



Environmental Study Report

Lakeshore Road West Improvements
(Mississaga Street to Dorval Drive)
Town of Oakville

Prepared for:

Town of Oakville

1225 Trafalgar Road, Oakville, ON L6H 0H3

July 5, 2021



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Prepared by:

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July 5, 2021

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Executive Summary

Introduction

Introduction and Background

Wood Environment & Infrastructure Solutions (Wood), formerly Amec Foster Wheeler Environment & Infrastructure, was retained by the Town of Oakville in the fall of 2016 to undertake a Class “C” Environmental Assessment (EA) for Lakeshore Road West improvements between Mississauga Street and Dorval Drive (ref. **Figure E-1**). Through the town’s Official Plan “Livable Oakville” (2009) the objective of this study was to provide a safe, efficient and accessible transportation corridor with choices of mobility; to foster the use and development of a sustainable transportation network; and to provide a network of on and off-road pedestrian and cycling facilities that allows for the use of active transportation modes as an alternative to the automobile. Much of this section of Lakeshore Road West is in poor structural condition and the Town’s Capital Works Program, based on the conclusions of the Transportation Master Plan, plans for this section of roadway to be reconstructed in four phases over the next ten years.

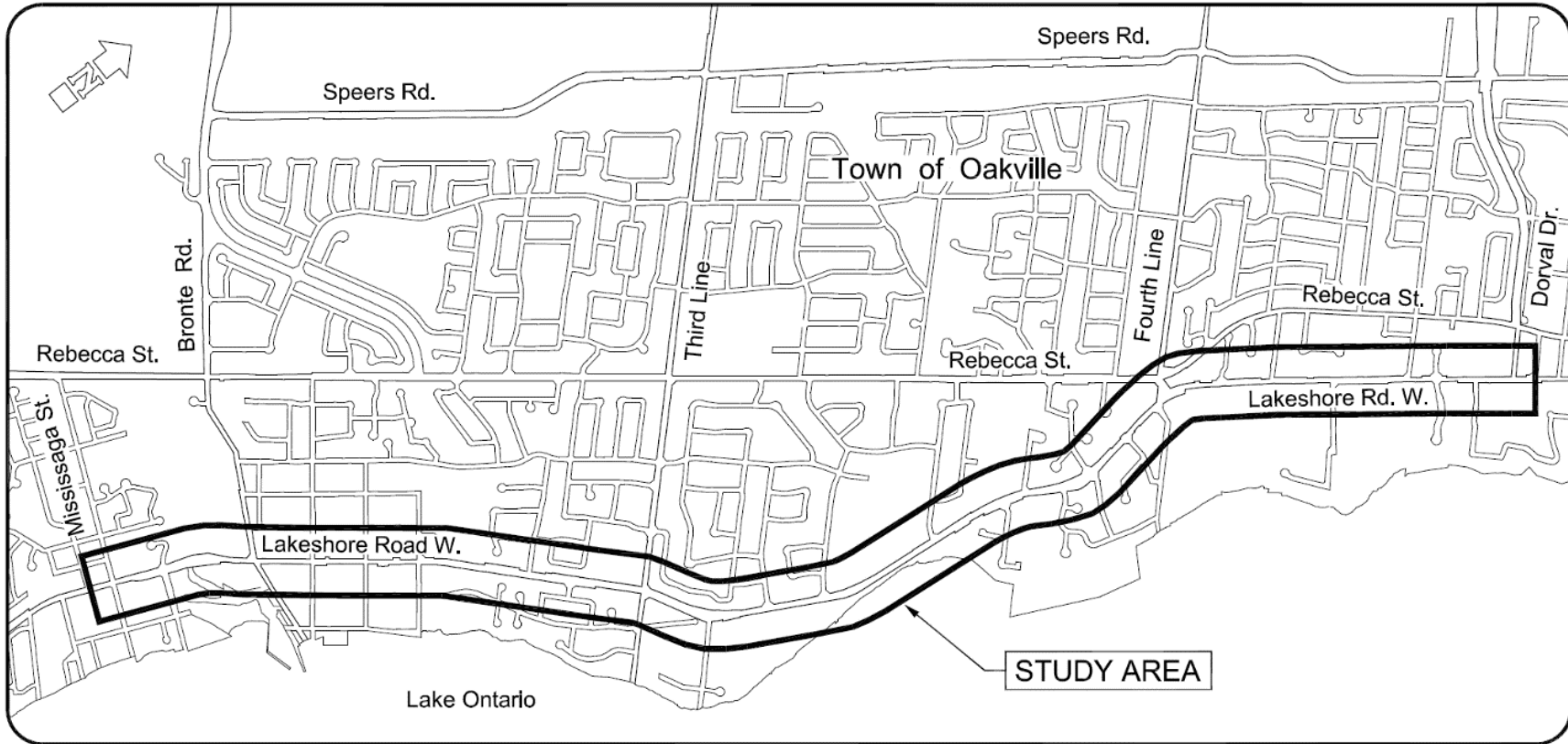
The purpose of this Class EA study was to determine what improvements are required for Lakeshore Road West, to select the preferred design and to identify any measures needed to mitigate impacts of the works.

Lakeshore Road is the only east-west roadway south of the Queen Elizabeth Way (QEW) that extends from one end of Oakville to the other, providing connections to Mississauga in the east and Burlington in the west. It is designated in the town’s Official Plan as a minor arterial roadway. Lakeshore Road West from Mississauga Street to Bronte Road has a four-lane cross-section, including the Bronte Creek Bridge. Lakeshore Road, from Bronte Road to East Street is a three-lane cross-section with the centre lane being used for left turns. Between East Street and Dorval Drive, Lakeshore Road West is currently a tree-lined two-lane arterial road.

Class Environmental Assessment Process

The Class Environmental Assessment process is a mechanism by which planning and approval of municipal servicing is provided in an efficient, timely, economical and environmentally responsible manner. This project was classified as being subject to the Municipal Class EA process. It was conducted according to the requirements of Schedule ‘C’ projects as outlined in the Municipal Engineers Association document titled *Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 & 2015)* (Municipal Class EA).

Figure E-1: Key Plan



Problem and Opportunity Statement

The purpose of this study was to address existing and future opportunities and constraints along the Lakeshore Road West corridor between Mississauga Street and Dorval Drive, through a comprehensive, environmentally sound planning process, while facilitating dialogue between stakeholders with diverse interests. Based on a review of existing and future conditions, as well as preliminary consultation with stakeholders, it was determined that improvements are needed along the Lakeshore Road West corridor. The following specific problems and opportunities were identified:

- Improve intersection operations
- Accommodate transit and improve transit infrastructure, wherever possible;
- Improve roadway geometrics to meet current design standards;
- Provide and improve pedestrian and cyclist facilities;
- Improve pavement conditions;
- Improve traffic, pedestrian, and cyclist safety;
- Improve existing drainage stormwater management through installation of curb and gutter, and storm sewers;
- Improve creek crossings and structures; and,
- Accommodate future municipal services and utilities within the ultimate right-of-way

Consultation Program

An extensive consultation program was implemented for this project to ensure the public, Indigenous Nations, stakeholders from key community groups, agency staff and utility companies were consulted early on and throughout the Class EA process.

The study was initiated in November 2016. Key project milestones to date are outlined in the following table:

Consultation Schedule

Meeting	Date
Notice of Commencement published in newspaper and mailed to review agencies and affected public	Ad: November 24, 2016 and December 1, 2016 Letter: January 9, 2017

Meeting	Date
Meeting with Conservation Halton Staff – Stormwater Management Focus (Technical Agency Committee Meeting)	January 30, 2017
Technical Agency Committee Meeting	February 17, 2017
Notice of Public Information Centre No. 1 published in newspaper and mailed to review agencies and affected public	April 3, 2017
Stakeholder Group Meeting No.1	April 6, 2017
Public Information Centre No.1	April 20, 2017
Technical Agency Committee Meeting	May 30, 2017
Meeting with Mississaugas of the Credit First Nations	June 8, 2017
Utilities Meeting	October 30, 2017
Presentation to Heritage Committee	October 30, 2017
Stakeholder Group Meeting No. 2	November 2, 2017
Technical Agency Committee Meeting	November 9, 2017
Notice of Public Information Centre No. 2 published in newspaper and mailed to review agencies and affected public.	Ad: November 16, 2017 and November 23, 2017 Letter: November 16, 2017
Presentation to Heritage Oakville Advisory Committee	November 21, 2017
Public Information Centre No. 2	November 29, 2017
Stakeholder Meeting – Third Line Roundabout	February 12, 2018
Meeting with Conservation Halton Staff – Stormwater Management Focus (Technical Agency Committee Meeting)	March 26, 2018
Draft Environmental Study Report to Community Services Committee	May 22, 2018
Public Meeting	July 25, 2018
Planning and Development Council Meeting – Direction to the staff regarding additional consultation and revaluation of alternative designs	August 7, 2018
Stakeholder Meeting – Mississauga Street to Third Line	March 29, 2019
Stakeholder Meeting – Third Line to Fourth Line	April 1, 2019
Stakeholder Meeting – Fourth Line to Dorval Drive	April 1, 2019
Site meeting with the study area residents	May 3, 2019
Stakeholder Meeting	March 16, 2021
Meeting with residents	April 22, 2021

Meeting	Date
Public Information Centre No. 3	April 6 to April 20, 2021 (interested individuals were encouraged to continue to submit comments past April 20, 2021)
Meeting with Oakvillegreen (hosted by Staff)	April 30th, 2021
Meeting with Coronation Park Residents Association (hosted by Staff)	May 20th, 2021

Existing and Future Conditions

The study area is located within the Town of Oakville and extends from Mississaga Street to Dorval Drive. In order to understand the study area and identify potential constraints, sensitivities and/or policy considerations, a review of the following components was undertaken:

- Land Use Plans
- Adjacent Projects and Planning Documents
- Scenic Corridor Elements
- Existing Roadway Network
- Active Transportation
- Transit
- Existing and Future Traffic Conditions
- Road Safety Performance
- Utilities
- Existing Bridge Conditions
- Natural Environment
- Archaeology
- Cultural Heritage
- Hydrology and Drainage

Transportation

As part of the needs assessment conducted in Phase 1 of this EA, the Project Team considered the aggregate traffic impacts of recent new development and planned developments within, and in close proximity to, the study area. Horizon years of 2021 (short term) and 2031 (longer term) were considered and a review of the operational performance along the corridor, including signalized intersections, was completed.

In addition, reassessment of the Traffic and Transportation Report and Road Safety Performance Assessment Report was completed to re-evaluate the justification and feasibility of traffic and safety analyses, based on input received from stakeholders.

Updates to traffic operational analysis and road safety assessment were conducted to review the effectiveness of the addition of a Two-Way-Left-Turn-Lane on Lakeshore

Road West between East Street and Dorval Drive. Results indicated that the traffic volumes entering and exiting driveway accesses along the corridor do not presently compromise capacity. Even though the Two-Way-Left-Turn-Lane could improve general traffic flows by removing turning traffic from the through lanes within the study limits, such improvement is considered as nominal. As a result, the traffic operational analysis does not warrant the implementation of a Two-Way-Left-Turn-Lane.

Safety performance assessment was also undertaken using the most recent historical collision data between 2013 and 2017. Locations of collisions by impact types were reviewed in detail to identify safety risks that are attributable to driveway access. The results of safety assessment did not show an overrepresentation of access-related collisions. Particularly, only segments between East Street and Wood Haven Park will likely benefit from a reduction in access-related collisions.

A pedestrian crossing assessment was also completed in conjunction with the Town of Oakville's *Pedestrian Safety Program, September 2017* (Paradigm Et. Al., 2017). Within the Study corridor, 10 pedestrian crossings were recommended to provide a safer pedestrian environment.

Development and Evaluation of Alternative Solutions

Phase 2 of the Class EA process requires that various reasonable solutions shall be identified and evaluated to address the problem and opportunity. The following Alternative Solutions were identified for this study:

- Alternative 1: Do Nothing
- Alternative 2: Improve other Roads
- Alternative 3: Multi-modal Improvements
- Alternative 4: Additional Improvements to Lakeshore Corridor
- Alternative 5: Widen Lakeshore Road West to 3 Lanes with Active Transportation Facilities

Based on a comprehensive assessment of the alternatives using a common set of criteria in the areas of transportation service, conformity with existing town policies and plans, the socio-economic environment, the natural environment and capital costs, the Preferred Solution was identified a combination of alternatives 3, 4 and 5, as follows:

- Multi-Modal Improvements
- Additional Improvements to the Lakeshore Road West Corridor, including turning lanes

- Widen Lakeshore Road West to 3 lanes (two-way left turn center turning lane) with active transportation facilities (bike lanes, multi-use trails and sidewalks)

Development and Evaluation of Alternative Design Concepts

Phase 3 of the Municipal Class EA process involves development and evaluation of alternative design concepts for the Preferred Solution. For this study, an initial Assessment of Alternatives was completed, which identified a Preferred Design Concept for the Study corridor. However, as a result of further consultation with the public and direction from the Town Council, a revised set of alternatives was developed, and a more rigorous assessment of those alternatives was completed. Accordingly, this report discusses the following:

- Initial Evaluation of Alternative Design Concepts
- Evaluation of Revised Alternative Design Concepts, based on direction from the Council to develop Alternative Design Concepts that would further reduce impacts (for example, number of tree removal, etc.)
- Technically Preferred Design Concept

Initial Evaluation of Alternative Design Concepts

Following the initial evaluation of alternatives, the following preferred design was identified for the Study Corridor:

Bronte Village Section: Mississaga Street to East Street

- 3.3 metre through lanes, a 3.5 metre centre turn lane
- 2.0 metre sidewalks and on-road 1.5 metre on road bike lanes with a 0.5m painted buffer in both directions

Suburban Section: East Street to Dorval Drive

- 3.3 metre through lanes, with a 3.5 metre centre turn lane
- On-road 1.5m bike lanes with a 0.5m painted buffer
- 1.5m sidewalk on the north side and a 3.0m multi-use trail on the south side

Consultation Regarding Design Revision

A Draft Environmental Study Report was prepared in 2018, which included details of the Preferred Design identified by the Initial Assessment of Alternatives. On May 22, 2018, Town of Oakville staff presented the draft Environmental Study Report to the Community Services Committee for approval. The committee passed a resolution to advise town staff to consult with the community regarding the implications on tree

preservation, property expropriation, daylight triangles and the selected locations for a centre turn lane, and report back in September 2018.

A public open house was held on July 25, 2018 at the Sir John Colborne Recreation Centre for Seniors on Lakeshore Road West to receive public input on the design and to discuss changes for the project design. On August 7, 2018 the town's Planning and Development Council directed the town staff to complete additional consultation and report back to Council in early 2019, with recommendations that include at least one option reflecting no continuous centre turn lane, no loss of trees and no expropriation of property while maintaining cycle lanes and reflecting sidewalks/multiuse paths on at least one side and minimizing impervious surfaces.

Accordingly, the Study Team developed and evaluated a revised set of alternative design concepts that aimed at maintaining scenic corridor values of the study corridor. The revised evaluation of alternative design concepts was presented at Stakeholder Meetings in March/April 2019, and is discussed below:

Evaluation of Revised Alternative Design Concepts

Following revised alternatives were developed for evaluation for the section of Lakeshore Road West between East Street and Dorval Drive:

Alternative Design A – No Impact

The design elements of this alternative are outlined below:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Convert to urban-standard curb & gutter cross-section with storm sewer system

Alternative Design A1 – Minimal Impact

The design elements of this alternative are outlined below:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- Addition of sidewalks (where missing)
- Intersection improvements

Alternative Design B – Hybrid

The design elements of this alternative are outlined below:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer

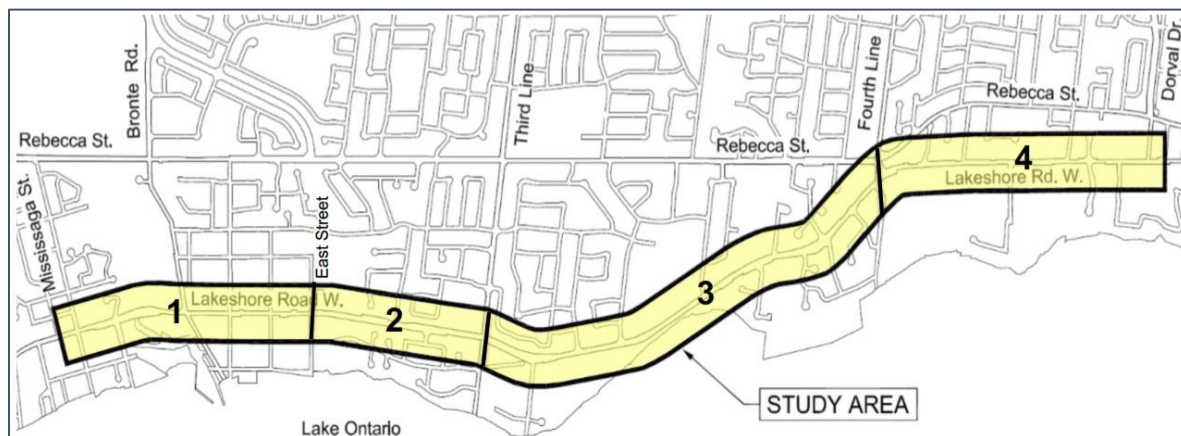
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- Intersection improvements

Study Corridor Blocks

The Study corridor was divided into following four (4) blocks (ref. **Figure E-2**):

- Block 1 - Mississaga Street to East Street;
- Block 2 - East Street to Third Line;
- Block 3 - Third Line to Fourth Line; and
- Block 4 - Fourth Line to Dorval Drive.

Figure E-2: Study Corridor Blocks



Evaluation of Revised Alternative Design Concepts

In order to address above, the following reassessments were completed:

- Traffic Operations Analysis and Safety Assessment
- Tree Assessment
- Property Assessment
- Cycling Reassessment
- Increase in Impervious Area Assessment

Technically Preferred Design Concept

With the exception of Block 1- Mississaga Street to East Street, Alternative Design Concepts were evaluated separately for each of the study corridor blocks. Block 1 - Mississaga Street to East Street was excluded from the reassessment as this section is already urbanized and currently has a three-lane cross-section. The preferred design for this section was carried forward from the initial evaluation of alternatives. An assessment of alternatives for Blocks 2 to 4 was completed to determine which alternative best fits the specific road section and will accommodate the overall technically preferred design concept for the study corridor while limiting the impacts to the scenic corridor, large trees and property. The technically preferred design concept for the entire study corridor is summarized below.

Block 1 - Mississaga Street to East Street

The key design elements of preferred design for this block are outlined below and illustrated in **Figure E-3**:

- 3.3 metre through lanes, with a 3.5 metre centre turn lane
- 2.0 metre sidewalks and 1.5 metre on road bike lanes with a 0.5m painted buffer in both directions
- Intersection improvements at Bronte Road

Block 2 - East Street to Third Line

The design elements of preferred design for this block are outlined below and illustrated in **Figure E-4**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- Intersection improvements

Block 3 - Third Line to Fourth Line

The design elements of preferred design for this block are outlined below and illustrated in **Figure E-4**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer

- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- Intersection improvements

Block 4 - Fourth Line to Dorval Drive

The design elements of Preferred Design for this block are outlined below and illustrated in **Figure E-5**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- 1.5m sidewalks on north and south sides
- Intersection improvements

