a spill of flood waters during extreme storm conditions which potentially affect those lands within the vicinity of the diversion channel, as well as properties further downstream. However, work is currently being undertaken by CH in order to mitigate these flood impacts of the diversion channel. Therefore, as part of the stormwater management analysis completed for this Class EA, it is recommended that peak runoff rates from any future development within the Morrison/Wedgewood Diversion Channel be controlled to existing conditions.

As there are no existing flood concerns for Sixteen Mile Creek in the study area, peak runoff rates from all future developments within the Sixteen Mile Creek watershed are to be controlled to existing flow rates.

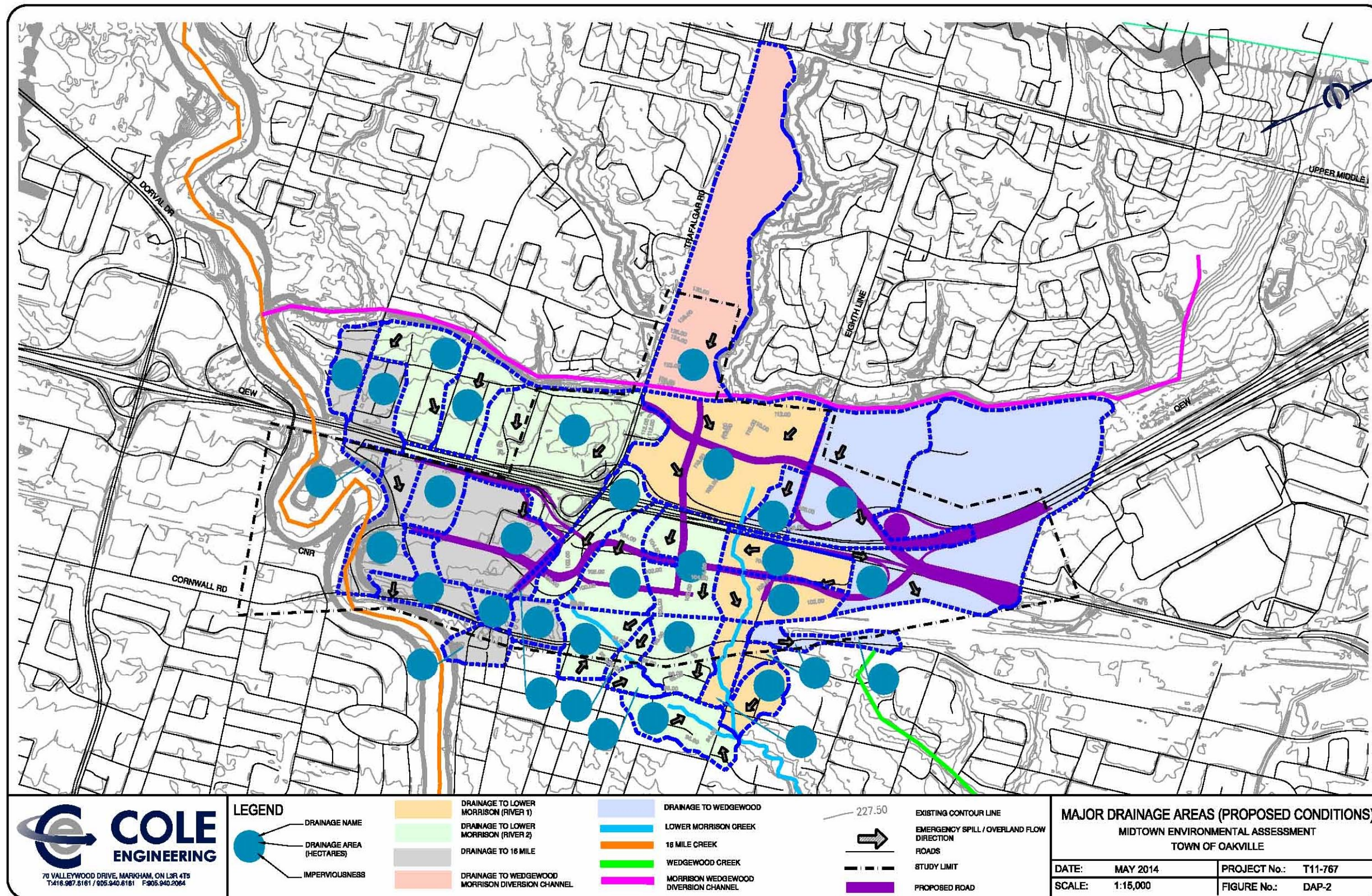
7.2. Proposed Conditions

The proposed drainage conditions of the Midtown Oakville study area resulting from the proposed transportation improvements were also simulated using a Visual OTTHYMO (VO2) hydrology model. The drainage area plan for proposed conditions is shown in **Figure 7-1**.