Figure E-3: Block 1 - Mississaga Street to East Street – Preferred Design

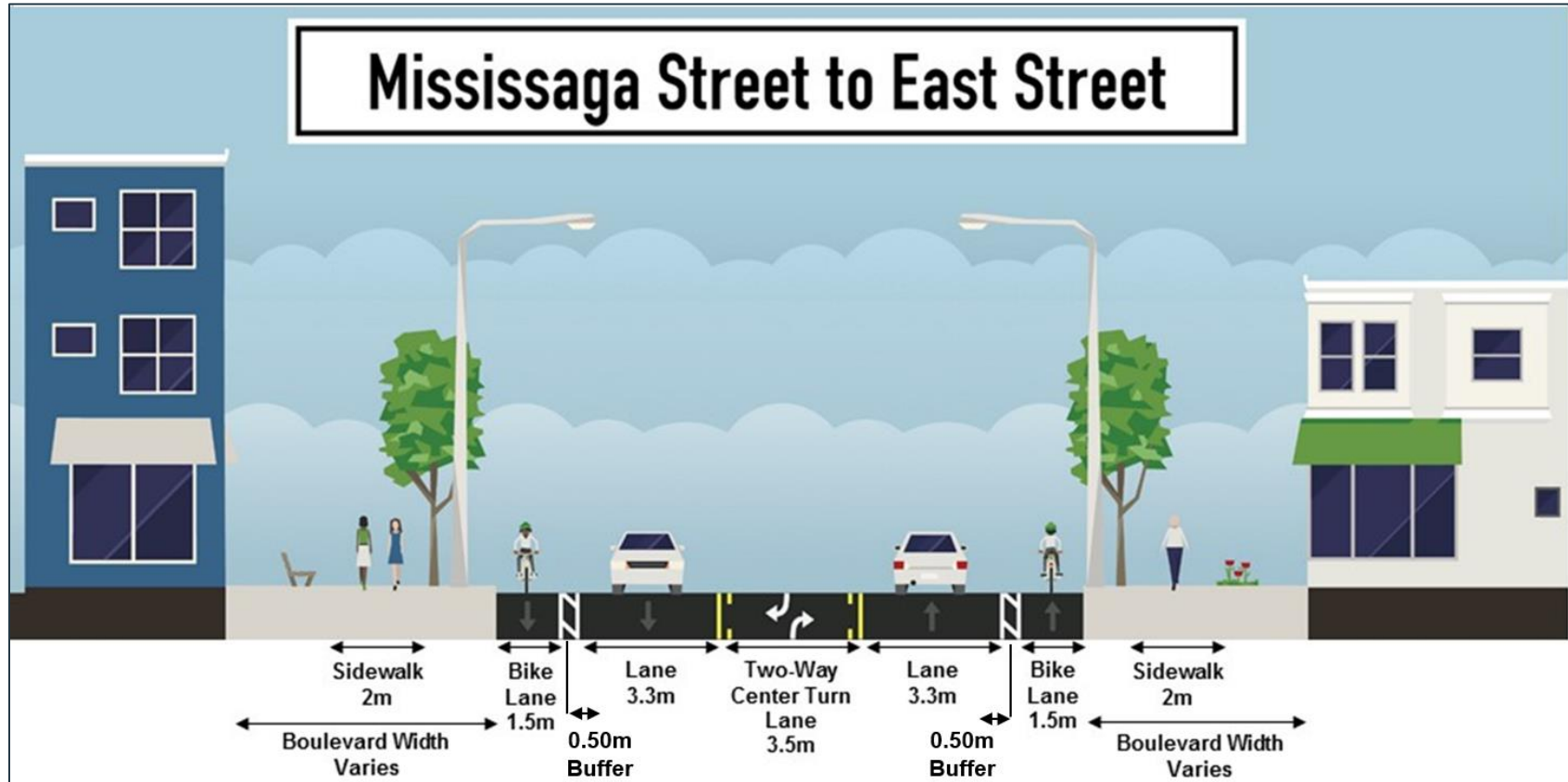


Figure E-4: Blocks 2 and 3 - East Street to Fourth Line – Preferred Design

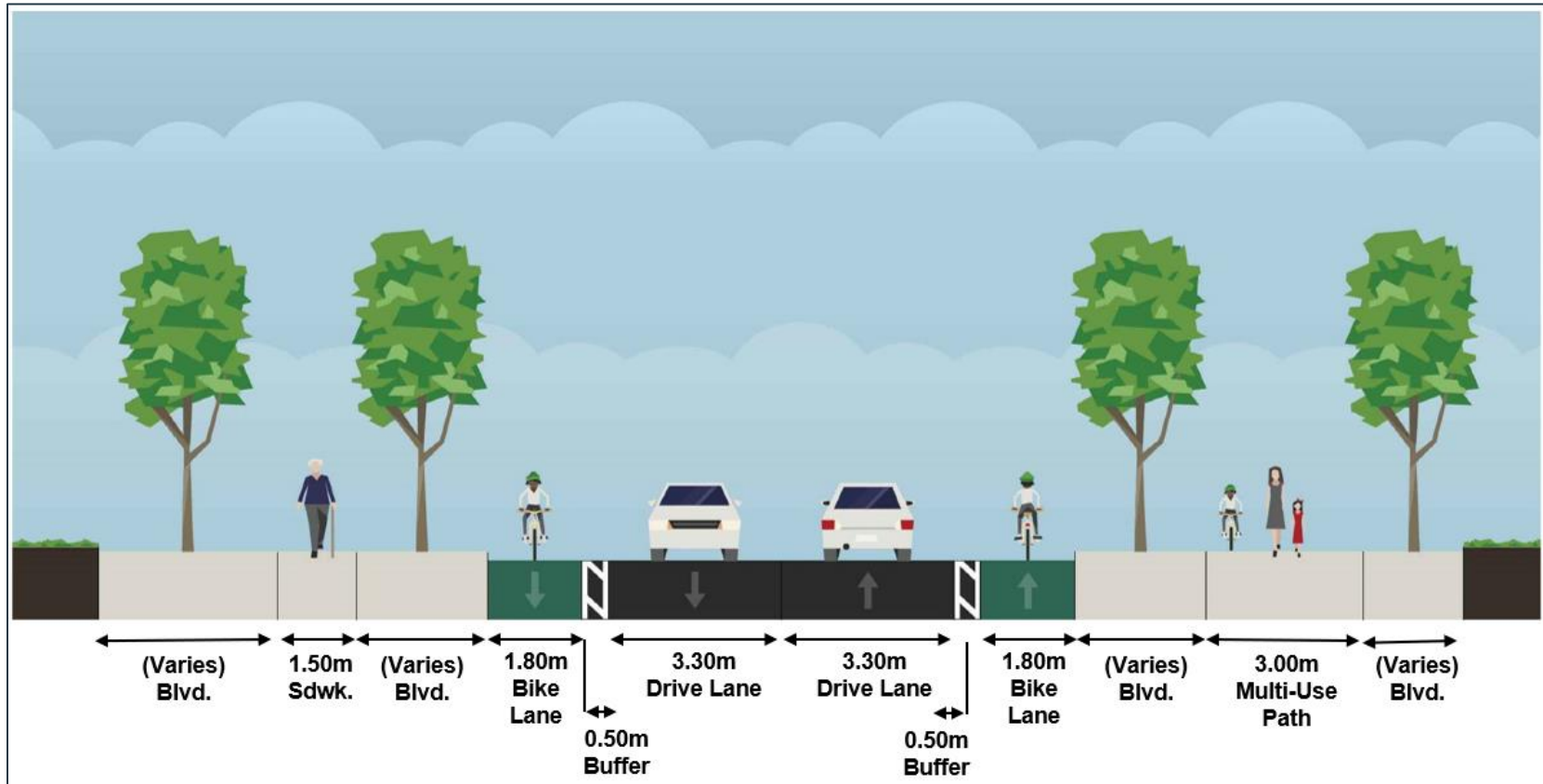
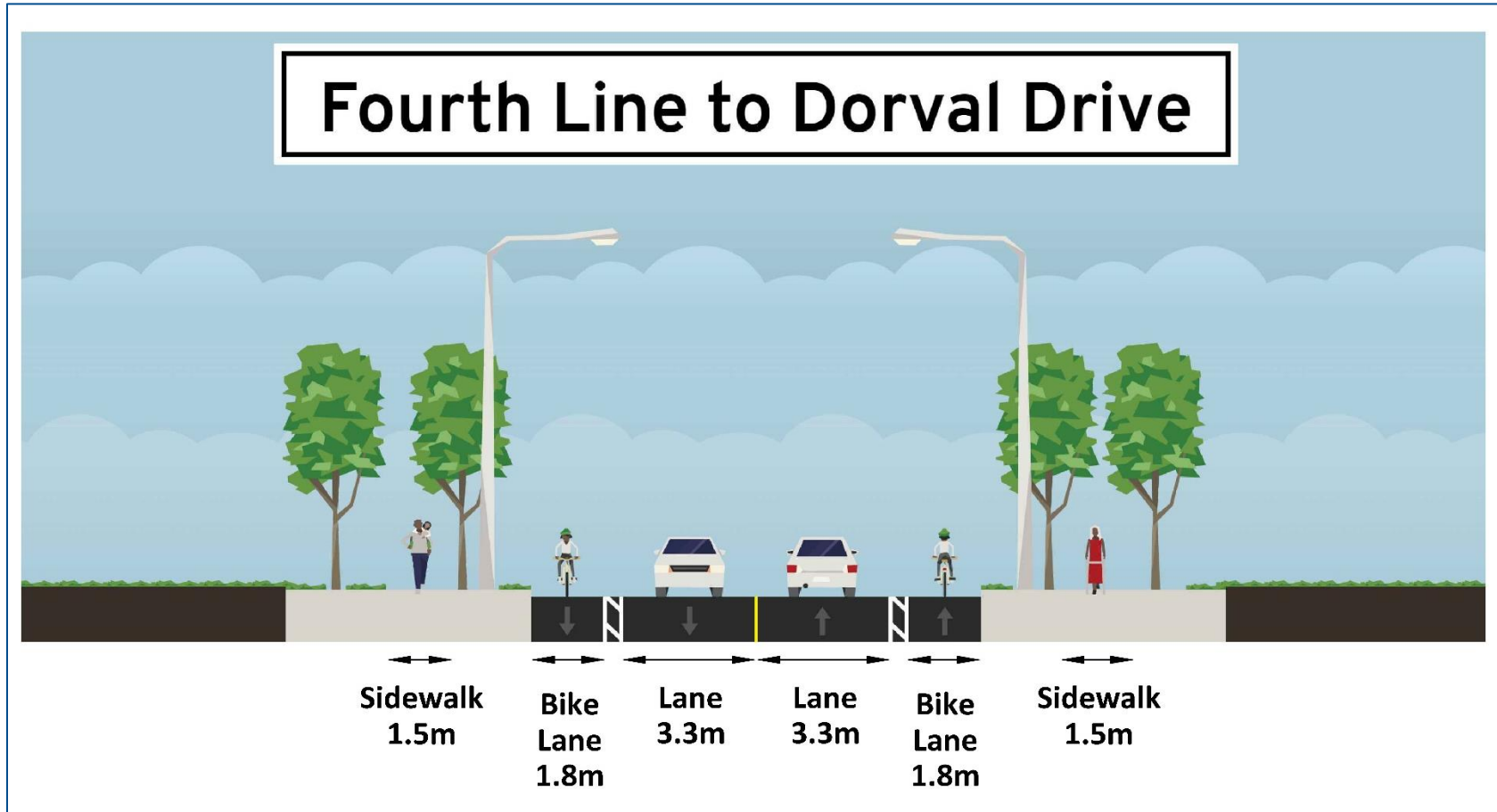


Figure E-5: Block 4 - Fourth Line to Dorval Drive – Preferred Design



Scenic Corridors Study (2020)

On August 6, 2019, the Planning and Development Committee of Council received a staff report entitled “Lakeshore Road West Class EA Update” (dated July 15, 2019), which recommended that staff be directed to undertake a Scenic Corridors Study and amend the Lakeshore Road West Class Environmental Assessment scope and work plan to incorporate findings of the Scenic Corridor Study for Lakeshore Road West (Town of Oakville, 2019).

The Scenic Corridors Study completed in February 2020 examined the Lakeshore Road and Trafalgar Road corridors to identify and evaluate the roadway, streetscape and framing elements that contribute to the scenic value. It identified four themes that support and define the characteristics and qualities of the scenic corridors. Each theme includes consideration(s) for future undertakings (such as, EAs, capital projects, Official Plan reviews, and other projects). The technically preferred design concept was reviewed against the themes and considerations identified in the Scenic Corridors Study to determine how it incorporates those considerations.

Major Features of the Recommended Plan

Description of the Technically Preferred Design

Horizontal Alignment

The proposed horizontal alignment will shift the centreline where required within the existing right-of-way to reduce the impacts on property, utilities and trees. No significant changes to horizontal alignment are proposed.

Vertical Alignment

The existing vertical alignment of Lakeshore Road is generally maintained, while providing for minimum gutter grades. Minor adjustments are to be reviewed during detailed design.

Intersections and Side Streets

Intersection designs have been developed to provide an acceptable level of service at each intersection. Signal warrants completed for major non-signalized intersections concluded no new traffic signals were warranted.

Transit Stops

The existing transit stop locations along the Lakeshore Road West corridor will be maintained.

Private Entrances

In general, existing private entrances will be reconstructed to match the original driveway width and material. The Bronte Village Revitalization Study has proposed the consolidation of existing commercial entrances and modification of roadway access from Lakeshore Road West to side streets as a priority. However, for purposes of this study, all existing entrances are being maintained, pending further development of the revitalization plans.

Active Transportation Facilities

1.5m – 1.8m on street bike lanes with a 0.5m painted buffer will be constructed in both directions along Lakeshore Road West from Mississauga Street to Dorval Drive.

Sidewalks 1.5m - 2.0m in width will be constructed on both sides of Lakeshore Road West between Mississauga Street and East Street.

On the north side of Lakeshore Road West from East Street to Dorval Drive, the existing 1.5m sidewalk will be retained and new 1.5m sidewalk will be constructed where gaps currently exist. A 3.0m multi-use trail will be constructed on the south side of Lakeshore Road West between East Street and Fourth Line. The existing 1.5m sidewalk on the south side from Fourth Line to Dorval Drive will be maintained where possible and reconstructed where the sidewalk is impacted by roadway construction.

Stormwater Management

A Stormwater Management Report was completed by Wood, which made the following recommendations for drainage system improvements and stormwater management:

- Because Lakeshore Road West is located immediately upstream of Lake Ontario, no stormwater management quantity controls are required to reduce peak flows to drainage outlets.
- Numerous new and upgraded storm sewers will be required to provide adequate flow conveyance. In some locations the potential basement flood risk could not be eliminated due to the basement elevations and storm system profile either on Lakeshore Road West or downstream of Lakeshore Road West. As part of the detailed design, new sump pumps, instead of gravity drains, could be added to discharge to grade and existing sump pumps retrofitted to discharge to grade could also be considered.
- The improved channel within Coronation Park should be connected to the proposed storm sewer system at the Westminster Drive and Lakeshore Road West intersection.

- To meet the water quality control, erosion infiltration trenches are recommended for the storm sewer systems draining to Fourteen Mile Creek and McCraney Creek. The infiltration trenches discharging to Fourteen Mile Creek would also provide thermal mitigation to address MNRF redbreasted sunfish habitat thermal mitigation requirements.
- An infiltration trench has been recommended for the road area draining to Birch Hill Lane.
- One (1) roadside bioretention system has been recommended for water quality treatment near Bronte Athletic Park.
- Various locations, in particular in the Bronte Village section of the corridor, have been recommended to use Soil Cells as a water quality measure (**Figure E-6**).
- Offsite LID BMP retrofits at Coronation Park, St. Jude's Cemetery and Bronte Creek Harbour (east side) have been recommended to provide water quality improvements (**Figure E-6**).
- Permeable pavers and/or pavement is recommended for use for the proposed multi-use-pathway at various locations along Lakeshore Road West.
- Oil/grit separators (OGS) have been recommended within the Lakeshore Road West R.O.W. at various locations at a combined cost of \$1,300,000. Whenever possible, additional water quality measures have been recommended in addition to the OGS units.
- Various LID BMP measures (**Figure E-6**) have been proposed to be implemented in the Lakeshore Road West corridor to provide source control (infiltration) as per the recommendations of the town's Stormwater Master Plan (Wood, June 2020) to offset the hydraulic impacts of land use intensification and climate change. The LID BMP measures have not been sized based on their ability to infiltrate 25 mm of precipitation, rather they have been preliminarily sized according to the potential for implementation which has been based on spatial and grading constraints. The size and level of treatment provided by each of the LID BMP units can be assessed at the next stages of planning and design.
- The cost to implement the storm sewer hydraulic upgrades would be \$8,815,000, and the cost to implement the LID BMP source controls has preliminarily estimated at \$9,261,000.
- The existing Bronte Creek and Fourteen Mile Creek structures will remain as is.
- The culvert at Station 3+450 needs to be extended by 4 m ± to accommodate the proposed road width. Retaining walls are required at each side of the culvert.

- The existing McCraney Creek culvert is recommended to be replaced with a 14.6 m by 4 m by 24.3 m structure that conveys the Regional Storm.

Hydraulic Crossing and Structure Design

Bronte Creek Bridge

The existing Bronte Creek bridge requires no structural changes. It will be modified with a new pavement marking plan to accommodate the new cross-section. Pedestrian protection will also be provided by constructing a new barrier wall or railing.

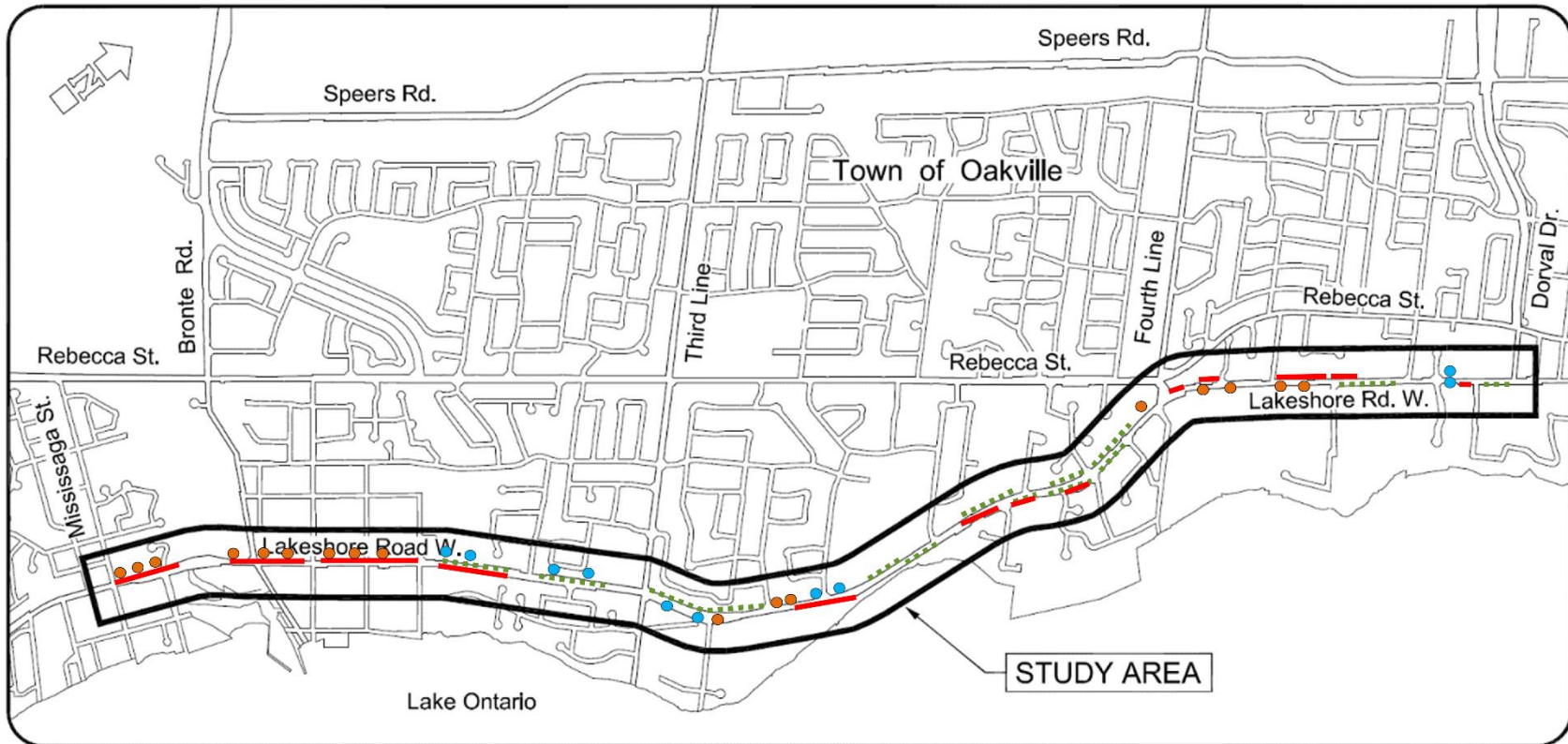
14 Mile Creek Bridge

The existing 14 Mile Creek bridge requires no structural changes. The bridge deck will be modified with new pavement markings to accommodate the new cross-section.

McCraney Creek Bridge

The McCraney Creek Bridge requires replacement due to poor condition and flooding potential.

Figure E-6: LID BMP Recommended Implementation Location Plan



Recommended LID BMPs

- Enhanced Grass Swales
- Bioretention Systems
- Permeable Pavers/Pavement or Infiltration Trenches
- Soil Cells

Utilities

Utility conflicts have been minimized to the degree possible. Some conflicts with existing utilities will result from the proposed improvements. Utility relocation requirements will be clarified and finalized during detailed design.

Property Requirements

The need for some property acquisition has been identified. The proposed property takings are primarily narrow frontage strips between Mississauga Street and East Street, to provide sidewalks and on-street parking. Lay-by parking was requested by the Bronte Village BIA for the shoppers and restaurant visitors in the Bronte Village section.

Cost Estimate

The estimated capital cost of the preferred design concept is \$43,434,000.00, not including costs for property acquisition, utility relocations or engineering. The high-level breakdown of the estimate is presented in the table below.

Description	Cost
Full Road Reconstruction	\$8,905,000
McCraney Creek Structure Replacement	\$2,000,000
Storm Sewer including OGS	\$10,115,000
LID	\$9,261,000
Reinstall 8 Traffic Signals	\$880,000
Install 10 Pedestrian Signals	\$400,000
Illumination	\$1,850,000
Minor Items and Contingency 30%	\$10,023,300
TOTAL	\$43,434,300

Environmental Issues and Commitments

Land Use

Future land use within the study area will remain consistent with the current uses of commercial and residential, with increasing infill. The Bronte Mall, within the Bronte Village area, is currently undergoing improvements, and will be further integrated into the urban design of the roadway corridor, in the detailed design phase.

Noise Impacts

A traffic noise study was completed which determined that traffic related noise impacts are anticipated to be minimal and noise mitigation is not required. Construction noise impacts are temporary, and the contractor will be responsible for controlling noise, in adherence to the Town of Oakville Noise By-Law 2008-098.

Aquatic Resources

Within the study area, Lakeshore Road West crosses four permanent watercourses including Bronte Creek, Fourteen Mile Creek, McCraney Creek, and an unnamed tributary located to the east of the water treatment plant. A secondary source review and correspondence with regulatory authorities revealed records of American Eel (*Anguilla rostrata*) and Silver Shiner (*Notropis photogenis*) in Bronte Creek, and Redside Dace (*Clinostomus elongatus*) within Fourteen Mile Creek.

The improvement works for the crossing structures will likely require 'in-water' works, depending on the extent of the structure modifications. In-water works should occur within appropriate timing windows for construction. Runoff from construction activities may lead to a temporary increase in erosion risk. The potential for such effects is low if appropriate mitigation and environmental protection planning measures are applied consistent with Ontario Provincial Standards. Further mitigation measures to protect aquatic habitat will be developed during the detailed design phase.

Terrestrial Resources

Through a secondary source review of Land Information Ontario data, several natural heritage features have been identified. Correspondence with MNR reports that 14 Species at Risk (SAR) have been recorded in the vicinity of the study area, 11 of which are terrestrial or semi-terrestrial. Several wildlife SAR and species of conservation concern were observed during field investigations, including: Barn Swallow, Chimney Swift, Eastern Wood-Pewee, Peregrine Falcon, Canada Warbler and Red-necked Grebe. These species are typically tolerant of disturbance and have learned to adapt in an urbanized environment. Generally, habitat for SAR and species of conservation concern is limited and highly fragmented within the project study area. Only minor impacts to wildlife and supporting habitat are anticipated from the proposed project works.

Confirmation of habitat use within identified Significant Wildlife Habitats should be conducted at the detailed design stage of the project to support the effects assessment and the development of environmental protection measures.

Tree Preservation

The technically preferred design was selected following the re-evaluation of alternatives that considered impacts to mature trees and other vegetation. The existing trees located along the Lakeshore Road corridor are preserved, where possible. Where tree removals are required these trees will be replaced consistent with town policy. A Tree Replacement Plan will be developed during the detailed design phase. The Tree Replacement Plan will recommend native trees and vegetation and identify areas for their planting.

Fluvial Geomorphic Assessment

As part of the corridor improvements, the Fourteen Mile Creek bridge needs to be replaced. A study of channel characteristics and flow volumes, called a Fluvial Geomorphic Assessment, was conducted to determine the channel configuration that would accommodate the new bridge over the long term without causing bank erosion, or scour at the structure. The assessment also served to delineate the channel requirements to protect fish habitat and allow fish passage.

Archaeology

A Stage 1 archaeological assessment has determined that a potential for archaeological resources exists within the Study Area. A Stage 2 archaeological assessment is required prior to any form of land alteration within the areas of archaeological potential.

If construction related activities extend past the current right-of-way fronting St. Jude's Cemetery (located at 258 Lakeshore Road West in Oakville), a cemetery investigation may be required. The preliminary design does not identify any construction outside of the current right-of-way, however, this is subject to detailed design. No further archaeological assessment is required for the remainder of the Study Area.

Cultural Heritage

Indirect impacts are anticipated to the following two (2) heritage properties:

- 3014 Lakeshore Road West (Bronte Bluffs and Bronte Harbour)
- 2457 Lakeshore Road West (Bronte Cenotaph)

In addition, a potential indirect impact was identified for 372 Lakeshore Road West due to the close proximity of the proposed work to landscape features associated with this property that are located within the existing right-of way.

These cultural heritage features should be depicted on project drawings during detailed design phase and appropriate notes should be included that state that impacts on these features should be avoided.

Permitting Requirements

Various permits will be required to be obtained during the detailed design. Regulatory agencies should be consulted and required permits should be obtained prior to construction activities.

Implementation

Construction Phasing

The Town of Oakville identifies completion of the project in four phases, as follows:

Phase 1 – Lakeshore Road West from Fourth Line to Dorval Drive (including replacement of McCraney Creek Bridge):

Detailed design 2022, land acquisition and utility relocation 2023, construction 2024

Phase 2 – Lakeshore Road West from Fourth Line to Sandwell Drive:

Detailed design 2023, land acquisition and utility relocation 2024, construction 2025-2026

Phase 3 – Lakeshore Road West from Sandwell Drive to Third Line:

Detailed design 2023, land acquisition and utility relocation 2024, construction 2025-2026

Phase 4 – Lakeshore Road West from Mississaga Street to Third Line:

Detailed design 2024, land acquisition 2025 and utility relocation 2026, construction 2027

Notable Items to be Considered in Phase 5 - Implementation

During the study, several items were identified for further consideration or discussion after the EA is filed and as the project moves into Phase 5 – Implementation. These include the following:

- The lane reduction from 4 lanes to 3 lanes from Mississaga Street to Bronte Road is to be deferred until such time as the east / west extension of Wycroft Road (west of Bronte Road) is completed.
- A Stage 2 Archaeological Assessment is required. This is to be completed as part of the detailed design.

-
- The existing trees located along the Lakeshore Road corridor will be preserved, where possible. Where tree removals are required these trees will be replaced consistent with town policy. A Tree Replacement Plan will be developed during the detailed design phase. The Tree Replacement Plan will recommend native trees and vegetation and identify areas for their planting. As part of the detailed design, traffic signal timings and traffic progression should be reviewed and optimized.
- Access control and access management along Lakeshore Road West should be reviewed further for opportunities to combine commercial accesses where possible, particularly in Block 1 – Mississaga Street to East Street.
- The proposed pedestrian crossing locations and crossing types identified in this report are to be reviewed further during detailed design. Careful planning will be required to ensure no conflict between the proposed crossings and the transit stops.
- The recommended LID BMPs within the right-of-way should be further investigated by assessing groundwater and bedrock elevations and ensuring the required clearances can be obtained. Detailed stormwater management commitments are discussed in Section 7.2.7 of this report.

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Wood Environment & Infrastructure Solutions is committed to achieving sustainability through balancing economic growth, social responsibility and environmental protection.

1.0 Introduction and Background

1.1 Introduction

The Town of Oakville (town) has completed a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for improvements to Lakeshore Road West from Mississaga Street to Dorval Drive. The improvements are required to meet the needs of the town to the year 2031. The town is considering a wide range of options to satisfy travel demand, operational requirements, active transportation, drainage, structural, pavement and other deficiencies within the Lakeshore Road West corridor. Wood was retained by the town to complete the study.

Lakeshore Road begins below the QEW Skyway Bridge between Burlington and Hamilton and extends along the north shore of Lake Ontario to Toronto. Within the Town of Oakville, Lakeshore Road West is a minor arterial roadway that begins at Burloak Drive in the west, extends to Sixteen Mile Creek where it then becomes Lakeshore Road East, and continues to the east boundary of Oakville. Lakeshore Road West within the study area extends through Bronte Village, and provides access to the Bronte Harbour (ref. **Figure 1-1** Key Plan).

1.2 Environmental Assessment

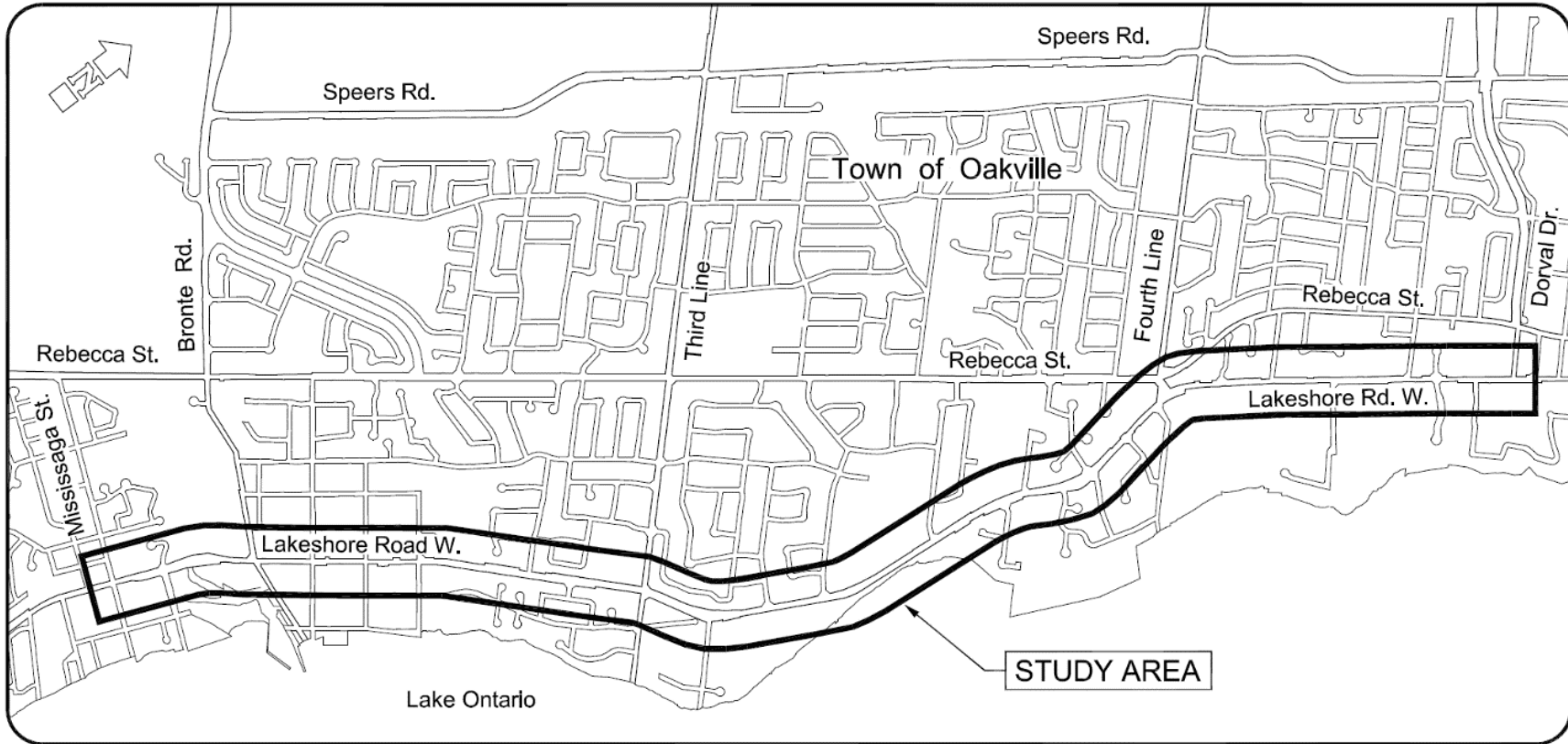
1.2.1 Class Environmental Assessment Process

The Class Environmental Assessment process is a mechanism by which planning and approval of municipal servicing is provided in an efficient, timely, economical and environmentally responsible manner. It represents a consistent, streamlined and easily understood process for planning and implementing municipal infrastructure projects. Under the Provincial Environmental Assessment (EA) Act, projects are classified as approved, subject to screening, subject to a Class Environmental Assessment (Class EA), or subject to a full Environmental Assessment. This project was classified as being subject to the Municipal Class EA process. It was conducted according to the requirements outlined in the Municipal Engineers Association document titled *Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 & 2015)* (Municipal Class EA).

Consistent with the Municipal Class EA, the study approach has been designed to meet the following objectives:

- i. Protection of the environment, including natural, social and economic components of the environment.

Figure 1-1: Key Plan



- ii. Participation of a broad range of stakeholders in the study process to allow for sharing of ideas, education, testing of creative solutions and developing alternatives.
- iii. Documentation of the study process in compliance with all phases of the Municipal Class EA process.

The Class EA process classifies projects according to their level of complexity and potential environmental impacts. These are termed "Schedules," and are summarized below:

Schedule A and A+ projects involve minor modifications to existing facilities. Environmental effects of these projects are generally small; therefore, the projects are considered pre-approved.

Schedule B includes improvements and minor expansion to existing facilities. There is potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with those affected. Schedule B projects are required to proceed through Phases 1, 2 and 5 of the Municipal Class EA process.

Schedule C includes the construction of new facilities and major expansion of existing facilities. These projects proceed through the full environmental assessment planning process outlined in the Municipal Class EA document. These projects are required to fulfill the requirements of all five phases of the Municipal Class EA process.

This project is being completed under the requirements of a Schedule C Class EA. The following Schedule C trigger applies to this project:

- Reconstruction or widening where the reconstructed road or other linear paved facilities (e.g. HOV lanes) will not be for the same purpose, use, capacity or at the same location as the facility being reconstructed (e.g. additional lanes, continuous centre turn lane) where the estimated cost is greater than \$2.4 million.

The following Class EA planning phases apply:

- **Phase 1** - Identify the problem (deficiency) or opportunity.
- **Phase 2** - Identify and evaluate alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input.
- **Phase 3** - Identify Alternative Design Concepts for the preferred solution implementation by taking into consideration the existing environment, and

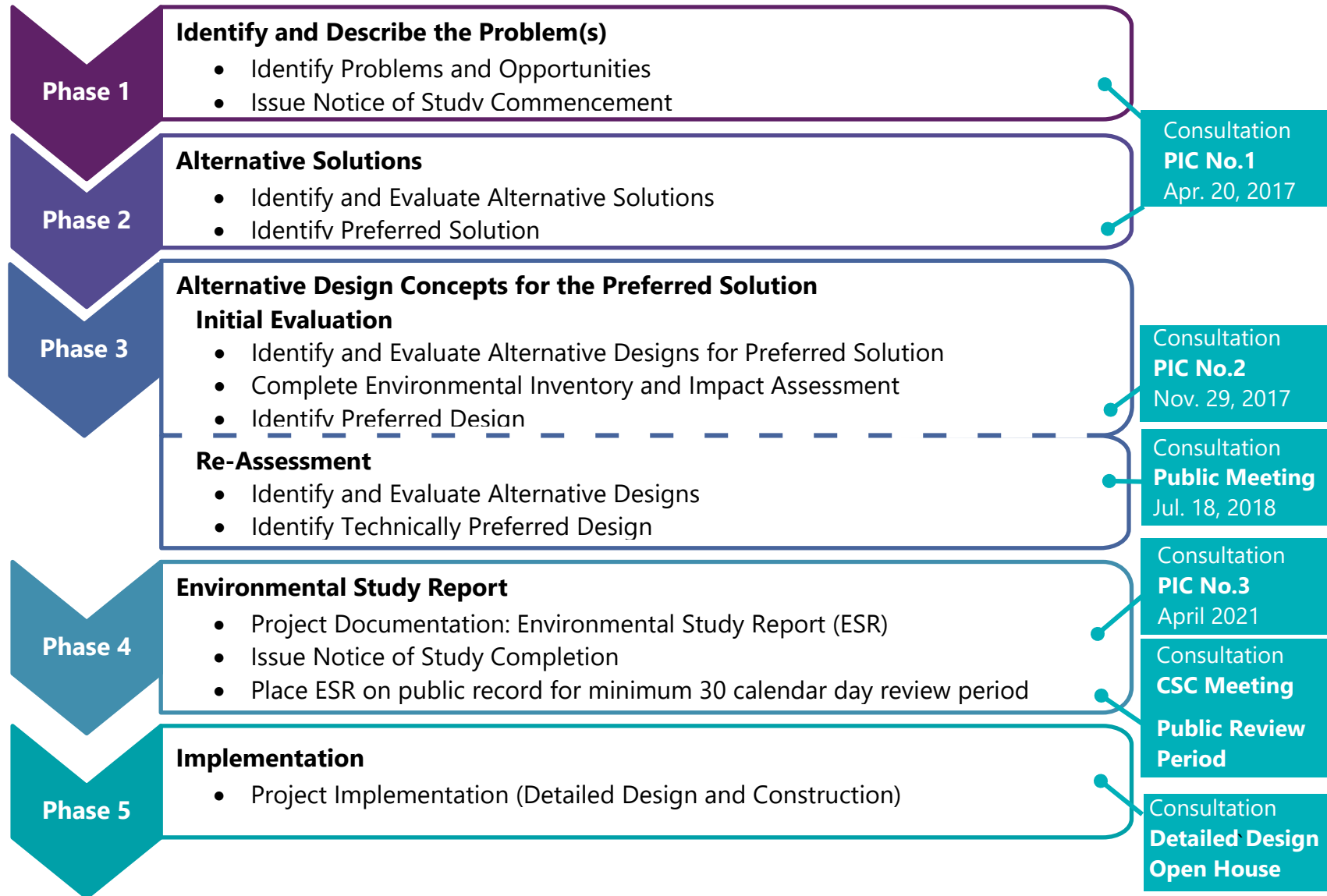
establish the preferred design concept by taking into account public and review agency input.

- **Phase 4** - Document the Environmental Assessment process that includes the design and consultation process, in an Environmental Study Report for public review.
- **Phase 5** - Complete contract drawings and documents, and proceed to construction and operation; monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facility.

The Phases of the Municipal Class EA process that will be used in this project are illustrated in **Figure 1-2**.

At the time of preparation of this report, the Municipal Engineers Association had proposed major amendments to modernize/streamline the Municipal Class EA process. Every project belonging to various Schedules, as described above, was reviewed and, where appropriate, re-classified. On July 8, 2020, the Ministry of the Environment, Conservation and Parks posted the Municipal Engineers Association's proposed amendments to the Municipal Class EA process on their Environmental Registry for a 45-day public commenting period. Following the public comment period, the MECP and Municipal Engineers Association will respond to comment received and finalize the amendments along with a recommendation for the Minister of the Environment, Conservation and Parks. These proposed amendments will come into effect following Minister's approval.

Figure 1-2: General Municipal Class Environmental Assessment Process



1.2.2 Environmental Study Report

This Environmental Study Report (ESR) documents the rationale for the project, the background to the study, existing and future conditions within the study area, the planning, design and consultation process leading to the preferred alternative, anticipated positive and negative impacts, and proposed mitigation measures.

1.2.3 Filing of the ESR

All parties having expressed an interest in the project were notified by letter, regarding the completion of the project and filing of the ESR. In addition, a Notice of Study Completion was placed in the local newspaper, the Oakville Beaver, in accordance with the requirements of the Class EA process.

In order to limit the spread of COVID-19, the ESR is being made available at the town's website for public review: <https://www.oakville.ca/residents/lakeshore-road-west-improvements-class-ea.html>

Interested persons may provide written comments to our project team. All comments and concerns should be sent directly to the following Proponent Contact at the Town of Oakville:

Syed Rizvi, M.Sc., P.Eng.,
Transportation Engineer, Town of Oakville
Tel: 905-845-6601 (Ext. 3981)
Email: syed.rizvi@oakville.ca
Address: 1225 Trafalgar Road, Oakville, ON L6H 0H3,

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e. requiring an individual/comprehensive EA approval before being able to proceed), or that conditions be imposed (e.g. require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name.

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

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

Minister - Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
Minister.mecp@ontario.ca

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

Requests should also be sent to the Town of Oakville staff identified above.

All personal information included in the request – such as name, address, telephone number and property location – is collected, under the authority of section 30 of the Environmental Assessment Act and is collected and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the Freedom of Information and Protection of Privacy Act (FIPPA) does not apply (s.37). Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

1.3 Project Organization

The Project Team consisted of staff from the following organizations:

Proponent:

Town of Oakville

Syed Rizvi, Town of Oakville
Jill Stephen, Town of Oakville
Martin Maguire, Town of Oakville
Rita Juliao, Town of Oakville
Rakesh Mistry, Town of Oakville
Joanne Phoenix, Town of Oakville
Christina Tizzard, Town of Oakville
Paul Allen, Town of Oakville
Sue Schappert, Town of Oakville
Jana Kelemen, Town of Oakville
Brad Sunderland, Town of Oakville
Kristina Parker, Town of Oakville

Prime Consultant:

Wood Environment & Infrastructure Solutions

David Sinke, Project Manager
Bob Felker, Assistant Project Manager / Senior Environmental Planner
Mir Ahsan Talpur, Environmental Planner
Louise McAndrew, Environmental Planner
Mary Kelly, Public Consultation Specialist

Sub Consultants:

Intus Road Safety: Gerry Forbes – Traffic Safety
McWilliams Landscaping: James McWilliams – Landscape Architect
AquaLogic Consulting: Bill de Geus – Fluvial Geomorphology
U Tech Engineers Inc.: Upul Padmanath – Illumination Report

1.4 Project Background

Lakeshore Road begins below the QEW Skyway Bridge between Burlington and Hamilton and extends along the north shore of Lake Ontario to Toronto. Within the Town of Oakville, Lakeshore Road West is a minor arterial roadway that begins at Burloak Drive in the west, extends to Sixteen Mile Creek where it then becomes Lakeshore Road East, and continues to the east boundary of Oakville. Lakeshore Road West within the study area extends through Bronte Village, and provides access to the Bronte Harbour.

1.5 Previous Studies and Adjacent Projects

The project team reviewed the following planning documents, guidelines and other reports relevant to the Lakeshore Road West corridor. The documents listed below are the key documents being referenced by the project but the list is not all inclusive.

Halton Region Studies/Documents:

- Halton Region Transportation Master Plan 2031 (2011)
- Halton Region Active Transportation Master Plan (2015)

Town of Oakville Studies/Documents:

- Town of Oakville Town-Wide Flood Study (2008)
- Livable Oakville Plan – Official Plan (2009)
- Bronte Village Revitalization Study (2009)
- Official Plan Review (ongoing)
- Bronte Village Growth Area Review (Council adopted OPA December 2017))
- Urban Structure Review (Approved 2018)
- Town of Oakville Growth Areas Transportation Report (2009)
- Town of Oakville Active Transportation Master Plan (2009 and 2017)
- Bronte Village Commercial Parking Implementation (2010)
- Town of Oakville Transit Strategy (2010)
- Switching Gears – Town of Oakville Transportation Master Plan (2013 and 2018 TMP review)
- Town of Oakville Streetscape Strategy (2014)
- Livable by Design Manual Part A – Urban Design Direction for Oakville (2014)
- Town of Oakville Pedestrian Safety Program (2017)

- Livable by Design Manual Part B – Urban Design Direction for Bronte Village Growth Area (2018)
- Coronation Park Drainage Improvements (Wood, 2019)
- Town of Oakville, Stormwater Master Plan Study (Wood, 2020)
- Scenic Corridors Study – Lakeshore Road East and West and Trafalgar Road between Cornwall Road and Lakeshore Road East (Town of Oakville, 2020)
- Town of Oakville’s OSIM Inspections (Wood, 2020)
- Flood Mitigation Opportunities Study - Fourteen Mile Creek and McCraney Creek Systems (Wood, ongoing)

2.0 Consultation Program

An extensive consultation program was implemented for this project to ensure that the public, Indigenous groups, stakeholders from key community groups, agency staff and utility companies were consulted early on, and throughout the Class EA process.

2.1 Public Consultation Plan

In January 2017, Wood prepared a Public Consultation Plan addressing communication and consultation activities with stakeholders, including the general public, interested persons, Indigenous Communities and government agencies. This Consultation Plan has directed Public Consultation activities throughout the Class EA process.

2.1.1 Contact List

A public contact list was generated from Town of Oakville records, which included all residents within 125 m of the Study Area. Additional contacts were added by request, including through completion of PIC comment forms.

2.2 Consultation Schedule

The study was initiated in November 2016. Project milestones are as follows:

Table 2-1: Consultation Schedule

Meeting	Date
Notice of Commencement published in newspaper and mailed to review agencies and affected public	Ad: November 24, 2016 and December 1, 2016 Letter: January 9, 2017
Meeting with Conservation Halton Staff – Stormwater Management Focus (Technical Agency Committee Meeting)	January 30, 2017
Technical Agency Committee Meeting	February 17, 2017
Notice of Public Information Centre No. 1 published in newspaper and mailed to review agencies and affected public	April 3, 2017
Stakeholder Group Meeting No.1	April 6, 2017
Public Information Centre No.1	April 20, 2017
Technical Agency Committee Meeting	May 30, 2017
Meeting with Mississaugas of the Credit First Nations	June 8, 2017
Utilities Meeting	October 30, 2017
Presentation to Heritage Committee	October 30, 2017
Stakeholder Group Meeting No. 2	November 2, 2017

Meeting	Date
Technical Agency Committee Meeting	November 9, 2017
Notice of Public Information Centre No. 2 published in newspaper and mailed to review agencies and affected public.	Ad: November 16, 2017 and November 23, 2017 Letter: November 16, 2017
Presentation to Heritage Oakville Advisory Committee	November 21, 2017
Public Information Centre No. 2	November 29, 2017
Stakeholder Meeting – Third Line Roundabout	February 12, 2018
Meeting with Conservation Halton Staff – Stormwater Management Focus (Technical Agency Committee Meeting)	March 26, 2018
Draft Environmental Study Report to Community Services Committee	May 22, 2018
Public Meeting	July 25, 2018
Planning and Development Council Meeting – Direction to the staff regarding additional consultation and revaluation of alternative designs	August 7, 2018
Stakeholder Meeting – Mississaga Street to Third Line	March 29, 2019
Stakeholder Meeting – Third Line to Fourth Line	April 1, 2019
Stakeholder Meeting – Fourth Line to Dorval Drive	April 1, 2019
Site meeting with the study area residents	May 3, 2019
Stakeholder Meeting	March 16, 2021
Meeting with residents	April 22, 2021
Public Information Centre No. 3	April 6 to April 20, 2021 (interested individuals were encouraged to continue to submit comments past April 20, 2021)
Meeting with Oakvillegreen (hosted by Staff)	April 30th, 2021
Meeting with Coronation Park Residents Association (hosted by Staff)	May 20th, 2021

2.2.1 Phase 1 Consultation

A Notice of Study Commencement was submitted to relevant property owners, agencies, stakeholders, and organizations by mail on January 9, 2017. The notice detailed the study area, summarized the objectives of the study and requested comments. In addition, the Notice of Study Commencement was published in the local newspaper, *Oakville Beaver*, on November 24, 2016 and December 1, 2016.