The proposed conditions VO2 model was used to determine the storage for each of the four subwatersheds required to control the proposed transportation improvements to the target flow rates discussed in **Section 7.1**. As part of the preferred alternative, a diversion of some of the drainage from the Lower Morrison Creek watershed to the Sixteen Mile Creek watershed is also considered, as there are currently flooding and erosion issues within the Lower Morrison and Wedgewood Creeks.

This diversion was assessed at a high level in order to determine the feasibility and benefits to decreasing flows in Lower Morrison Creek. This assessment consisted of a hydrologic review only, and if this diversion is to be considered further, the resulting impacts to ecology and base flows should be assessed under separate cover. It is noted that the environmental assessment requirements for this diversion are not covered within the Midtown Oakville Class EA, and that a separate study would be required to satisfy environmental assessment requirements. If the subsequent EA was to confirm the diversion, drainage would be diverted to Sixteen Mile Creek via a storm pipe along the proposed Cross Avenue road. As discussed in the SWM Report provided in **Appendix J**, the hydrological benefits of the proposed diversion are limited as the total combined storage requirements for both of the Lower Morrison Creek and Sixteen Mile Creek subwatersheds is not significantly reduced with the proposed diversion. It is therefore not proposed to implement the diversion at this time, but the diversion may be reconsidered in the future.

Figure 7-1: Drainage Area Plan



70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

LEGEND

- DRAINAGE NAME
- DRAINAGE AREA (HECTARES)
- IMPERVIOUSNESS

- DRAINAGE TO LOWER MORRISON (RIVER 1)
- DRAINAGE TO LOWER MORRISON (RIVER 2)
- DRAINAGE TO 16 MILE
- DRAINAGE TO WEDGEWOOD MORRISON DIVERSION CHANNEL

- DRAINAGE TO WEDGEWOOD
- LOWER MORRISON CREEK
- 16 MILE CREEK
- WEDGEWOOD CREEK
- MORRISON WEDGEWOOD DIVERSION CHANNEL

- 227.50
- EXISTING CONTOUR LINE
- EMERGENCY SPILL / OVERLAND FLOW DIRECTION
- ROADS
- STUDY LIMIT
- PROPOSED ROAD

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7.3. Preliminary SWM Criteria

The SWM analysis completed as part of this Class EA Report also includes recommendations on preliminary SWM criteria for any future development within the Midtown Oakville study area. As previously noted, the predominant focus of the preliminary SWM criteria recommended as part of this Class EA is on setting flow targets for each of the subwatersheds within the Midtown Oakville study area, with a preliminary assessment of water quality, erosion control and water balance requirements. As discussed in the Stormwater Management Report, provided in **Appendix J**, it is recommended that any future development or transportation improvement within the study area is to utilize the Midtown Oakville EA study hydrology model in order to demonstrate that the target flows specified in the Stormwater Management Report are met for each subwatershed. Any future development and transportation improvement within the Midtown Oakville study area is to also achieve Enhanced Level 1 Protection, as per the MOE Stormwater Management Planning and Design Manual (March 2003). Any future development or transportation improvement within the Midtown Oakville study area is also to provide water balance controls by achieving the greater of either of the two following requirements:

- Provide retention of 5 mm over the entire area of the proposed development, as per the City of Toronto's *Wet Weather Flow Management Guidelines* (November 2006); or
- Retain stormwater on-site to achieve an equivalent annual volume of infiltration as pre-development conditions, as per Section 3.2 of the MOE *Stormwater Management Planning and Design Manual* (March 2003).

This water balance objective could be achieved by a variety of low impact development (LID) measures, as specified in the Low Impact Development Stormwater Management Planning and Design Guide, prepared by Credit Valley Conservation and Toronto and Region Conservation Authority (2010).

The existing Midtown Oakville area is highly impervious with limited SWM controls, and no known LID measures. This results in the generation and discharge of runoff during the majority of rainfall events, and would contribute to downstream erosion. Although a SWM criterion for erosion control was not assessed as part of the SWM analysis for this Class EA, from a practical perspective, it is anticipated that the water balance criteria will provide inherent benefits that will ensure that downstream erosion is decreased through development of Midtown Oakville.

It should be noted that the town intends to complete a separate flood mitigation opportunities study in the near future which will confirm the final SWM criteria for the Midtown Oakville study area.

7.4. Hydraulics

As discussed in the Stormwater Management Report provided in **Appendix J**, hydraulic analysis was completed for the Morrison/Wedgewood Diversion Channel and the Lower Morrison Creek in order to evaluate the hydraulic impacts resulting from the proposed transportation improvements. The hydraulic analysis was completed using a HEC-RAS model for each watercourse. The purpose of the hydraulic analysis is to demonstrate that there are no significant hydraulic impacts as a result of the proposed

transportation improvements. Only the proposed major crossings of these watercourses were analyzed during the current study, with assessment of smaller crossings and linear drainage systems to be completed during future design phases.

As part of the proposed transportation improvements, a crossing over the Morrison/Wedgewood Diversion Channel is proposed approximately 240 m east of Trafalgar Road. Due to the proximity of the proposed crossing location to Trafalgar Road, the preliminary sizing of the crossing was done using the same geometry as the existing Trafalgar Road crossing which has a total span of 8.0 m and a height of 3.0 m. Also, as part of the proposed transportation improvements, a crossing over the Lower Morrison Creek is proposed approximately 150 m south of the QEW. The proposed crossing of the Lower Morrison Creek is to be a precast concrete arch structure with an open bottom, with span of 9.8 m wide, and a height of 2.4 m. These proposed crossings were sized to minimize any hydraulic impacts to the existing watercourses.

As per CH criteria, under all flow conditions, up to and including flows generated by the regulatory storm, the crossing (including all required grading) will not result in any negative impacts to any existing habitable structure, and will provide safe access and egress to adjacent properties and roadways, for the duration or frequency of any spill. Any local water level increases may be accepted provided that:

- There is either no increased regulation of adjacent private properties; or
- The impacted private landowners have been given an understanding of how the proposed works will impact their property, the regulatory implications this will have on their future land use of the property, and have provided written confirmation of their understanding and acceptance of these impacts.

The analysis completed during the Midtown Oakville Class EA process has demonstrated that it is feasible to implement new crossings that meet CH's criteria. During subsequent detailed design phases, crossing sizes would be optimized to maximize cost efficiencies while meeting all appropriate criteria.

8. Mitigation

The proposed improvements in Midtown Oakville and the construction activities necessary for implementing the various proposed improvements will impact existing conditions. This section presents measures for minimizing adverse impacts to the existing environment that will be required as the proposed improvements proceed to detailed design and construction.

8.1. Natural Environment

The following summarizes the anticipated effects on natural heritage and the proposed mitigation measures. The assessment of the natural environment is provided in the Natural Heritage Report by LGL Limited in **Appendix D1**.

8.1.1. Physiography and Soils

Erosion and sedimentation mitigation measures will be implemented prior to and during the construction phase and will include:

- Limiting the geographical extent and duration that soils are exposed to the elements.
- Implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 577 Construction Specification for Temporary Erosion and Sediment Control Measures and the Greater Golden Horseshoe Conservation Authorities' Erosion and Sediment Control Guideline for Urban Construction. These standard measures include installing silt fences along the margins of areas of soil disturbance, or applying conventional seed and mulch and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long term slope stabilization.
- Managing surface water outside of work areas to prevent water from coming in contact with exposed soils.

8.1.2. Fisheries and Aquatic Ecosystems

Mitigation measures for specific fish habitat sites are provided below:

Tributary 1 of Lower Morrison Creek

- If realignment is required, natural channel design measures should be incorporated.
- Maintain existing seasonal groundwater or wetland surface flows.

Tributary 2 of Lower Morrison Creek

- Maintain feature form and flow.

Tributary 1 of Lower Wedgewood Creek

- If realignment is required, natural channel design measures should be incorporated.
- Maintain existing seasonal groundwater or wetland surface flows.

QEW Ditch System (Ditch Feature 3)

- Replicate functions by lot level conveyance measures or low impact stormwater options.