Responses were received from several stakeholders and agencies. Copies of the newspaper advertisement, letters to stakeholders and agencies, copies of all comments received, and written responses are contained in Appendix A.

2.2.2 Phase 2 and 3 Consultation

Consultation with agencies and the public in Phases 2 and 3 of the Class EA process included meetings with stakeholders and agencies and two Public Information Centres. Stakeholders were notified of the opportunities for consultation by letter and/or newspaper advertisement in the Oakville Beaver, as well as on the town's website. Results of the consultation with various stakeholders are discussed in Section 2.5 of this ESR.

Consultation with agencies and the public was completed in Phase 2, including a meeting with Conservation Halton on January 30, 2017, and Public Information Centre (PIC) 1, on April 20, 2017. Evaluation of the alternative solutions was completed with input from the town, agencies, and stakeholders, to identify and address natural environment constraints. Other components of evaluation included the social, cultural and economic environment, technical aspects, cost, and compatibility with regional, town and Conservation Halton plans and policies. A total of 31 people signed the register for PIC 1. The attendees expressed concerns regarding safety along the corridor, cycling infrastructure, improving sidewalks, improving drainage, and beautification through burying hydro lines. Further information regarding PIC 1 is found in Section 5.5.1 of this document and in Appendix A.

As part of Phase 3 consultation, a technical advisory meeting with Conservation Halton, Halton Region and MNRF occurred on November 9, 2017, for consideration of stormwater and drainage issues, as well as the preliminary design. A second point of public contact, PIC 2, occurred on November 29, 2017. 81 people signed the register and 29 comments and comment forms were received back within the review time period. The attendees expressed concerns regarding roundabouts, reduction of the roadway to 3 lanes within Bronte Village, and pedestrian crossings through Bronte. Further information regarding PIC 2 can be found in Section 5.5.2 of this document and Appendix A.

The initial draft of this ESR was presented in a report to the Community Services Committee on May 22, 2018 (see **Section 6.2**) with the project mailing list being notified of this milestone via an email dated May 16, 2018. Delegations spoke against accepting the report and it was referred back to staff for further community consultation.

On July 25, 2018 a public meeting was held to present the new direction of the project to the community. It was a town-led program consisting of a presentation summarizing

feedback received on the study, the direction provided in the Community Services Committee resolution, and the outline of the process going forward, with a question and answer session. Details of this meeting can be found in Appendix A. The recommendation of the Community Services Committee was reviewed and affirmed at the Town Council meeting on August 7, 2018. Following further work a series of three (3) segment-specific stakeholder meetings were held on March 29 and April 1, 2019.

PIC No. 3 was hosted from April 6 to April 20, 2021, to solicit public comments and suggestions on the revised evaluation of alternative design concepts, and the updated preferred design. PIC No. 3 was held in an online format through the Town of Oakville's website. The PIC materials were posted online, and the public was invited to review information materials and provide comments. Further information regarding PIC No. 3 can be found in Section 6.7.3 of this document and Appendix A. Approximately 190 comments were received from the members of public.

2.3 Indigenous Consultation

Indigenous consultation is a key component of the Municipal Class EA process. The province has delegated the procedural aspects of the *Duty to Consult* to the Town of Oakville (letter dated February 8, 2017). Copies of all Indigenous consultation documents can be found in Appendix B.

2.3.1 Identification of Indigenous Communities

Wood provided a request to the Ministry of the Environment, Conservation and Parks (previously called Ministry of the Environment and Climate Change) (February 8, 2017) to confirm the Aboriginal Communities/groups that should be contacted for this project. This email included copies of the letters, Project Information Sheet and Notice of Commencement that were sent to the following Indigenous Communities/Groups:

- Mississaugas of the Credit First Nation;
- Six Nations of the Grand River, and
- Haudenosaunee Development Institute.

A response was provided from the MECP (February 8, 2017) confirming that the identified communities/groups would fulfill the *Duty to Consult* obligation for the indigenous consultation component of this study. The following is a summary of the indigenous consultation completed to date.

2.3.2 Mississaugas of the Credit First Nation (MNCFN)

Introductory Letter and Information Package – March 9, 2017: The purpose of this letter was to introduce the project and determine if the Indigenous Community has an interest in the study.

Follow-up Phone Call – March 30 and April 19, 2017: Follow-up phone calls were made to determine the level of interest in this project.

Meeting – June 8, 2017: A meeting was held at the Mississaugas of the Credit First Nation office in Hagersville to discuss the project. Meeting minutes were taken and can be found in Appendix B.

2.3.3 Six Nations of the Grand River

Introductory Letter and Information Package – March 9, 2017: The purpose of this letter was to introduce the project and determine if the Indigenous Community has an interest in the study.

Follow-up Phone Call – March 30 and April 19, 2017: A follow-up phone call was made to determine the level of interest in this project.

2.3.4 Haudenosaunee Development Institute (HDI)

Introductory Letter and Information Package – March 9, 2017: The purpose of this letter was to introduce the project and determine if the Indigenous Community has an interest in the study.

Follow-up Phone Call – March 30 and April 19, 2017: Follow-up phone calls were made to determine the level of interest in this project.

2.4 Agency Consultation

Due to the interest expressed by various government agencies, a Technical Agency Committee (TAC) was initiated at the commencement of this study. Correspondence with TAC members took place throughout the course of the study, with three meetings being held at key points, one with Conservation Halton, near the beginning of the study, one with the entire TAC prior to the second PIC, and a final meeting with Conservation Halton, near the end of the study.

2.4.1 Meetings

Meeting with Conservation Halton – January 30, 2017

A meeting was held with agency representatives including the Town of Oakville, Conservation Halton and Wood. The purpose of the meeting was to review the stormwater requirements from the perspective of the Town and Conservation Halton. Opportunities for Low Impact Development (LID) along the corridor were also discussed. Minutes of the meeting can be found in Appendix C.

Technical Agency Committee (TAC) Meeting – November 9, 2017

A meeting was held with representatives of Conservation Halton (CH), Ministry of Natural Resources and Forestry and Halton Region. The purpose of the meeting was to

discuss drainage issues, proposed bridge conditions, and stormwater management, and to review existing conditions including terrestrial and aquatic studies. Meeting materials and minutes of the meeting can be found in Appendix C.

Meeting with Conservation Halton – March 26, 2018

A meeting was held with agency representatives including the Town of Oakville, Conservation Halton, and Wood. The purpose of the meeting was to review the stormwater management report, including plans for the McCraney Creek structure. Minutes of the meeting can be found in Appendix C.

2.5 Stakeholder Consultation

Stakeholders from key community groups (both businesses and residents) were invited to be part of the stakeholder committee for this study. Representatives of the following groups were invited to attend the meetings:

- Sir John Colborne Recreation Centre for Seniors
- Coronation Park Residents Association
- Bronte Village Business Improvement Association
- Oakville Historical Society
- Town of Oakville Councillors
- Appleby College
- Local School Boards
- Bronte Village Mall
- Bronte Village Residents Association
- Oakville Cycling
- Association of Oakville Harbours Stakeholders
- Bronte Historical Society
- Heritage Oakville

Seven (7) stakeholder meetings took place over the course of the study. The opinions expressed by the stakeholders were used to inform the project and the information subsequently presented to the public.

2.5.1 Meetings

Stakeholder Meeting 1 – April 6, 2017

A meeting was held with stakeholders representing the following groups:

- Sir John Colborne Recreation Centre for Seniors
- Coronation Park Residents Association
- Bronte Village Business Improvement Association
- Oakville Historical Society
- Town of Oakville Ward 1 Councillor

The purpose of this meeting was to introduce the stakeholders to the project and determine any specific or broader issues that the groups they represented might find important. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 2 – October 30, 2017

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Wards 1 and 2
- Coronation Park Residents Association
- Bronte Village Business Improvement Association
- Appleby College

The purpose of this meeting was to present the preliminary preferred solution to the group and determine if there were suggestions to implement or concerns to address, prior to presenting the preliminary preferred solution to the wider public. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 3 – February 12, 2018

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Wards 1 and 2
- Coronation Park Residents Association
- Seniors Working Action Group (SWAG)
- Oakville Christian School

The purpose of this meeting was to discuss the potential roundabout at the intersection of Lakeshore Road with Third Line. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 4A – March 29, 2019

Corridor Section: Mississauga Street to East Street and East Street to Third Line

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Wards 1 and 2
- Walton United Church
- Bronte BIA
- Oakville Christian School
- Bronte Residents

The purpose of this meeting was to present the revisions to the study, including discussions regarding specific issues relevant to the specific corridor segment. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 4B – April 1, 2019

Corridor Section: Third Line to Fourth Line

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Ward 2
- Coronation Park Residence Association
- Lakeshore Road Residents

The purpose of this meeting was to present the revisions to the study, including discussions regarding specific issues relevant to the specific corridor segment. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 4C – April 1, 2019

Corridor Section: Fourth Line to Dorval Drive

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Ward 2
- Appleby College
- Lakeshore Road Residents
- Holyrood Avenue Residents

The purpose of this meeting was to present the revisions to the study, including discussions of any specific issues relevant to the specific corridor segment. Meeting materials and minutes can be found in Appendix D.

Site Meetings with Residents – May 3, 2019

Site visits were undertaken on May 3, 2019 to meet with the residents of following properties:

- 573 Lakeshore Road West
- 540 Lakeshore Road West
- 465 Lakeshore Road West
- 461 Lakeshore Road West
- 307 Lakeshore Road West
- 94 Holyrood Avenue
- 93 Holyrood Avenue

The purpose of these meetings was to discuss concerns of residents regarding the roadway design and how it will impact their property and trees in front of their properties. Staff from the Town of Oakville and Wood, along with the Town Councillors (Cathy Duddeck and Ray Chisholm) attended these meetings with residents. Meeting materials and minutes can be found in Appendix D.

Stakeholder Meeting 5 – March 16, 2021

The meeting was attended by stakeholders representing the following groups:

- Town of Oakville Councillors, Wards 1 and 2
- Oakvillegreen Conservation Association

- Bronte Village Residents Association
- Bronte Business Improvement Area
- Coronation Park Residents Association
- Oakville Historical Society
- Appleby College
- Residents

The purpose of this meeting was to provide an update on the Study and share the updated preferred design that incorporated the elements of the Scenic Corridor Study. Meeting minutes can be found in Appendix D.

Stakeholder Meeting 6 – April 22, 2021

This meeting was held with the residents of following properties:

- 461 Lakeshore Rd W
- 465 Lakeshore Rd W

The purpose of this meeting was to discuss residents' concerns related to the preferred design. Meeting notes can be found in Appendix D.

2.6 Utilities Consultation

Utility companies were contacted at the commencement of the study and invited to participate. Responses were received from Halton Region, Hydro One Networks, Bell Canada, Enbridge Gas, TransCanada Pipelines, Oakville Hydro, Rogers Cable, Cogeco Connexion and Ontario Power Generation. A meeting was held on October 30, 2017. Meeting materials and minutes can be found in Appendix E.

Based on the responses there are various utilities present within the Lakeshore Road West right-of-way. Further consultation will be required through detailed design to confirm conflicts and determine any required relocations.

2.7 Summary of Comments Received

A summary of comments received during the Class EA Study is provided in **Table 2-2** and **Table 6-9**. It is important to note that **Table 2-2** documents a summary of comments received before PIC No. 3 held in April 2021, and **Table 6-9** documents a summary of comments received as part of PIC No. 3.

Table 2-2: Consultation Summary

Commenter	Summary of Comments Received	Response/Action
Resident	Resident on Sandwell Drive concerned with the lack of crossing in the vicinity of Sandwell Drive and Lakeshore Road. Closest crossing would be Fourth Line.	Crossing recommendations have been reviewed as part of this study.
Resident	Resident expressed concern with safety provisions for cyclists.	Responded that provisions for active transportation by cyclists and pedestrians within the corridor is part of the study.
Resident	Resident expressed interest in a crosswalk at 2511 Lakeshore.	Responded that provisions for active transportation by cyclists and pedestrians was part of the study and that 2511 Lakeshore Road West would be included in evaluations for pedestrian crossings.
Resident	Resident expressed interest in curbs for their safety value.	Replied that road user safety and active transportation safety were both key parts of the study.
Resident	Stakeholder expressed concerns that proposed changes to Lakeshore Road would have negative impact on traffic.	A Traffic and Safety Study were undertaken as part of this study. Negative impacts on traffic were not shown.
Resident	Resident asked questions about what "urban standard" refers to, if there is room to expand Lakeshore Road in downtown Bronte.	A definition and example of "urban standard" were provided. It was also identified that a "complete streets" approach would be taken through Bronte Village.
Resident	Resident expressed concern with noise impacts on property facing Lakeshore.	Town responded that the noise study had not yet been completed and updates would be available through the Town's website.
Resident	Resident provided comments on their preference for a 3-lane road.	
Resident	Resident requested additional trash cans be placed along the Lakeshore Road corridor.	
Resident	Resident interested in the study area as a long-term resident and requested to be included as a member of the Stakeholder Group.	Invited to take part in targeted stakeholder meetings.
Resident	Resident provided the following comments: With new infill development they requested that noise dampening measures be included (between Third Line and Westminster) and requested the next PIC to be held in the community (Senior Centre or school in the neighbourhood).	PICs and Public Meetings beyond the initial PIC were moved to Senior Centre. A Traffic Noise Impact Study was completed as part of this study.
Resident	Resident attended the PIC and had the following comments: does the intersection of Lakeshore Road and Bronte Road have a high accident rate as it is on a significant skew, prefer a conventional right turn lane without the channelization, and request an emphasis on streetscaping and urban design in the Bronte Village.	Accident rates and roadway safety were included as an important aspect of this study. The intersection has been redesigned, and streetscaping enhancements are included in keeping with Town of Oakville urban design standards.
Resident	Resident requested to make this part of Oakville more bike friendly	Inclusion of cycling infrastructure is a component of this study.
Resident	Resident concerned about sections of Lakeshore being safe for small children biking	Inclusion of cycling infrastructure is a component of this study.
Resident	Resident provided comments regarding bike access along Lakeshore	Inclusion of cycling infrastructure is a component of this study.
Resident	Resident concerned about sidewalk widths and repair, bike paths, APS at Jones and East. Would also like to limit condo development along Lakeshore	Inclusion of cycling infrastructure is a component of this study. Sidewalk widths are being addressed as part of the preferred design. Limiting condo development is outside of the purview of this study.
Resident	Stakeholder concerned about the impact of reducing Lakeshore from 4 lanes to 3 through the Bronte corridor near 2511 and 2489 Lakeshore Road	A Transportation and Traffic Study, as well as a Safety Assessment were undertaken as part of this study.

Commenter	Summary of Comments Received	Response/Action
Resident	Resident requested further information regarding the area between Mississauga Street and Bronte Road as well as the analysis that was used to determine the preferred solution so any further comments can be consistent with the evidence base and analysis that has been gathered.	Please refer to Section 5.0, Section 6.0 and Section 7.0 for details regarding the evaluation of alternatives processes and the preferred design.
Resident	Resident provided comments regarding the PIC. Concerned that snow removal may not have been accurately addressed. Also concerned there are too many pedestrian crossings being proposed in a small area.	Comments are noted and will be considered as the study progresses.
Resident	Resident provided feedback on the preferred solution available online. Concerned with roundabouts, speed of traffic, and keeping bike lanes clear. Agrees with the changes to the Bronte Road intersection and the addition of bike lanes.	Many aspects of the preferred design have been changed and will be provided for review.
Resident	Resident who was unable to attend PIC 2 provided comments on the information posted on the Town's website. Concerned with roundabouts and pedestrians. Also, would like wires to be buried.	Many aspects of the preferred design have been changed and will be provided for review.
Resident	Resident requested information regarding proposed improvements at Solingate due to limited visibility.	Many aspects of the preferred design have been changed and will be provided for review.
Resident	Resident would like to see roundabouts given a more thorough consideration for inclusion in the corridor and believes they would make a center turn lane unnecessary.	As documented in the draft Environmental Study Report (ESR), the potential to convert existing signalized intersections to roundabouts was assessed as a high-level screening by applying a common set of evaluation criteria. Through that screening only the Third Line intersection was brought forward for more in-depth analysis, however the close proximity to the Sir John Colborne Seniors Centre and Oakville Christian School removed a roundabout from further consideration at this location.
Resident	Indicated intention to attend the CSC meeting, but unable to do so.	Outcome of the meeting was communicated.
Resident	Resident was looking for more information regarding stormwater management at Coronation Park.	Was directed to Coronation Park SWM study for further information.
Resident	Resident was unable to attend the CSC meeting but has reviewed the Draft ESR. Resident has concerns regarding the required roadway width, removal of mature trees, destruction of elaborate home entranceways, and the requirement of the centre turn lane.	Outcome of the meeting was communicated, and proposed design is being revisited to address many of these comments.
Resident	Resident requested to be added to the mailing list and to speak to someone on the project team.	Added to the mailing list Contacted by phone regarding concerns to her property being affected by an intersection daylight triangle. Confirmed that there would be no impact to the existing building.
Resident	Resident was concerned they were not receiving project mailings. Also concerned about the direct impact to their property of the proposed design, including removal of trees and expropriation. Looking for more details.	Responded with email and meeting. Proposed revisions to the preferred design take into account these issues and were presented at a targeted stakeholder meeting. Both mailing and email address are included in the project contact list.

Commenter	Summary of Comments Received	Response/Action
Resident	Resident was concerned that the proposed project would significantly and adversely impact their home through property expropriation, major mature tree loss (over 15 mature trees) and other losses. Wanted to see engineering reports.	Responded with email and meeting. The revisions to the preferred design take into account these issues and were presented at a targeted stakeholder meeting.
Resident	Resident expressed their approval of the improvements to pedestrian protection and the safety added by the center left turn lane based on concerns of previous accidents. Would like to see improvements in the cycling infrastructure but not at the cost of trees. Would prefer to see sidewalk winding between the existing trees.	Responded with email, comments will be taken into account with the revised designs.
Resident	Resident was out of the country during the Public Meeting and would like to schedule a further meeting. Is in agreement that development of the segment of Lakeshore Road West from Dorval Drive through to Bronte is well over-due as it is in a very bad shape. Is concerned about the safety of pedestrians and cyclists. However, would like to mitigate the tree loss, loss of private land, and sustain the original character/heritage of the road. Supports retaining a 2-lane design where there is not a full turning lane required for safe travel along this roadway.	Responded with email and meeting. The revisions to the preferred design take into account these issues and were presented at a targeted stakeholder meeting.
Resident	Resident expressed support for the inclusion of an off-leash dog park within Coronation Park or at 4 th Line and Lakeshore/Rebecca.	Comment forwarded to the Town, not within the context of this study.
Resident	Resident interested in the study and would like to be added to the mailing list.	Resident address and email were added to the contact list.
Resident	Resident expressed preference for all electrical, and other service lines to be buried along Lakeshore Road to enhance the beauty.	Responded via email. This will be taken into consideration as part of detailed design.
Business	Chairperson of Bronte Village BIA requested to be contacted.	Responded by phone and email. Invited to participate in the Stakeholders Group as a representative of the Bronte Village BIA.
Business	A representative from the Bronte BIA provide a summary of the Bronte Village Vision and the elements that the Bronte BIA would like to see incorporated within the Bronte Village section of the study area	Noted
Business	Bronte BIA is encouraged by the Project Team's familiarity with the issues raised by the letter from the Bronte BIA	Noted
Agency	Ministry of Transportation has no concerns and does not need to be involved in the study.	Noted
Agency	Halton Region - notes that Ecological and Environmental Advisory Committee (EEAC) has been replaced by Natural Heritage Advisory Committee (NHAC). NHAC will not be commenting on this project.	Noted
Agency	Parkland Fuel Corporation requested to be added to the study mailing list.	Noted

Commenter	Summary of Comments Received	Response/Action
Agency	Oakville Hydro - Requests to be active stakeholder. Oakville Hydro has overhead and underground lines throughout the study area and is concerned about any possible impact.	Noted
Agency	Halton Region- requests to be advised if the study reviews potential development lands or intensification areas that may impact servicing on this roadway.	Noted
Agency	Town of Oakville - Road and Works Operations. No interest at the time but wish to remain on the contact list.	Noted
Agency	Resident - on behalf of Coronation Park Residents Association - requests a direct link to the project website and an outline of the study.	Responded that the Town's website would be updated shortly. An invitation was also issued to be part of the Stakeholder Group.
Agency	Regional Municipality of Halton Water and Wastewater Planning Team requests to be added to the study mailing list.	Noted
Agency	MECP notes that consultation with First Nations stakeholders is required for this project.	Noted
Agency	MECP provided information of areas of interest that will need to be addressed as part of the Class EA and information on the responsibility of the Proponent to consult with Indigenous Communities. Areas of Interest include the following: Source Water Protection, Ecosystem Protection and Restoration, Surface Water, Groundwater, Air Quality, Dust and Noise, Servicing and Facilities, Contaminated Soils, Mitigation and Monitoring, Planning and Policy, and Class EA Process.	Noted
Agency	MTCS responding to notice of study commencement	Noted
Agency	TransCanada PipeLines confirmed the study area is clear of TransCanada facilities.	Noted
Agency	Hydro One Networks confirmed the study area is clear of Hydro One Network distribution plant (< 44,000 volts).	Noted
Agency	Oakville Hydro identified the location of facilities within the study area (drawings included).	Noted
Agency	Halton Region Public Works - requested the contact for Halton Region be changed.	Noted
Agency	Cogeco provided map with markup of infrastructure.	Noted
Agency	Halton Catholic District School Board provided a letter relating to their concerns surrounding St. Thomas Aquinas Catholic Secondary School, located within the project study area.	Noted
Agency	Halton District School Board has no comments at this time on the Preliminary Preferred Alternative but asks that the schools within the study area be contacted directly, and that the school board and subject schools continue to be kept informed.	Noted

3.0 Existing and Future Conditions

Existing conditions along Lakeshore Road West are documented on Drawing 1 – Existing Conditions (ref. rear pocket).

3.1 Study Area

The study area is located within the Town of Oakville and extends from Mississaga Street to Dorval Drive (ref. Key Plan, **Figure 1-1**).