Morrison Wedgewood Diversion Channel

- Crossing structure should clear span the watercourse.
- No earth fill placed below the high water mark.

At all locations where in-water work is proposed, cofferdams (pea gravel bags, sheetpiles, etc.) will be used to isolate the work area from the watercourse to enable work to be done in-the-dry. Flow will be maintained through either damming and pumping or a flume. If possible, work should be done during the driest part of the year when no flow is present. This will minimize disturbance to fish habitat at the site and downstream. To further reduce the potential for serious harm to fish, the following mitigation measures will be implemented:

- No in-water work (or work on watercourse banks) will be permitted from April 1 to June 30 to protect spawning warmwater fish, incubating eggs and fry emergence.
- Work areas will be delineated with construction fencing to minimize the area of disturbance.
- Best management practices and special provisions will be employed to reduce impacts during construction.
- Appropriate sediment controls such as silt fencing, straw bale flow checks, etc. will be installed prior to, and maintained during construction to prevent entry of sediments into the watercourse. These controls will be dynamic and may evolve with the project if site conditions warrant.
- Where cofferdams are to be employed, dewatering effluent will be treated prior to discharge to receiving watercourse.
- Cofferdams will be constructed using pea gravel bags, sheet piling or other appropriate material to isolate the work area. Flow will be maintained at all stations.
- Only clean material free of particulate matter will be placed in the watercourse.
- Fish isolated by construction activities (if present) will be captured and safely released to the watercourse.
- Good housekeeping practices related to materials storage/stockpiling, equipment fuelling/maintenance, etc. will be implemented during construction.
- Disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation.
- No construction machinery or vehicles will cross any watercourse at any time during construction.
- All debris/materials associated with works will be contained and prevented from entering the watercourse.
- General restoration/enhancement of the riparian areas of all affected watercourses within the study area will be undertaken once work is completed. This restoration/enhancement will include, but not be limited to, the replacement of existing vegetation types and densities to mimic existing natural conditions.

8.1.3. Vegetation and Vegetation Communities

Applicable town policies will be followed to reduce potential negative impacts to vegetation within the study area, which can include the following mitigation measures:

- The timing of construction should be planned to avoid excessive impacts to natural features (i.e. avoid periods of heavy rainfall or snow melt in early spring).
- Natural features designated for protection should be clearly identified (including individual trees where applicable) and fenced to ensure no construction traffic, equipment or materials storage intrude on these areas. Town by-laws and policies which were developed to protect, as well as enhance the tree canopy, should be followed to avoid negative impacts to existing trees.
- Stockpiling of soil should be done away from protected natural areas particularly watercourses and wetlands and additional silt fencing used to prevent sediment transport.
- Where engineering standards can be met any fill used on site should consist of native soils.
- Soil disturbance and disturbance of the existing vegetation on-site should be limited to only those areas requiring grading or excavation.
- Any portion of riparian habitat adjacent to any waterbodies or any portion of wetlands that are not to be impacted but are inadvertently damaged as a result of construction, should be immediately replaced with comparable native plant material.
- Perimeter silt fencing of a size and type capable of containing runoff should be installed down slope of all construction areas to slow down and filter surface water runoff.
- Exposed soils should be re-vegetated as soon as possible and re-vegetation should be completed prior to the onset of winter.
- On steep slopes (e.g., greater than 3:1) erosion blankets should be used to stabilize the soils to encourage the establishment of vegetative cover.
- During the detail design phase, edge management plans, tree protection plans and an arborist report should be prepared to identify site-specific mitigation measures once the full extent of the project is better defined.

8.1.4. Wildlife and Wildlife Habitat

Funnel and/or barrier fencing, in conjunction with an appropriately sized crossing structure can be used to guide wildlife to a given crossing structure and reduce road-mortality. Given the complexities of fence erection in heavily urbanized areas (such as the study area), installation of funnel/barrier fencing may not be feasible, but should still be further explored during the detail design phase of the project.

Potential disturbance caused by light pollution from the proposed improvements to the transportation network can be mitigated by using reflectors to focus light beams away from natural heritage features adjacent to the road.

During detail design, field surveys conducted within the appropriate breeding bird season (June-July) and consultation with the MNR will be required to ensure compliance with the ESA.

8.1.5. Overall Monitoring

An environmental inspector will monitor the site during construction to ensure that construction fencing, tree protection barriers, and erosion and sedimentation control measures are installed correctly and remain functional.