3.2 Land Use and Development Plans

Livable Oakville Official Plan, 2009, Office Consolidation August 2018

The Livable Oakville Plan (2009 Town of Oakville Official Plan) was prepared to conform to the Province of Ontario’s Growth Plan for the Greater Golden Horseshoe, 2006, as required by the Places to Grow Act, 2005. It replaced the policies contained in the 1984 Town of Oakville Official Plan and applies to all lands within the Town except the North Oakville East and West Secondary Plan areas.

The Livable Oakville Plan:

- establishes the desired land use pattern for lands within the town, south of Dundas Street and north of Highway 407, to 2031;
- coordinates land use and infrastructure requirements to ensure that the anticipated growth can be accommodated;
- establishes a framework and policy context for decision making that provides certainty for the planning process;
- conforms or does not conflict with provincial plans, has regard to matters of provincial interest, and is consistent with provincial policy statements, and
- Includes policies specific to the Bronte Village Growth Area, in section 24, including objectives relating to:
 - Nurturing, conserving and enhancing the historic lakeside village character of Bronte;
 - Revitalizing the village and maintaining a complete community; and,
 - Maintaining and improving waterfront connections.

Part C – Making Oakville Livable(General Polices) of the Town of Oakville’s Livable Oakville Plan, Section 8 - Transportation Policies outlines the importance of an efficient transportation network for all users, automobiles, buses, pedestrians, cyclists and trucks,

as well as rail facilities and off-road pedestrian and cycling facilities. The major road networks existing and proposed for the town are shown on Schedule C – Transportation Plan. This schedule, together with Table 4, Functional Classification of Roads, and Table 5, Road and Section Right-of-Way Widths, is to be the basis for the provision of roads, right-of-way widths, and access control within the town.

Walking and cycling are recognized as active modes of transportation that can play a positive role in improving mobility and quality of life as part of a balanced transportation system. A complete active transportation system in existing and new development areas will augment and provide connections to the road and transit system. The location of existing and proposed pedestrian and cycling facilities are designated on Schedule D – Active Transportation Plan. The location of pedestrian and cycling facilities should conform to the Part C, recognizing that the alignments are diagrammatic, and an amendment to this Plan will not be required for changes in pedestrian and cycling facilities alignment provided that the general intent and purpose of this Plan are maintained.

Official Plan Review

Urban Structure Review (April 2018)

The Urban Structure Review was adopted as an Official Plan Amendment 15 (OPA 15) in September 2017 and approved by the Region of Halton in April 2018. Subsequent to the Region’s approval, OPA 15 was appealed to the Local Planning and Appeal Tribunal. As a result of this appeal, the town-wide urban structure is not in full force and effect. The Urban Structure considers:

- Population projections and accommodating required growth to 2041;
- Where future growth and intensification is to be directed, including nodes and corridors for future study;
- The preservation of stable residential areas and the protection of natural heritage;
- The relationship between growth areas and the delivery of municipal infrastructure; and,
- Criteria for evaluating site-specific official plan amendments.

In addition to above, Urban Structure Review identified Lakeshore Road as a “Scenic Corridor” as part of the OPA 15. OPA 15 defines a Scenic Corridor to mean ‘a thoroughfare containing roads and associated features that are recognized for their scenic value and for their related natural and cultural heritage features (Town of Oakville, 2017). In response to the policy direction the town undertook a Scenic Corridors Study in 2020 that included the portion of the Lakeshore Road West corridor

under EA study. The influence of the Scenic Corridors Study on the assessment of alternative design concepts and selection of the Technically Preferred Design is documented in Section 6.0.

Bronte Village Growth Area Review (June 2018)

The Bronte Village Growth Area Review study put forth an official plan amendment to modify the text and schedules of the Livable Oakville Plan pertaining to Bronte Village. In December 2017, the Town Council passed By-law 2017-118 to adopt Official Plan Amendment 18 (OPA 18: Bronte Village) to the Livable Oakville Plan. OPA 18 was then approved by Halton Region and it came into effect on June 20, 2018. The purpose of the Bronte Village Growth Area Review was to consider new or revised policies, as necessary, to ensure the goals and objectives for Bronte Village continue to be realized. It introduced a new transportation policy (Policy 24.4.1 c), which has specific regard to this EA. Policy 24.4.1c is stated as below (Town of Oakville, 2009, as amended in 2018):

“As part of the class environmental assessment process for Lakeshore Road West, the Town shall consider streetscape design and public realm improvements for Bronte Village to support and enhance pedestrian and cycling activity, transit use, as well as on-street parking opportunities within the right of way, to complement and contribute to Bronte Village’s lakeside village character.”

In addition, (OPA 18: Bronte Village) added the following policy to the Liveable Oakville Official Plan (Town of Oakville, 2009, as amended in 2018):

Development and public realm improvements, including the streetscape for Lakeshore Road West, shall be evaluated in accordance with the urban design direction provided in the Livable by Design Manual.

The urban design direction for the Bronte Village is provided in the Urban Design Direction for Bronte Village Growth Area (Livable by Design Manual Part B). This design document builds upon the broad urban design direction contained within the Livable by Design Manual (Part A) – Urban Design Direction for Oakville. It implements the policies and guides improvements in the public realm and built form.

Oakville Harbours Master Plan, March -2016

This initiative incorporates two Oakville harbours, Bronte Harbour and Oakville Harbour. The purpose of this initiative is to achieve the following goals:

- Integrate the parks adjacent to both harbours, and
- Provide a vision for both harbours and their role in the larger community.

This multifaceted study focuses on the harbour areas and adjacent parks. Key directions for the study are as follow:

1. Connect the harbours with their urban centres
2. Balance and respect for all users
3. Clear public access
4. Shared space for vehicle access and parking
5. Beautify amenities
6. Enhance wayfinding and signage
7. Protect natural features
8. Identify and preserve cultural heritage landscapes
9. Promote financial responsibility in harbour operations

The study is currently paused and is expected to recommence in 2021.

Town of Oakville Streetscape Strategy 2014

This plan provides guidelines for streetscape studies to be undertaken within the Town of Oakville. The studies would be conducted by an inter-departmental project team with representation from all departments of the Town of Oakville.

3.2.1 Provincial Land Use Planning Initiatives

The following planning documents were reviewed to determine their applicability to the study area:

- Provincial Policy Statement (PPS);
- A Place to Grow: The Growth Plan for the Golden Horseshoe (2020);
- The Greenbelt Plan, and
- Parkway Belt West Plan (1978).

The following policies were reviewed to ensure the development proposed is in line with the policies contained within them:

Provincial Policy Statement (2020): The Provincial Policy Statement (PPS) is the statement of the government's policies on land use planning. It is issued under the authority of Section 3 of the Planning Act. Note that the current PPS (2020) came into effect on May 1, 2020, and replaced the PPS issued on April 30, 2014. It applies province-wide and provides clear policy direction on land use planning to promote strong communities, a strong economy, and a clean and healthy environment.

It includes policies on key issues that affect our communities, such as:

- the efficient use and management of land and infrastructure;

- protection of the environment and resources; and
- ensuring appropriate opportunities for employment and residential development, including support for a mix of uses.

The Town of Oakville uses the PPS to develop their official plan and to guide and inform decisions on other planning matters.

The following policies within the Provincial Policy Statement support potential improvements to the Lakeshore Road West corridor:

1.1.1 Healthy, liveable and safe communities are sustained by:

ensuring that necessary infrastructure, and public service facilities are or will be available to meet current and projected needs.

1.6 Infrastructure and Public Service Facilities:

1.6.1 Infrastructure, and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.

A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020): The Growth Plan for the Greater Golden Horseshoe – Places to Grow, was adopted in June 2006 under the provisions of the Places to Grow Act, 2005. It was replaced by A Place to Grow: Growth Plan for the Greater Golden Horseshoe in 2020. A Place to Grow Plan, builds on the PPS to establish a unique land use planning framework for the Greater Golden Horseshoe area, that supports the achievement of complete communities, a thriving economy, a clean and healthy environment, and social equity. The plan provides the framework for implementing the provincial government’s vision for building strong, prosperous communities by better managing growth in this region.

The Growth Plan (2020) provides direction on where growth can occur, the form of future development, and future population and employment forecasts. It contains specific policies and directives regarding transportation infrastructure, land use planning, urban form, housing, natural heritage and resource protection. All decisions affecting a planning matter must conform to these policies of the Growth Plan (2020) (Ministry of Municipal Affairs and Housing). Following policies of Growth Plan (2020) apply to this project:

3.2.2.2 The transportation system within the Greater Golden Horseshoe will be planned and managed to:

- a) provide connectivity among transportation modes for moving people and for moving goods;

- b) offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation;
- c) be sustainable and reduce greenhouse gas emissions by encouraging the most financially and environmentally appropriate mode for trip-making and supporting the use of zero- and low-emission vehicles;
- d) offer multimodal access to jobs, housing, schools, cultural, and recreational opportunities, and goods and services;
- e) accommodate agricultural vehicles and equipment, as appropriate; and
- f) provide for the safety of system users.

3.2.2.3 In the design, refurbishment, or reconstruction of the existing and planned street network, a complete streets approach will be adopted that ensures the needs and safety of all road users are considered and appropriately accommodated.

The Greenbelt Plan (2017): Based on the review completed, the Greenbelt Plan, Section 6 - Urban River Valley Polices now includes Bronte Creek which is within the study area. This policy change does not affect the study as no changes are being recommended at Bronte Creek.

The Parkway Belt West Plan (PBWP) (1978): The Parkway Belt West Plan was implemented to create a multi-purpose utility corridor, urban separator and linked open public space system.

The four general goals of the plan are:

- Separate and define the boundaries of urban areas, giving residents a better sense of community;
- Link urban areas and areas outside the region by providing space for the movement of people, goods, energy, and information, without disrupting the community;
- provide a land reserve for future linear facilities (such as highways, electric power transmission corridors, and pipelines) which require a substantial land area; and
- provide open public space and recreational facilities linked with each other, nearby communities and other recreational areas.

This plan applies to lands along Bronte Creek. Bronte Creek is identified as being part of the Parkway Belt West Planning Area.

3.2.2 Existing Land Use

The land use adjacent to Lakeshore Road West corridor, within the study area, is a combination of residential, commercial, and park space. The following is a breakdown of the major land uses along the corridor:

- Single family residential dwellings located along both sides of Lakeshore Road, predominantly in the east section of the study area;
- Numerous apartment buildings (rental, condo and senior orientated) along the corridor;
- Numerous heritage designated properties (built heritage structures and cultural heritage landscapes);
- Park spaces including the Bronte Harbour Park and Coronation Park;
- Numerous commercial developments along the corridor, with a grouping of Main Street uses (commercial and mixed-use) within the Bronte Village area, and
- Institutional properties, including Walton Memorial United Church and Appleby College.

3.2.3 Existing Land Use Designation

Region of Halton Official Plan Land Use Designation

The Region of Halton Official Plan identifies the land use designation for the Region, including the Lakeshore Road West study area. **Figure 3-1** (Map 1 - Regional Structure) defines this area to be an Urban Area. The Region of Halton Official Plan designates a portion of the study area (between Bronte Road to the east and West River Street to the west) as part of the Bronte Harbour Waterfront Park (ref. **Figure 3-2**). The objectives of this designation are to:

- To maximize public accessibility to the Halton waterfront by increasing the amount of well distributed public open space, and
- To provide a variety of recreational, cultural and tourism opportunities along the Halton waterfront.

The Official Plan also outlines the process for the development of the Waterfront Park Master Plan in partnership with Conservation Halton and the local municipalities. The Oakville Harbours Master Plan study is currently paused and is expected to recommence in 2021.

Figure 3-3 (Map 3 - Function Plan of Major Transportation Facilities) identifies the roadway classification for Lakeshore Road West as a minor arterial roadway. The Region of Halton Official Plan defines the function of a minor arterial roadway as follows:

- Serve mainly local travel demands;
- May serve an Intensification Corridor;
- Accommodate local truck traffic;
- Accommodate local transit services;
- Connect Urban Areas within the same municipalities;
- Carry moderate to high volumes of traffic;
- Distribute traffic to and from Major and Multi-Purpose Arterials; and
- Accommodate active transportation.

Town of Oakville Official Plan

The Town of Oakville Official Plan (Schedule B - Natural Features and Hazard Lands) designates areas around the Sixteen Mile Creek and the Fourteen Mile Creek as Floodplain, Significant Wildlife Habitat, Woodlands, and Areas of Natural and Scientific Interest (**Figure 3-4**). These areas have been investigated as a component of this study.

Land use designations within the study area are illustrated on the Town of Oakville Official Plan (Schedule F - Southwest Land Use) and include the following: Low Density Residential, Medium Density Residential, High Density Residential, Neighbourhood Commercial, Institutional, Natural Area, Parks and Open Space, and Utility (**Figure 3-5**). The study area also includes a Growth Area (Bronte Village), and a Special Policy Area.

In addition, in September 2017, as part of the five-year Official Plan Review, Town Council adopted a new town-wide Urban Structure (OPA 15), which identified all of Lakeshore Road (East and West) and a portion of Trafalgar Road (Cornwall Road to Lakeshore Road) as scenic corridors.

Bronte Village Growth Area

Bronte Village is identified in the Livable Oakville Plan as one of the six areas where the majority of new growth in Oakville will be accommodated south of Dundas Street. It is a historic area located along Bronte Creek at Lake Ontario. Bronte Village is intended to be revitalized as a mixed-use area with a thriving commercial area and a variety of housing options that provide a year-round environment for residents, employees, and visitors. As noted in section 3.2, the Bronte Village Growth Area Review (OPA 18) was approved by Halton Region and it came into effect on June 20, 2018.

Schedule P1 (Bronte Village - Land Use) of the Town of Oakville Official Plan shows that the Bronte Village Growth Area land use within the Study Area include: Main Street 1, Main Street 2, Parks and Open Space, Natural Area, Waterfront Open Space, Greenbelt –

Urban River Valley, Parkway Belt – Overlay, and Lands Eligible for Bonusing (**Figure 3-6**). Schedule P2 (Bronte Village - Urban Design) identifies the areas for enhanced streetscape and gateways (**Figure 3-7**). Lakeshore Road West is identified as a Primary Street, while the sections of it between Bronte Creek and East Street are classified as Enhanced Streetscape Area. Gateways are identified at three key locations along Lakeshore Road West at East Street, Bronte Road and Bronte Creek.

Part E of the Town of Oakville Official Plan explains that Enhanced Streetscape treatments (such as, cycling, transit and pedestrian-oriented amenities) shall be provided on primary and secondary streets identified on Schedule P2. Gateways indicate locations which are visually prominent entry points into Bronte Village. These locations shall provide gateway treatments which may include well designed built form or structures, distinctive streetscape treatments, landscaping, and/or public art (Town of Oakville, 2009, as amended in 2018).

Figure 3-1: Excerpt from Region of Halton Official Plan: Map 1 Regional Structure

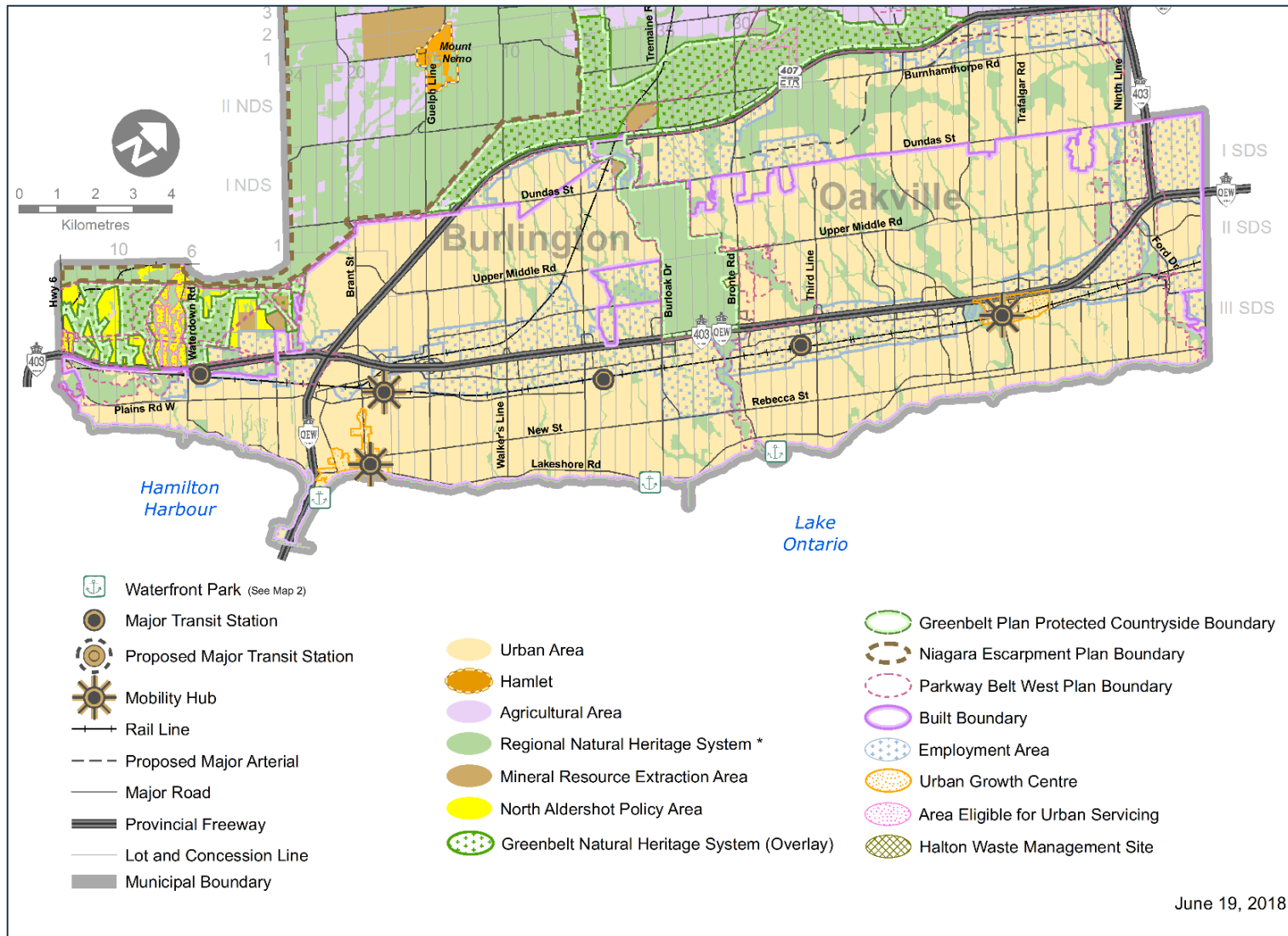


Figure 3-2: Excerpt from Region of Halton Official Plan: Map 2 Regional Waterfront Parks (June 19, 2018)



Figure 3-3: Excerpt from Region of Halton Official Plan: Map 3 Function Plan of Major Transportation Facilities

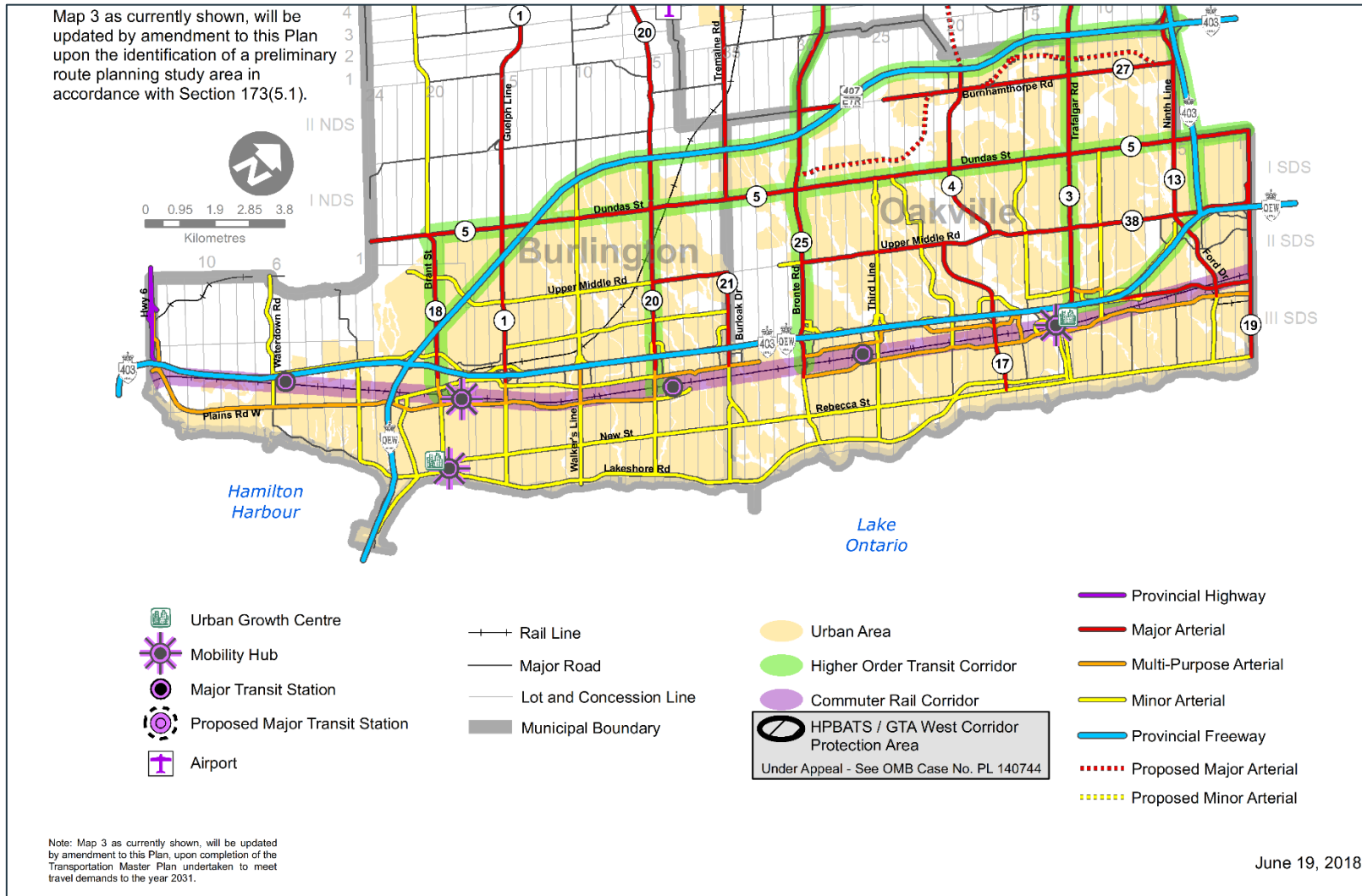


Figure 3-4: Excerpt from Town of Oakville Official Plan - Schedule B Natural Features and Hazard Lands