8.2. Cultural Heritage Environment

The following measures are recommended to mitigate any potential impacts to the identified cultural heritage resource located within the Midtown Oakville study area – 420 South Service Road (GE Plant):

- Further heritage work should be carried out by a qualified heritage consultant. This work should include a field visit and documentation of existing conditions of the built heritage resource and the cultural heritage landscape towards the completion of a cultural heritage evaluation report (CEHR). This report should include an assessment of any potential impacts which arise out of the proposed work and should be used to develop appropriate mitigation measures.
- Staging and construction activities should be suitably planned and undertaken to avoid impacts including, but not limited to alteration/destruction, altered visibility, and isolation, to the identified cultural heritage resource.
- A qualified heritage consultant should be consulted in order to develop appropriate mitigation measures to potential vibrations.
- A qualified heritage consultant should be consulted in order to determine the effectiveness of the construction of protective fencing.

The full Cultural Heritage Resource Data Collection Study by ASI is provided in **Appendix D2**.

8.3. Archaeological Environment

Although there are no previously registered archeological sites located within 1 km of the study area, some areas may have retained their original soils and may possess archeological potential. Due to this, the following measures are recommended to mitigate any potential impacts to the archaeological environment:

- Archeological potential exists in parts of the study area. These lands require Stage 2 archaeological assessment by a combination of test-pit survey at 5 m intervals. This should be completed prior to any land disturbance and may be done as part of the detailed design process.
- Due to extensive and deep land alterations that have severely damaged the integrity of any potential archeological resources, the remainder of the study area does not retain archeological potential and does not require further archeological assessment.
- Should the proposed work extend beyond the current study area, then further Stage 1 assessment must be conducted to determine the archaeological potential of the surrounding lands.

The Stage 1 Archaeological Assessment (Background Study and Property Inspection) by ASI is provided in **Appendix D3**.

8.4. Subsurface Conditions (Foundations)

Further investigation at the final location of the structure foundations is required during detailed design to obtain subsurface information specific to the foundation locations and to confirm the subsurface conditions and provide sufficient information on which to base geotechnical recommendations for detailed design.

With space restrictions and the requirement for temporary roadway protection adjacent to the travelled lanes and/or embankments of the QEW, the use of deep foundations (caissons or driven piles) for the new bridge supports may be a feasible foundation alternative which minimizes the depth of excavations by maintaining the pile cap level as high as possible.

Deep excavations at some structure sites and/or foundation elements may be required to found on bedrock. Alternatively, caissons (drilled piers) extending into the shale bedrock, for support of the new bridge structure foundations may also be considered.

Additional investigation will be required within the footprint of the new structure foundations at each of the sites and the approach embankment widening areas to further assess and/or confirm the subsurface conditions and the preliminary recommendations provided in the Desktop Review and Preliminary Recommendations Foundation Study by Golder Associates Ltd. (see **Appendix D4**).

Temporary roadway protection will be required along the QEW and other roads. These temporary excavation support systems should be designed and constructed in accordance with OPSS 539 (Temporary Protection Systems).

If granular soils are encountered during detail investigations, some form of groundwater control may need to be considered. An assessment should be made at the detailed design stage with respect to anticipated seepage volumes and whether or not a Permit to Take Water (PTTW) is required for the construction of the foundations.

8.5. Noise

The proposed improvements is not anticipated to significantly increase noise above current levels. The Noise Assessment Report by Golder Associates is provided in **Appendix D5**.

However, construction noise could impact receptors within the study area and the following general measures can assist in mitigating impacts:

- All construction equipment should be properly maintained according to manufacturer's recommendations and be in accordance with Ministry of Environment (MOE) Model Municipal Noise Control by-law.
- If any of the construction activities involve piling or blasting, they will need to be carried out in accordance with OPSS 120 and MOE NPC-119.

- Construction equipment and/or activities typically known to be of annoyance (e.g. piling) should consider one of the following:
 - Limit operating time within the daytime when ambient noise levels are expected to be higher.
 - Maintain an acceptable setback distance from the identified NSAs.
 - Carry out additional noise studies or monitoring program to verify and document noise levels.
 - Implement temporary noise barriers or other localized noise mitigation measures.
 - Investigate other alternative construction equipment or process to complete the task.