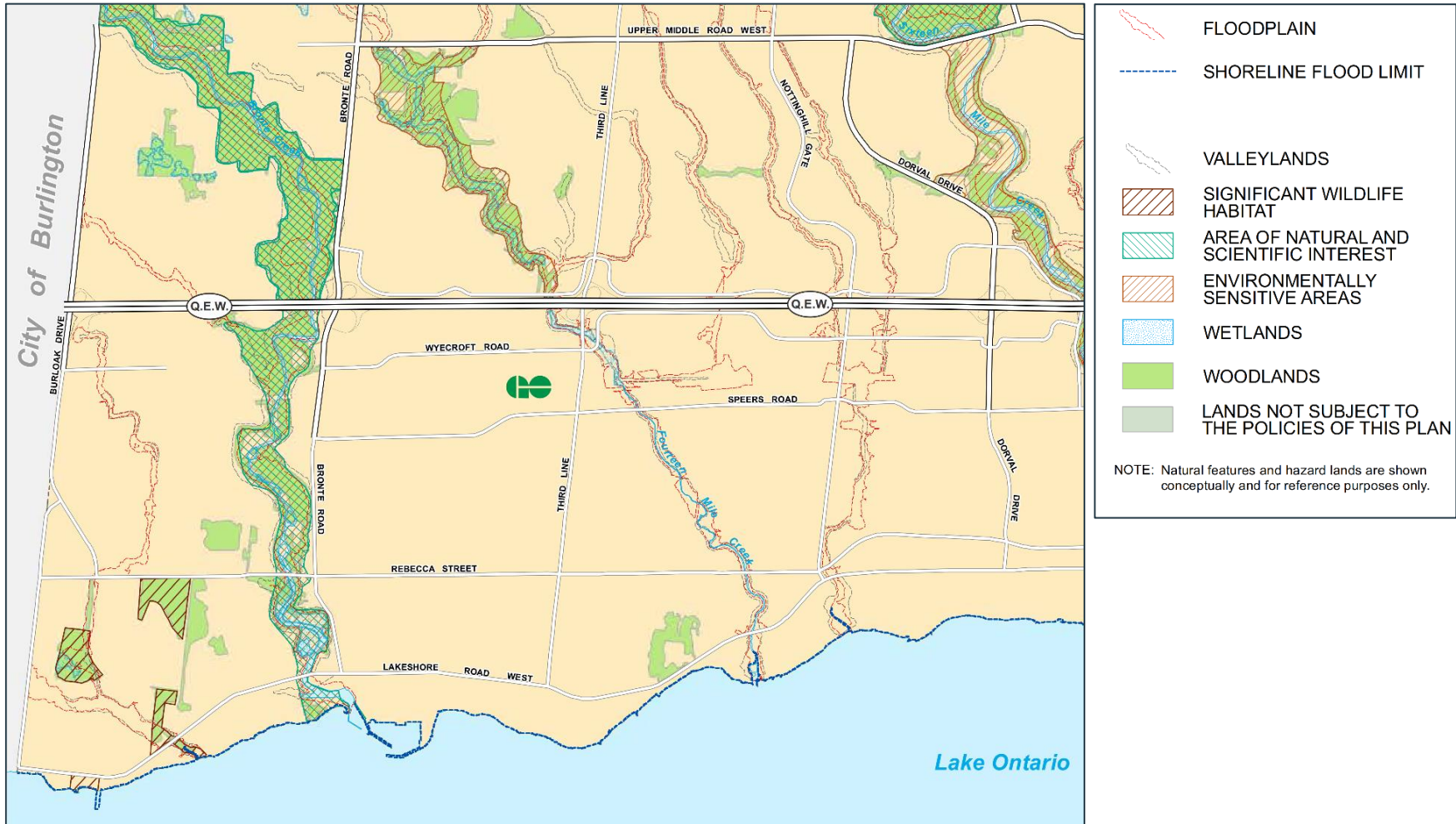


Figure 3-5: Excerpt from Town of Oakville Official Plan - Schedule F Southwest Land Use (August 2018)

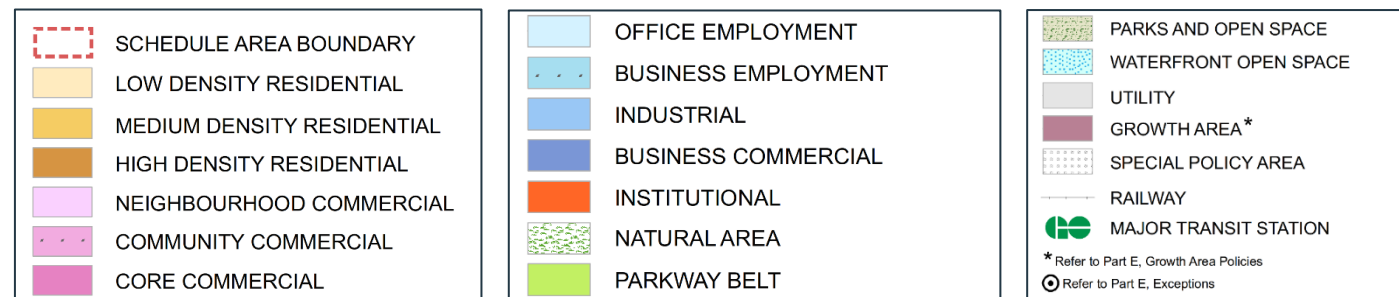
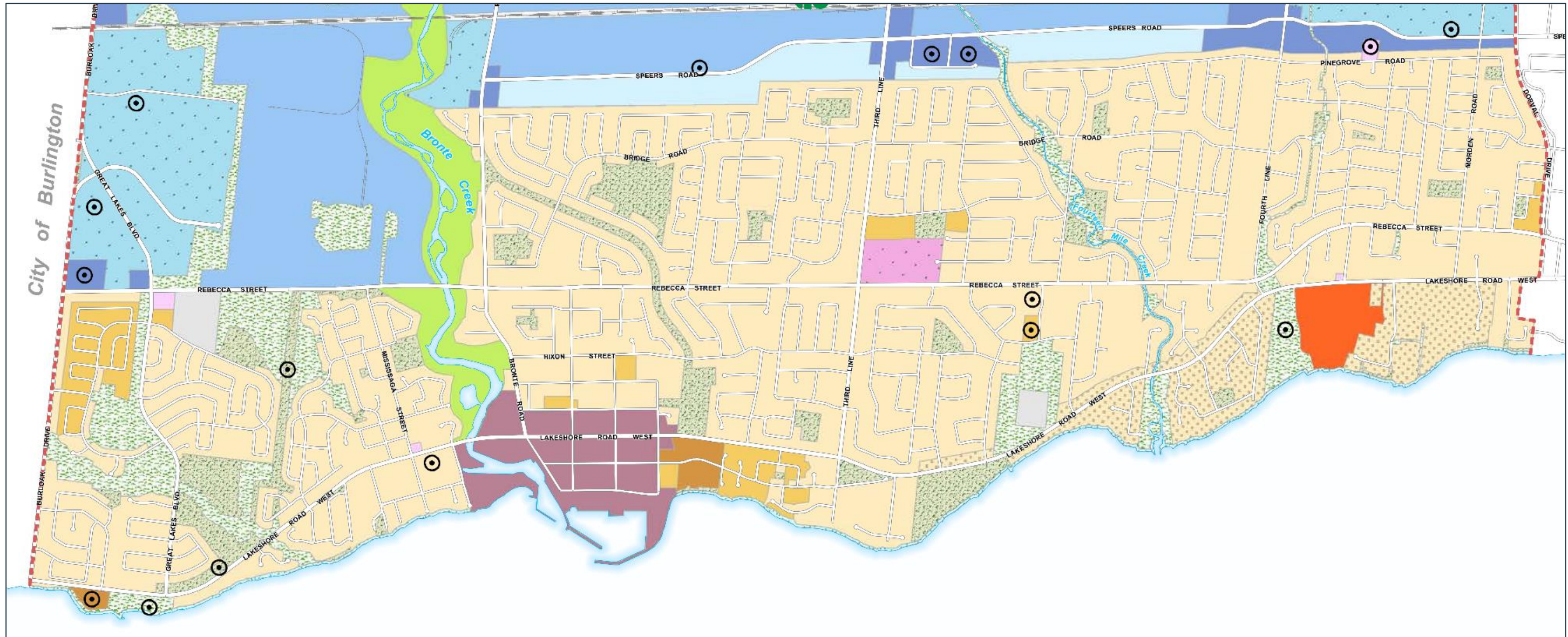


Figure 3-6: Town of Oakville Official Plan - Schedule P1 Bronte Village Land Use (August 28, 2018)

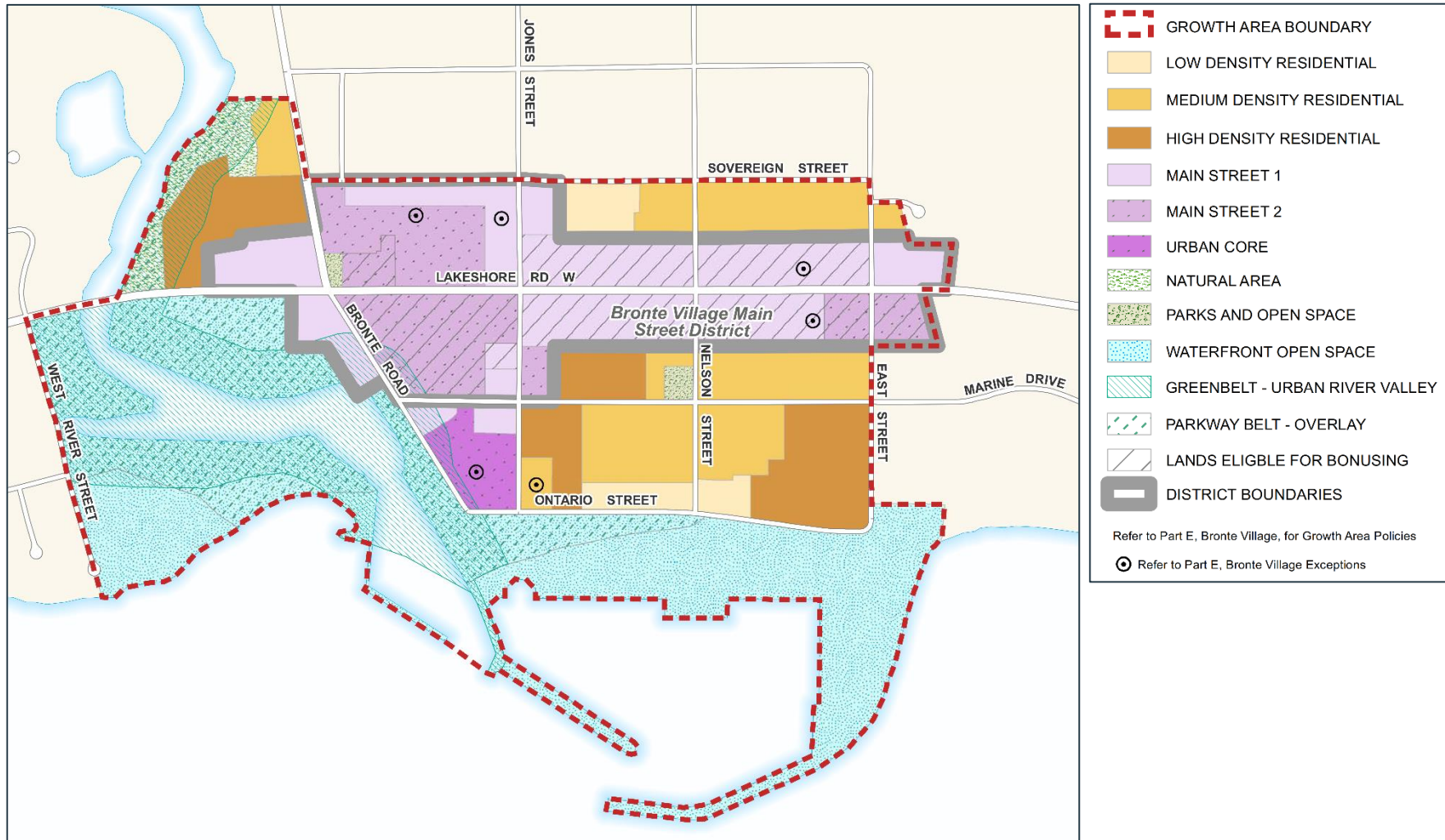
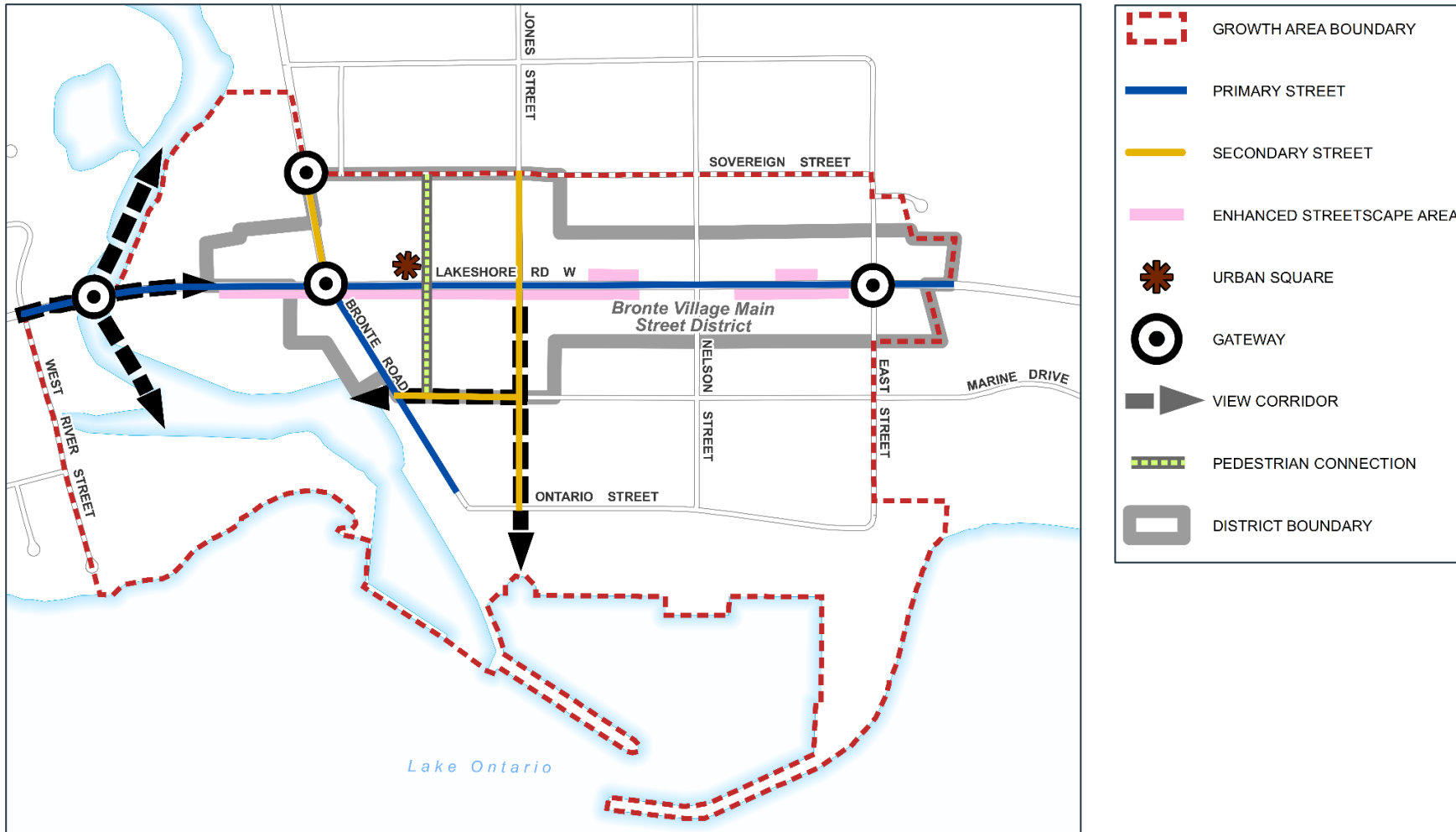


Figure 3-7: Town of Oakville Official Plan - Schedule P2 Bronte Village Urban Design (August 28, 2018)



3.2.4 Proposed Development

The following proposed development has been identified along the study area:

- Future development within the Bronte Village Growth Area , and
- Small pockets of residential infill development along the corridor.

3.3 Transportation

3.3.1 Adjacent Projects and Planning Documents

Numerous studies, projects and initiatives previously completed or currently underway by the Town of Oakville and other public agencies provide the planning context for the Lakeshore Road West Class EA. The 2013 Town of Oakville Transportation Master Plan (Switching Gears) established the need and justification for roadway improvements along Lakeshore Road West through the study area and serves as the foundation for the *Problem and Opportunity Statement* for this Class EA study. Other notable documents include:

- Town of Oakville Official Plan 2009, 'Livable Oakville';
- Town of Oakville Official Plan Review
- Town of Oakville Zoning By-law 2014-014
- Development Applications map;
- Active Transportation Master Plan 2009 and 2017;
- Halton Region 2011 Transportation Master Plan;
- Halton Region Active Transportation Master Plan (2015), and
- Other ongoing reviews and Class EA studies near or within the study area.

3.3.2 Transportation and Traffic Analysis Report

A Transportation and Traffic Analysis Report was completed by Wood (previously called Amec Foster Wheeler) in 2018, to investigate existing and future traffic conditions in the study corridor (ref. Appendix F). The study assessed the need for improvements to accommodate traffic in a safe and efficient manner. It discussed existing road, transit and active transportation networks and analyzed existing and future traffic conditions. The report also undertook intersection analyses, roundabout evaluation, and traffic signal warrant analysis, and a review of auxiliary left and right turn lanes. Discussion related to these items is summarized below. Recommendations from this report were incorporated into the Initial Evaluation of Alternative Design Concepts discussed in Section 6.0.

3.3.2.1 Existing Roadway Network

The study examined current traffic conditions, operational deficiencies, and constraints experienced by the public travelling along Lakeshore Road West. There are 31 intersections (stop controlled and signalized) and numerous accesses and driveways within the study area. The analysis of existing 2017 traffic conditions illustrated that:

- Traffic throughout the corridor is currently operating at an acceptable level-of-service, with only minor delays during peak periods;
- Intersections along Lakeshore Road West are operating at acceptable levels-of-service;
- Transit currently has stops along Lakeshore Road West from Mississauga Street to Windsor Gate. Oakville Transit currently operates two bus routes on Lakeshore Road west of Third Line. Route 3 travels between Bronte Village and the Oakville Trafalgar Memorial Hospital via South Oakville Centre and the Bronte GO station, and Route 14/14A travels between the Oakville GO and Appleby GO stations, via downtown Oakville, South Oakville Centre and Bronte Village. Route 14/14A is one of the highest ridership routes in the transit system; and
- Cycling and walking are very prevalent within the Lakeshore Road corridor and there are some connectivity gaps and missing infrastructure that need to be addressed in the design.

3.3.2.2 Active Transportation

Active transportation infrastructure facilities within the study area were reviewed as part of the Transportation and Traffic Analysis Report (Amec Foster Wheeler, 2018) and it was found the study area is comprised of many different cycling facilities. Connectivity through the study limit was restricted with sections housing no facility.

Sidewalks within the study area vary in width and quality and extend along the entire southern boulevard of Lakeshore West Road with a varying buffer width between the curb and the sidewalk. Sidewalks also exist on the north side of the road, but are not continuous.

All shoulders within the study area are paved and appear to act as de facto cycle lanes. There is only one small section of Lakeshore Road West within the study area that contains officially signed cycle lanes and this falls between Bronte Road and Third Line.

A section of the Great Lakes Waterfront Trail (Waterfront Trail) extends along Lakeshore Road West within the study area, including on-road sections between West River Street and Bronte Road and between Fourth Line and Dorval Drive, as well as an off-road

section, which extends along a multi-use path within the north side boulevard, from Third Line to Fourth Line.

In 2014, the Town of Oakville acquired cycling data from Strava to gain a better understanding of current use and trends. A variety of users, from recreational cyclists (on multi-use trails), to commuter cyclists (using on-road bike lanes), walkers, joggers, skateboarders and rollerbladers (on sidewalks and multi-use trails) utilize what facilities exist. Cycling on town sidewalks is prohibited. One of the key objectives of Town of Oakville's Active Transportation Master Plan is to provide "A town-wide visible and connected active transportation network of on-road and off-road facilities designed with safety in mind that are comfortable, convenient and accommodate the needs of existing and future users (WSP and Glenn Pothier (GLPi), 2017). In keeping with this objective, creating a safe, consistent, and efficient network for these users is paramount. There are 31 intersections, numerous residential driveways, and commercial accesses that front Lakeshore Road West which create conflict points for drivers, pedestrians and cyclists.

A Road Safety Performance Assessment was completed for the study with recommendations to address issues identified, including issues associated with active transportation (Intus Road Safety Engineering Incorporated, 2017). The Road Safety Performance Assessment is provided in Appendix G.

3.3.2.3 Transit

Within the Study Area, Oakville Transit currently provides transit service to the following two routes (Oakville Transit, 2020):

- (Route 14/14A – Lakeshore West) along Lakeshore Road West between Mississaga Street and Third Line (9 stops westbound and 8 stops eastbound) and,
- (Route 3 – Third Line) along Lakeshore Road West between Bronte Road and Third Line (6 stops, eastbound only).

Transit stops along Lakeshore Road West currently stop in the through lane with minimal disruption to traffic. Based on a review of Town of Oakville's Accessibility Interactive Map and input from Town's Transit Staff, of the 17 bus stops within the Study Area, 14 stops (82%) are accessible and five (5) stops (29%) have bus shelters.

Intercity transit, originating from or passing through Oakville, is provided through GO Transit (Metrolinx) and Megabus. No intercity transit routes follow Lakeshore Road West.

3.3.2.4 Existing Traffic Conditions

VISSIM software was used to run the analysis to provide the overall existing intersection delay in seconds. Other outputs included:

- delay by traffic movement (seconds);
- level-of service (LOS A to F)
- 95th percentile queue

Based on the analysis outputs, Lakeshore Road West from Mississaga Street to Dorval Drive was/is/will be operating at an acceptable LOS for 2016, 2021 and 2031. Three (3) intersections were identified as having a left turn movement operating at a LOS 'D'. These intersections were further reviewed as part of the preliminary design of improvements to Lakeshore Road West.

Traffic conditions for the horizon year 2021 along Lakeshore Road West include new development that is expected to be complete by 2021. A growth rate of 1% for both eastbound and westbound directions was used for the section of Lakeshore Road West from Mississaga Street to Jones Street, accounting for new development within the Bronte Village Growth Area (Schedule A1, Urban Structure, *Town of Oakville's Official Plan 'Livable Oakville'*). The growth rates for the remainder of the corridor (Third Line to Dorval Drive) were derived from the Town's 2006 EMME PM model (Population and Employment). The growth rates varied from -1% to 2%.

The Town's EMME model plots only used the major intersections (13 of 31). Given the aggregation level of the EMME model, several side streets are missing. The growth rates were assumed to mirror side streets which are represented in the EMME plot. Using the above noted growth rates, forecasted background traffic for 2021 was modelled in VISSIM.

Traffic volumes generated by the new development were calculated using ITE trip generation rates based on the size of the development. There were four developments identified at the time of this analysis. All developments are expected to be at full buildout by 2021. Total estimated traffic volumes for 2021 were derived by adding the forecasted traffic with the estimated development-generated traffic.

The year 2021 was identified as being the critical year for the traffic study due to the zero (0) to negative growth expected from 2021 to 2031.

3.3.2.5 Future Traffic Conditions 2031

Future traffic conditions for the horizon year 2031 for Lakeshore Road West assumed that all significant redevelopment will be complete by 2021. Growth rates of 0% for both east and westbound directions were utilized for the section of Lakeshore Road West

from Mississaga Street to Jones Street, based on a targeted 20% projected modal split (vehicular vs transit, walking cycling, carpooling, etc.). The growth rates for the remainder of the corridor (Third Line to Dorval Drive) were derived from the Town's 2021 and 2031 EMME PM models and accounted for the same modal split of 20%. The growth rates varied from 0% to -2% and were used to model forecasted background traffic for 2031 in VISSIM.

3.3.2.6 Roundabout Evaluation

An evaluation of all intersections was completed as part of the Transportation and Traffic Analysis Report (Amec Foster Wheeler, 2018) to determine whether converting a signalized intersection to a roundabout would improve capacity. Through a high-level screening process, only six intersections were carried forward for further evaluation and analysis. The list of the 6 locations are as follows:

- Lakeshore Blvd @ Mississaga Street
- Lakeshore Blvd @ Bronte Road
- Lakeshore Blvd @ East Street
- Lakeshore Blvd @ Third Line
- Lakeshore Blvd @ Fourth Line
- Lakeshore Blvd @ Dorval Drive

After reviewing many considerations, such as, traffic analysis, property impacts, impacts to residents, large trees, grades and overall geometrics of the locations, only one location, Lakeshore Road at Third Line, was carried forward for review. Further assessment was completed at the Third Line location to determine the appropriateness of a roundabout in close proximity to the Sir John Colborne Recreation Centre for Seniors (fronting Lakeshore Road) and Oakville Christian School (fronting Third Line). The Project Team, taking into consideration that this location has a high number of seniors and young school children, removed the roundabout from further consideration at this location.

Detailed roundabout feasibility evaluations for all six locations can be found in Appendix F.

3.3.2.7 Traffic Signal Justification

The following major unsignalized intersections, along Lakeshore Road West from Mississaga Street to Dorval were analyzed as part of the Transportation and Traffic Analysis Report (Amec Foster Wheeler, 2018) to determine if a traffic control signal was warranted under future conditions (critical year 2021):

- Lakeshore Blvd @ Westminster Drive
- Lakeshore Blvd @ West River / Triller Place
- Lakeshore Blvd @ Suffolk Avenue
- Lakeshore Blvd @ Morden Road

The warrant analysis was based on the methodologies contained in Ontario Traffic Manual (OTM) Book 12 (Justification 7 – Projected Volumes). Justification 7 used the projected AM and PM peak hour volumes that were generated from the 2021 Vissim model. For 2021, using the Justification 7 warrant, traffic signals were not warranted at any of the intersections.

Detailed traffic signal warrant analyses for the above listed intersections are provided in Appendix F.

3.3.2.8 Intersection Analysis

Intersection Analyses were completed for the existing road configuration based on 2016 and 2021 conditions, and the 3-lane cross section (one lane in each direction with a two-way center left turn lane) based on 2021 conditions. Results of these analyses are summarized below:

- Under 2016 conditions, the Lakeshore Road West corridor operates very well, with all movements showing level of service “C” or better.
- Under 2021 conditions, with no changes to the existing geometric configuration of Lakeshore Road West (number of lanes, lane designation, storage lengths, etc.), the corridor operates well, with all movements showing level of service “C” or better, except for the following three left turn movements that operate at level of service “D”:
 - Southbound Lane on Third Line in the AM peak,
 - Northbound Lane at Suffolk Ave / Appleby College in the AM peak and
 - Northbound Lane at Bronte Road in the PM peak
- Under 2021 conditions, with the 3-lane configuration, the Lakeshore Road West corridor operates well, with all movements showing level of service “C” or better, except for three left turn movements that operate at level of service “D”:
 - Southbound Lane on Third Line in the AM peak,
 - Northbound Lane at Suffolk Ave / Appleby College in the AM peak
 - Northbound Lane at Bronte Road in the PM peak

3.3.2.9 Recommendations of Transportation and Traffic Analysis (2018)

The Transportation and Traffic Analysis Report (Amec Foster Wheeler, 2018) determined that a three lane cross-section would work well in terms of traffic operations, for Lakeshore Road West between Mississaga Street and Dorval Drive (one lane in each direction with the inclusion of a two-way center left turn lane, where required (i.e. the need for left turns exists). However, as discussed below in Section 6.3.2 of this report, further analysis was completed by Wood in 2019 which determined that a three-lane cross section was not essential, supporting the maintenance of a two-lane cross section. It also recommended that active transportation infrastructure be considered in the roadway design and that improvements be made to connectivity to adjacent trails throughout the corridor. Update to Traffic Operations Analysis/Safety Assessment (2019) is provided in Appendix H.

3.3.3 Road Safety Performance Assessment (2017)

As part of the Class EA, Intus Road Safety Engineering completed a Road Safety Performance Assessment for the Lakeshore Road West corridor within the study area. This report was completed in 2017. A copy of the report is included in Appendix G.

Several items were suggested, for consideration, to improve the overall safety of the study corridor during the Class EA process. These included:

- The alignment and proposed cross-section of Lakeshore Road West should generally manage speeds to 50 km/h through the entire study area;
- Converting Lakeshore Road West east of Bronte Road from a two-lane facility to a three-lane facility;
- The section of Lakeshore Road West from Mississaga Street to Bronte Road should be made congruous with the remainder of the road (i.e., with respect to number of lanes and cross-section design);
- Provide sidewalks on both sides of the road throughout the entire study area;
- Sidewalks should be prioritized over boulevards and outer separations, and if necessary the absolute minimum vehicular lane widths should be used in order to provide enough road space for a sidewalk.
- A reasonable level of safety for cyclists will be achieved if the design team conforms to the guidance provided in OTM Book 18 with respect to cycling facility type selection;
- On structures where pedestrians will be required to walk adjacent to motorized traffic on curb-faced sidewalks (e.g., the structure over the Bronte Creek), the

device separating pedestrian and motorized traffic should also offer splash and spray protection;

- Selecting intersection control for individual intersections based on the control warrants adopted by the Town of Oakville (e.g., the OTM Book 12 warrants for traffic signal control) will result in a form of intersection control that is reasonably safe;
- Roundabouts could be considered as a form of control for intersections and major driveways in the study area; and
- The design team and the town should consider speed management measures during the Class EA process including but not limited to, roundabouts, narrow lanes, cycling lanes, roadside landscaping (i.e. trees and planters), and a reduced speed limit of 40 km/h in the Bronte Village area.

Each of these items was reviewed as part of the overall evaluation of alternatives for Lakeshore Road West. Further assessment of safety performance for a two-lane option was completed by Wood in 2018 (ref. Section 6.3.2 and Appendix H).

3.3.4 Sightline Review

A site visit was performed to understand sightline restrictions within the study area. The area in general is moderately flat, however there are a few horizontal and vertical curves along the corridor. Given wider radii and suitable crest or sag curvature, no potential sight restrictions were found along Lakeshore Road. However, at a few intersections, it was observed that northbound and southbound traffic may have limited sightlines overlooking eastbound and westbound lanes. These locations are as follows:

Bronte Road – is a signalized intersection with skewed geometry (**Figure 3-8**). It has channelized northbound and southbound right turn lanes. The south leg of the intersection has a greater skew as compared to the north leg, which results in a tighter northbound right turn which could potentially result in drivers overlooking and not yielding to oncoming eastbound traffic. However, no sightline restrictions were found at this location.

Figure 3-8: Bronte Road Intersection



Third Line – is a signalized intersection with skewed geometry, though not to the extent of the Bronte Road intersection. Although there is a large horizontal curve immediately east of Third Line, no sightline deficiencies were observed along Lakeshore Road. It was observed that sightlines are restricted on the southbound approach overlooking the west leg of the intersection due to vegetation within the boulevard, which can be easily mitigated by clearing and removing overgrown vegetation and trees.

Dorval Drive – is a signalized intersection with a mildly skewed angle. This location does not possess any significant issues; however, the southbound right turn lane has restricted sightlines overlooking the west leg of the intersection due to adjacent higher ground elevation in the northwest quadrant. Shifting the stop bar closer to the intersection would help in providing better sightlines. No other restrictions were observed at this location.

3.3.5 Pedestrian Crossing Assessment (2017)

A pedestrian crossing assessment was completed in conjunction with the Town of Oakville’s *Pedestrian Safety Program, September 2017* (Paradigm Et. Al., 2017). Within the Study corridor, 10 pedestrian crossings were recommended in order to provide a safer pedestrian environment. A list of the proposed crossing locations and types is included as **Table 3-1**. **Figure 3-9** shows the approximate locations of the crossings within the corridor. These pedestrian crossings were incorporated into the Initial Evaluation of Alternative Design Concepts discussed in Section 6.0.

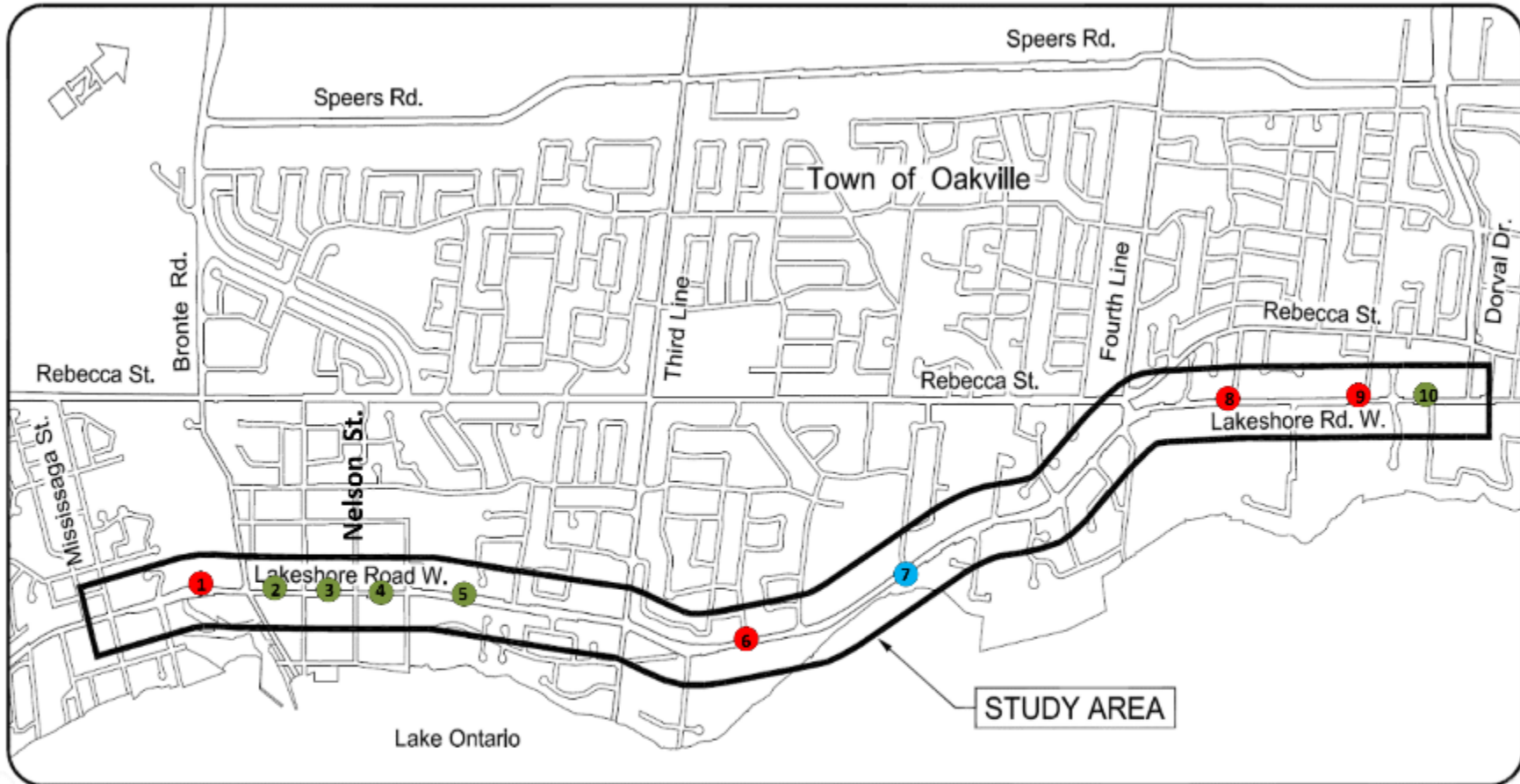
Table 3-1: Pedestrian Crossing Locations and Types

Location	Area	Crossing Type
Bronte Creek Trail	Midblock	Intersection Pedestrian Signal
West of Jones Street	Midblock	Level 2 Type B Crossing
West of Nelson Street	Midblock	Level 2 Type B Crossing
West of East Street	Midblock	Level 2 Type B Crossing
Bronte Athletic Park ¹	Midblock	Level 2 Type B Crossing
Westminster Drive	Intersection	Intersection Pedestrian Signal
Sandwell Drive	Intersection	Level 2 Type C Crossing
Suffolk Avenue ²	Intersection	Intersection Pedestrian Signal
Morden Road	Intersection	Intersection Pedestrian Signal
Holyrood Avenue	Intersection	Level 2 Type B Crossing

¹ The pedestrian crossing at Bronte Athletic Park Walk was installed in November 2018, prior to filing this ESR and will have to be maintained during construction.

² The pedestrian crossing at Suffolk Avenue² was installed in 2019.

Figure 3-9: Approximate Proposed Pedestrian Crossing Locations



Proposed Pedestrian Crossing Types:

- Intersection Pedestrian Signal (IPS)
- Level 2 Type B Crossing
- Level 2 Type C Crossing

Proposed Pedestrian Crossing Locations:

- | | | |
|-----------------------|------------------------------|-------------------|
| 1. Bronte Creek Trail | 5. Bronte Athletic Park Walk | 9. Morden Rd. |
| 2. West of Jones St. | 6. Westminster Dr. | 10. Holyrood Ave. |
| 3. West of Nelson St. | 7. Sandwell Dr. | |
| 4. West of East St. | 8. Suffolk Ave. | |

3.4 Utilities

Based on mark-ups received, relocation or protection of various utilities may be required. The following is an outline of the utility information supplied and known to date:

Halton Region	Halton Region initiated a Municipal Class EA for the Berta Point Pumping Station with two twin forcemains along Lakeshore Road West from west of West River Street/Triller Place to East Street. As of January 2021, this study was on hold due to COVID-19.
Bell Canada	Bell has buried lines and conduit buried throughout the study area. In general, these lines are located on both sides of Lakeshore Road West. Mark-up drawings were provided.
Enbridge Gas	No infrastructure in the corridor.
TransCanada PipeLines	No infrastructure in the corridor.
Hydro One Networks	No infrastructure in the corridor.
Ontario Power Generation	No infrastructure in the corridor.
Rogers Cable	Rogers has existing aerial plant in the study area, both following and crossing the corridor. Mark-up drawings were provided.
Cogeco Connexion	Cogeco has existing plant through the entire study area. Between Mississauga Street and Third Line the majority is buried, and between Third Line and Dorval Drive the majority is aerial. Mark-up drawings were provided.
Oakville Hydro	Oakville Hydro has existing plant in the study area both underground and overhead, with the majority along the south side of Lakeshore Road West. Mark-up drawings were provided.

3.5 Existing Bridge Conditions

3.6.1 Bronte Creek

The Bronte Creek Bridge (also known as the 12 Mile Creek Bridge) was built in 1970 and rehabilitated around 1999. The total deck length is 64.9m and the structure width is 19.5m. The roadway width is 14.4m. The current posted speed is 50 km/h and the roadway consists of four (4) lanes. The bridge has been assessed as being in good condition and will not require any structural modifications.

3.6.2 14 Mile Creek

The 14 Mile Creek Bridge was built in 1916 and has been extended both north and south. It is a Spandrel Arch structure. The total deck length is 17.1 m and the structure width is 15.74 m. The roadway width is 11.54m. The current posted speed is 50 km/h and the roadway consists of two (2) lanes. The bridge has been assessed to be in good condition and will not require any structural modifications. The structure conveys the 100-year storm event, but the Regional Storm overtops the structure by 0.75 m +/- with a velocity of 1.09 m/s +/-.

3.6.3 McCraney Creek

The McCraney Creek crossing is an arch culvert built in 1940 and was subsequently extended with a box culvert section. The total deck length is 21m and the structure width is 5.4 m. The roadway width is 8.4 m. The current posted speed is 50 km/h and the roadway consists of two lanes. In July 2017, emergency work was undertaken to temporarily stabilize the road embankment slope as a result of the north-west wingwall collapse. Further erosion issues have been identified. The structure conveys the 100-year event but is overtopped by the Regional storm by 1.48 m +/- . Due to the condition of this crossing, it will require replacement as part of this project.

3.6 Natural Environment

3.6.4 Terrestrial Resources

Wood completed a Terrestrial Resources investigation. The full report is included as Appendix I. Terrestrial resources existing conditions were gathered through both secondary source information and field investigations conducted on May 24 and June 19, 2017. Through a secondary source review of Land Information Ontario (LIO) data, several natural heritage features have been identified in the vicinity of the project area.

Correspondence with MNRF reports that 14 Species at Risk (SAR) have been recorded in the vicinity of the study area, 11 of which are terrestrial or semi-terrestrial. Several

wildlife SAR and species of conservation concern were observed during field investigations, including: Barn Swallow, Chimney Swift, Eastern Wood-Pewee, Peregrine Falcon, Canada Warbler and Red-necked Grebe. These species are typically tolerant of disturbance and have learned to adapt in an urbanized environment. Generally, habitat for SAR and species of conservation concern is limited and highly fragmented within the project study area. As such, only minor impacts to wildlife and supporting habitat are anticipated to result from the proposed project works.

The study area is characterized by large amounts of cultural land use and fragmentation. Approximately 93.1% of the study area includes these anthropogenic and cultural habitats and land uses in the form of residential, industrial and commercial lands and cultural vegetation communities. The majority of existing naturalized areas are associated with the watercourses throughout the project study area. Many non-native species were found within these naturalized areas. Wildlife found to occur in the vicinity of the project area from the secondary source review, as well as those observed on site during field investigations were found to be those that are tolerant of urbanized environments (i.e., raccoon, skunk) and includes several SAR which were observed or have a high likelihood of occurring in the area.

Only those features immediately adjacent to Mississaga Street have potential to be directly impacted by project works. The Lower Bronte Creek Wetland Complex is located approximately 170 m north of the Bronte Creek Bridge on Lakeshore Road West and is not anticipated to be impacted by the project works. Several urbanized parks (Riverview Park, Bronte Athletic Park and Coronation Park), as well as fragmented areas of woodland/forest near the watercourses are also present within the project study area. These parklands and fragments of forest/cultural woodland near the watercourses and are a relatively significant feature in context of the project area landscape, given that the area is characterized by a high degree of disturbance and development. Although the high disturbance and habitat fragmentation suggest limited functionality of these lands, several candidate Significant Wildlife Habitats have been identified in the project study area, including:

- Bat maternity colonies;
- Turtle wintering areas;
- Land bird migratory stopover areas;
- Amphibian woodland breeding habitat;
- Turtle nesting areas;
- Special concern and rare wildlife species habitats; and
- Amphibian movement corridor habitat.

3.6.5 Aquatic Resources

Wood completed an Aquatic Resources investigation. The complete report is included as Appendix J. Within the study area, Lakeshore Road West crosses four (4) permanent watercourses including Bronte Creek, Fourteen Mile Creek, McCraney Creek, and an unnamed tributary to Lake Ontario which flows through Sedgewick Forest, located to the east of the water treatment plant. There is one intermittent watercourse (unnamed tributary located at Crossing C17) and thirteen (13) additional drainage features which have ephemeral flow. The study area is under the jurisdiction of Conservation Halton and the Aurora District Ministry of Natural Resources and Forestry. A secondary source review, as well as correspondence with regulatory authorities revealed records of American Eel (*Anguilla rostrata*) and Silver Shiner (*Notropis photogenis*) in Bronte Creek, and Redside Dace (*Clinostomus elongatus*) within Fourteen Mile Creek.

A review of MNRF's NHIC database and correspondence from MNRF indicates that there are a number of natural heritage features recorded in the vicinity of the project study area:

- Occupied American Eel and Silver Shiner habitat: Bronte Creek;
- Occupied Redside Dace habitat: Fourteen Mile Creek;
- Lower Bronte Creek Wetland Complex (located approximately 170 m north of the Bronte Creek Bridge on Lakeshore Road); and
- Riverview Park, Bronte Athletic Park, Coronation Park lands.

3.6.6 Fluvial Geomorphic Assessment

AquaLogic Consulting completed a Fluvial Geomorphology Review for Fourteen Mile Creek and McCraney Creek. This report is included as Appendix K. Fourteen Mile Creek and McCraney Creek have been investigated based on fluvial geomorphic considerations for crossing improvements. Scoping level review of existing channel conditions, planform characteristics, crossing sizing and guidance for scour and erosion control, have been undertaken.

3.7 Archaeological Assessment (2017)

A Stage 1 Archaeological Assessment was completed for the study corridor and is included as Appendix L. The Stage 1 background study concluded that undisturbed portions of the study area have archaeological potential for three principal reasons: 1) the study corridor is in close proximity to Lake Ontario, and crosses four creeks; 2) a clear pattern of pre-contact aboriginal and historic Euro-Canadian land use in the vicinity as demonstrated by the presence of 11 previously registered archaeological sites

within a 1-km radius; and 3) Lakeshore Road is an historic transportation route that also traverses a portion of the historic Bronte Village. It has been concluded that areas where potential has been removed as a result of previous road and sidewalk construction, disturbed shoulders, driveways and boulevards comprise approximately 88% (12.5 ha) of the total study area, while areas of low potential due to excessive slope constitute approximately 1% (0.13 ha). The potential for archaeological resources exists within 11% (1.1 ha) of the total study area.

3.8 Cultural Heritage Assessment (2017) and Update (2020)

A Cultural Heritage Assessment (CHER) was completed in 2017 for the study corridor. The 2018 CHER identified a total of 17 listed and designated heritage properties within, or adjacent to the Study Area. These include a number of heritage homes, buildings and landscapes relating to the two World Wars and the Korean War (Cenotaph), and buildings relating to recreation, industry, religion, and education. Since the completion of the 2017 CHER, the heritage status of several properties in the Study Area has changed. A Cultural Heritage Update memo was completed by Wood in 2020 to provide updated heritage status for the 17 heritage properties, update inventory of built heritage resources and cultural heritage landscapes and discuss impacts and mitigation measures (Wood, 2020). Updated heritage status for the 17 heritage properties is provided in **Table 3-2**. The 2017 CHER and the 2020 Cultural Heritage Update memo are provided in Appendix M.

Table 3-2: Status of Identified Heritage Properties in or Adjacent to the Study Area

HP No.	Address/Resource Type	2018 Heritage Status	2020 Heritage Status
HP 1	-3014 Lakeshore Road West -Bronte Bluffs and Bronte Harbour	Listed in the Oakville Heritage Register	Notice of Intention to Designate (February 10, 2020)
HP 2	-2508 Lakeshore Road West -Bronte Marina Building	Designated under Part IV of the <i>Ontario Heritage Act</i>	Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 2014-124)
HP 3	-2500 Lakeshore Road West -Bronte Cenotaph	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register

HP No.	Address/Resource Type	2018 Heritage Status	2020 Heritage Status
HP 4	-2489 Lakeshore Road West -Walton Memorial United Church	Designated under Part IV of the <i>Ontario Heritage Act</i>	Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 1933-53)
HP 5	-2457 Lakeshore Road West -Cenotaph	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 6	-2003 Lakeshore Road West -Private residence	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 7	-1426 Lakeshore Road West -Coronation Park	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 8	-1110 Lakeshore Road West -Private residence	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 9	-573 Lakeshore Road West -The Acacias (private residence)	Designated under Part IV of the <i>Ontario Heritage Act</i>	Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 2015-044)
HP 10	-549 Lakeshore Road West -Old McCraney House (private residence)	Designated under Part IV of the <i>Ontario Heritage Act</i>	Designated under Part IV of the <i>Ontario Heritage Trust</i> (By-law 1984-83)
HP 11	-540 Lakeshore Road West -Appleby College	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register

HP No.	Address/Resource Type	2018 Heritage Status	2020 Heritage Status
HP 12	-489 Lakeshore Road West (formerly 491 Lakeshore Road West) -Captain G. E. Morden House (private residence)	Listed in the Oakville Heritage Register	Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 2019-092)
HP 13	-372 Lakeshore Road West -Private residence	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 14	-369 Lakeshore Road West -Private residence	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 15	-335 Lakeshore Road West -Private residence	Listed in the Oakville Heritage Register	Listed in the Oakville Heritage Register
HP 16	-258 Lakeshore Road West -St. Jude's Cemetery -Oakville Cultural Heritage Landscape	Designated under Part IV of the <i>Ontario Heritage Act</i>	-Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 2009-075) -Draft notice of Intention to Designate as a Cultural Heritage Landscape (February 10, 2020)
HP 17	-105 Paliser Court -Reverend George Washington House (private residence)	Designated under Part IV of the <i>Ontario Heritage Act</i>	Designated under Part IV of the <i>Ontario Heritage Act</i> (By-law 1987-302)

3.9 Hydrology and Drainage

The Town of Oakville's Stormwater Management Master Plan (Wood, 2020) was developed to help guide the planning and design of capital works to address flood risks,

establish new policy and guidelines, and develop associated strategies for the management of stormwater in the Study's focus area. The focus area for the Stormwater Management Master Plan is located in the areas of the town, south of the Queen Elizabeth Way, between Winston Churchill Blvd. Boulevard to the east, Burloak Drive to the west, and Lake Ontario to the south. A Stormwater Management Report was prepared by Wood as part of the current study to assess the existing drainage systems and associated hydraulic crossings, and to propose road drainage and stormwater management requirements (Wood, 2020). The Stormwater Management Report is provided in Appendix N.

3.9.1 Drainage

The existing roadway drainage is split between numerous major/minor drainage outlets to Lake Ontario and three (3) watercourses: the Bronte Creek, Fourteen Mile Creek and McCraney Creek.

The existing drainage system along the urbanized sections of Lakeshore Road consists of a series of storm sewers conveying minor system flows, and a series of urban R.O.W.s (curb and gutter) conveying major system flows. The minor system conveys storm events up to the 5-year storm event, and the major system conveys storm events greater than the 5 year, up to the 100-year storm event. The rural road sections of Lakeshore Road drain to roadside ditches, which are intended to convey drainage up to the 100-year event.

3.9.2 Hydraulic Crossings

There are four (4) hydraulic crossings (bridges and culverts) within the Study Area located at the following road Stations:

- Bronte Creek (0+310)
- Un-named Drainage Feature (3+450)
- Fourteen Mile Creek (3+390)
- McCraney Creek (4+790)

3.9.2.1 Bronte Creek

Bronte Creek Bridge (also known as 12 Mile Bridge) was built in 1970 and rehabilitated around 1999. The total deck length is 64.9m and structure width is 19.5m. The roadway width is 14.4 m. The current posted speed is 50 km/h and the roadway consists of four (4) lanes. The bridge has been assessed to be in good condition and will not require any structural modifications. Conservation Halton provided the current Bronte Creek HEC-2 hydraulic model for use in the Oakville Stormwater Master Plan. The Lakeshore Road

crossing has been modelled as a bridge. Based on the HEC-2 hydraulic model the Bronte Creek crossing is capable of conveying the Regional Storm (Hurricane Hazel).

3.9.2.2 Un-named Drainage Feature

The second crossing is a 1.22 m x 1.84 m box culvert conveys runoff from north of Lakeshore Road (Hixon Street Remnant Channel) to Lake Ontario. Hydraulic modelling of the crossing has been included within the PCSWMM integrated hydrologic/hydraulic model. The crossing is capable of conveying the 100 year storm without overtopping Lakeshore Road, with approximately 0.50 m freeboard.

3.9.2.3 Fourteen Mile Creek Bridge

The Fourteen Mile Creek Bridge was built in 1916 and has been extended both north and south. It is a Spandrel Arch Structure. The total deck length is 17.1 m (+/-) and the structure width is 15.74 m (+/-). The roadway width is 11.54 m (+/-). The bridge has been assessed in good condition and will not require any structural modifications.

The bridge has been modelled in HEC-RAS Version 4.1 as part of the ongoing Fourteen Mile Creek and McCraney Creek Flood Mitigation Opportunities Class EA. It conveys the 100-year storm event based on a deck elevation of 81.66 m, but the Regional Storm overtops it by 0.75 m (+/-) with a flow velocity of 1.09 m/s (+/-).

At the bridge crossing, based on the simulated 0.75 m (+/-) overtopping road depth and 1.09 m/s (+/-) flow velocity, and using the Ministry of Natural Resources and Forestry's (MNR's) vehicle ingress and egress requirements (Technical Guide – River and Stream Systems: Flooding Hazard Limit, 2002), private vehicles would not be able to drive along Lakeshore Road at the Fourteen Mile Creek crossing during the Regional Storm Event. Emergency vehicles (fire trucks) would be able to cross the bridge as the flood depth is below the 0.90 m MNR guideline for flow depth for emergency vehicles. However, Town of Oakville staff have indicated emergency vehicles would not use the bridge under Regional Storm flooding conditions.

3.9.2.4 McCraney Creek Crossing

The McCraney Creek crossing is an arch culvert built in 1940 and subsequently extended with a box culvert section. The total deck length is 14 m (+/-) and the structure width is 5.4 m (+/-). The roadway width is 8.4 m (+/-). The structure has a 100-year hydraulic capacity but is overtopped by the Regional Storm by 1.36 m (+/-) with a flow velocity of 1.46 m/s (+/-).

In July 2017, emergency work was undertaken to temporarily stabilize the road embankment slope as a result of the north-west wingwall collapse. Erosion issues along the west creek bank will continue and will need to be addressed through creek works.

Due to the structural condition and hydraulic capacity of this crossing it will require replacement as part of this project.

3.9.3 Soils

Surficial soils data for the Study Area (as available from Agriculture Canada – Ontario Soil Survey Reports) is generally lacking; mapping for the Study Area indicates an urbanized land use and therefore does not provide more detailed information. Based on the soils information determined within the Coronation Park Drainage Improvements Class EA, the surficial geology within the Coronation Park area is predominantly characterized by coarse-textured glaciolacustrine deposits (sand, gravel, silt and clay).

The borehole logs from previously completed Geotechnical Reports for other projects were reviewed. These boreholes indicated presence of silty sand, as well as clayey silt and silty clay within the surficial soils. Weathered shale material (Queenston formation) was generally indicated at the base of the boreholes.

3.9.4 Hydrology

An integrated hydrologic/hydraulic model of the existing conditions of the Lakeshore Road R.O.W. was developed in PCSWMM Version 7.0. The original PCSWMM model was developed as part of the Town of Oakville Stormwater Master Plan by Amec Foster Wheeler (now Wood) and was designed to assess the storm sewer system within southern Oakville. The PCSWMM modelling was updated for the hydrologic/hydraulic assessment within the Class EA to be more discretized and to assess each storm sewer section and roadside ditch to determine the Lakeshore Road drainage system performance.

In summary most of the existing storm sewer system surcharges, with only two (2) drainage systems not surcharging. For the major system within an urban road section, level of performance has been noted as non-surcharged meaning flow below top of curb, surcharged above the curb and then surcharged more than 0.15 m above centreline of road. The Town of Oakville requires overland flow on roads to be less than 0.15 m above road centreline. For rural road sections with roadside ditches the level of performance has been assessed as non-surcharged (within the ditch) or surcharged (flooding outside of the ditch).

Site reconnaissance was conducted to determine potential basement connections to the storm sewer system. It is not known if basements have direct or sump system connections to the minor system. The PCSWMM model was used to determine if the minor system hydraulic grade line may be above basement levels.

3.10 Scenic Corridors Study (2020)

As discussed in Section 3.2, the full length of Lakeshore Road (East and West), and a portion of Trafalgar Road (from Cornwall Road to Lakeshore Road) were identified as scenic corridors in the new town-wide Urban Structure (OPA 15). On August 6, 2019, Planning and Development Council received a staff report entitled “Lakeshore Road West Class EA Update” (dated July 15, 2019) which recommended that the staff be directed to undertake a Scenic Corridors Study and amend the Lakeshore Road West Class Environmental Assessment scope and work plan to incorporate findings of the Scenic Corridor Study for Lakeshore Road West (Town of Oakville, 2019).

The Scenic Corridors Study was completed in February 2020 by the Town staff to examine the Lakeshore Road and Trafalgar Road corridors to identify and evaluate the roadway, streetscape and framing elements that contribute to the scenic value. The findings of the Scenic Corridors Study are intended to inform current and future road improvement projects within the scenic corridor areas, as well as guide future Liveable Oakville Plan policy and urban design direction. The purpose of the Scenic Corridors Study is not to determine whether or not the identified elements will be preserved as part of the future road works. Instead, the study provides information with respect to elements of the road corridor that contribute to its function as a Scenic Corridor to ensure this role can be considered and balanced against competing priorities through the EA process, such as stormwater management, active transportation, traffic safety, etc.

3.10.1 Consultation

Public consultation to gather input on the elements and features along the corridors that citizens identify as scenic and characteristic of the route was an important component of the Scenic Corridors Study. A study webpage was developed by town staff which provided information about the study and the public consultation events.

Open houses for the study were held at the Oakville Town Hall (October 23, 2019), Trafalgar Park Community Centre (October 24, 2019) and Queen Elizabeth Park Community and Cultural Centre (October 29, 2019). Advertisements for the open houses were posted in the Oakville Beaver on October 10, 2019.

Invitation to attend the open houses were emailed to all nine of the residents associations (RA) in Wards 1, 2 and 3, including: Bronte Village RA, Chartwell Maple Grove RA, Coronation Park RA, Hopedale RA, Joshua Creek RA, Oakville Lakeside RA, Trafalgar Chartwell RA, West Harbour RA, and West River RA. The Scenic Corridors Study grouped the comments received at the Open Houses into the following categories: trees/vegetation, pedestrian connections, roadway, and heritage.

A staff report summarizing the findings of the Scenic Corridors Study was presented at the March 9, 2020 Planning and Development Council meeting. The Council passed the resolution that the findings of the Scenic Corridors Study be endorsed as a background study informing the preparation of Official Plan policies and urban design direction documents and informing future major town projects within the right of way of identified Scenic Corridors, including the Lakeshore Road West Class Environmental Assessment.

3.10.2 Scenic Corridor Themes

The Scenic Corridors Study identifies four themes that support and define the characteristics and qualities of the scenic corridors. Each theme includes consideration(s) for future undertakings (such as, EAs, capital projects, Official Plan reviews, and other projects). The four themes and their corresponding considerations are provided below:

Importance of maintaining trees and vegetation

- Retain healthy mature trees within the municipal right-of-way and on abutting private properties, where possible;
- Foster the overall health of trees through ongoing assessments and, where necessary, interventions;
- Identify open space areas along the right-of-way where future planting of trees, shrubs or understory vegetation can be accommodated;
- Plan for tree succession by developing a replacement plan to account for tree death and/or strategic removals, and
- Promote the planting of native tree, shrub and plant species within the municipal right-of-way and on abutting private properties.

Importance of maintaining and complementing the historical attributes

- The identified heritage features shall continue to be protected and managed through the *Ontario Heritage Act*, the Conservation District Plans, the Livable Oakville Plan policies and the heritage permit approvals process.

Importance of maintaining connectivity for pedestrians and cyclists

- Provide continuity of and variety in travel modes so that users have different ways to experience the corridor, whether as a pedestrian, cyclist, or driver, which can greatly contribute to their experience and connection to that place/corridor.

Importance of Maintaining the Proportions of the Existing Roadway

- Maintain the current number and width of the existing vehicle travel lanes, where possible;
- Limit road widenings to only accommodate vehicle turning lanes at intersections, where necessary;
- Incorporate necessary active transportation improvements for predictable and continuous cycling and pedestrian movement;
- Maintain an appropriate balance between landscaped spaces and hard surface spaces (roadway, sidewalks, etc.) which currently form part of the scenic character of the corridors, and
- Where physically feasible, incorporate low impact development features/facilities to enhance the 'greening' of the boulevard.

4.0 Problem and Opportunity Statement

The purpose of this study was to address existing and future opportunities and constraints along the Lakeshore Road West corridor, through a comprehensive, environmentally sound planning process, while facilitating dialogue between stakeholders with diverse interests. Based on a review of existing and future conditions, as well as preliminary consultation with stakeholders, it was determined that improvements are needed along the Lakeshore Road West corridor. The following specific problems and opportunities were identified:

- Improve intersection operations
- Accommodate transit and improve transit infrastructure, wherever possible;
- Improve roadway geometrics to meet current design standards;
- Provide and improve pedestrian and cyclist facilities;
- Improve pavement conditions;
- Improve traffic, pedestrian and cyclist safety;
- Improve existing drainage stormwater management;
- Improve creek crossings and structures;
- Accommodate future municipal services and utilities within the ultimate right-of-way
- Maintain or enhance the scenic character of the corridor, as described in the Scenic Corridor Study, 2020 (Town of Oakville, 2020).

5.0 Development and Evaluation of Alternative Solutions

Phase 2 of the Class EA process requires that various reasonable solutions be identified to address the problem and opportunity identified in Phase 1. The potential solutions are then evaluated against various factors (such as natural environment, social and cultural environment, and technical and financial considerations). Based on the evaluation, the preferred solution is identified and presented to the public for input and review. This section provides a summary of the evaluation of alternative solutions process for this study. Detailed evaluation results are provided in Appendix O.

5.1 Identification of Alternative Solutions

The following Alternative Solutions were identified for consideration in addressing the problems and opportunities identified during the Phase 1 of the Class EA process of this study:

Alternative 1: Do Nothing:

- No improvements
- Continue regular maintenance

Alternative 2: Improve other Roads:

- Add capacity to adjacent parallel roads to accommodate traffic

Alternative 3: Multi-modal Improvements:

- Improve transit and active transportation infrastructure
- Promotion of increased active transportation and carpooling use

Alternative 4: Additional Improvements to Lakeshore Corridor:

- Improvements in the form of:
 - Signal timing changes
 - Active transportation facilities
 - Horizontal alignment
 - Streetscaping

Alternative 5: Widen Lakeshore Road West to 3 Lanes with Active Transportation Facilities:

- Addition of two-way centre turning lanes to increase traffic capacity throughout the corridor (left turning vehicles not blocking through lane), providing pedestrian sidewalks and cycle lanes throughout the study area

5.2 Evaluation Criteria for Alternative Solutions

In assessing Alternative Solutions, a range of environmental factors, and potential avoidance or mitigation of negative effects were considered. To facilitate assessment of Alternative Solutions, this study identified evaluation criteria that reflected the concerns of various stakeholders, as communicated through preliminary consultation, as well as the concerns of the Town of Oakville. The evaluation criteria is provided in **Table 5-1**. A summary of assessment of the various Alternative Solutions is provided in **Table 5-2**.

In addition to the following criteria, the scenic corridor attributes of the design alternatives were a major consideration, and based on the results of the Scenic Corridors Study (2020), this factor was considered in the further evaluation of alternatives, as discussed in Section 6.0.

Table 5-1: Evaluation Criteria for Alternative Solutions*

Component	Evaluation Criteria	Description
Natural Environment	Wetlands and Vegetation	Potential adverse effects on terrestrial species and habitats
	Wildlife Habitat	Potential adverse effects on existing wildlife due to disturbance or loss of habitat
	Species at Risk	Potential effects on Species at Risk identified in the study area
	Groundwater/ Surface Water	Potential adverse effect on groundwater and wells including groundwater discharge and recharge
	Fisheries and Water Quality	Potential to minimize impact on aquatic features
	Flooding, Erosion and Surface Water Quality	Potential impact on flood potential, flood elevations, downstream erosion risk and water quality
Social Environment including, Cultural, and Economic	Land Use	Presence, number and characteristics of residences, community facilities, public parks, institutions or businesses within or adjacent to the study corridor
	Noise	Impact on noise levels at noise sensitive receivers during construction, and during operation

Component	Evaluation Criteria	Description
	Archaeology and Cultural Heritage Resources	Potential adverse effects on archaeological and built heritage resources
	Property Access Considerations	Ability to maintain/maximize access following construction
	Utilities	Ability to minimize effects on existing and proposed utilities
	Construction Disruptions	Ability to minimize construction disruption and complexity
	Active Modes of Transportation	Ability to contribute to the Active Transportation (AT) network through the corridor including the provision of continuous facilities, AT type and design, and access to destinations along the corridor
	Accessibility (AODA)	Ability to maintain or enhance accessibility of the roadway for all road users including pedestrians
	Air Quality	Ability to reduce emission associated with transportation within the study area
Transportation	Safety	Ability to improve road user safety
	Travel Delay/Traffic Capacity	Potential to address existing and future capacity and operational needs
	Transit	Potential to address transit needs for future planned transit initiatives
Costs	Capital Cost	Capital costs of the proposed improvements
Technical	Constructability	The ability to construct the improvements in a simple and cost-effective manner
	Adherence to Applicable Design Standards	Degree to which the proposed improvements meet applicable standards and codes
Transportation Plans & Policies	Compatibility with Region and Town Transportation Plans and Policies	Compatibility with Regional and Municipal Official Plans and Policies

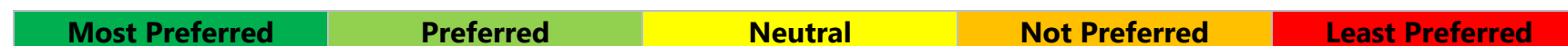
5.3 Evaluation of Alternative Solutions

All the alternatives were evaluated against the evaluation criteria listed in **Table 5-1**. The full Assessment of Alternative Solutions is provided in Appendix O. A summary of the assessment is presented in **Table 5-2**. To facilitate comparison of alternatives a rating system is used showing a green (most preferred) to red (least preferred) scale, as shown below.



Table 5-2: Evaluation of Alternative Solutions

	1. Do Nothing	2. Improve Other Roads	3. Multi-Modal Improvement	4. Additional Improvements to Lakeshore Corridor	5. Widen Lakeshore Road West to 3 Lanes with Active Transportation Facilities
Natural Environment	• No impacts	• No Impacts	• Potential for minor impacts but can be mitigated with established practices and guidelines	• Potential for minor impacts but mitigated with established practices and guidelines	• Potential impacts associated with widening of road corridor
Social Environment	• Minor impact associated with increased congestion, lack of consistent active transportation facilities	• Continued lack of active transportation facilities	• Limited impacts to land use and other social factors	• Potential for minor impacts associated with widening and property acquisition	• Potential impacts associated with widening and property acquisition
Transportation	• Through traffic would be impacted by left turning vehicles • Pedestrian safety concern would remain unchanged	• Improvement to other roads has already been taken into consideration (i.e. improvements to Speers Road)	• Increase in traffic congestion • Opportunity to improve transit and AT facilities	• Opportunity to improve traffic congestion and corridor capacity	• Improve capacity and safety performance
Cost	• Zero capital cost • Continued maintenance cost	• No direct costs • Continued maintenance cost	• Moderate capital cost associated with improvements	• Moderate capital cost associated with improvements	• Higher capital cost associated with improvements
Technical	• No construction • No upgrading of existing infrastructure	• No construction • No upgrading of existing infrastructure	• Minor constructability concerns. Able to upgrade some aspects of corridor to new standards	• Minor constructability concerns and able to upgrade some aspects of corridor to new standards	• Constructability concerns. Able to fully upgrade the corridor to new standards
Transportation Plans and Policies	• Recommended improvements for future growth would not be implemented	• Recommended improvements for future growth would not be implemented	• Complies with some aspects of Town and Region planning documents	• Complies with of Town and Region planning documents	• Complies with of Town and Region planning documents
SUMMARY	Removed	Removed	Carried Forward	Carried Forward	Carried Forward



The following discussion summarizes the results of the evaluation assessment of alternatives:

- **Alternative 1:** Dropped from further consideration, as it fails to address key deficiencies, particularly the lack of accommodation of pedestrians and cyclists, and traffic operations.
- **Alternative 2:** Improvements to other roadways have been considered in town's EMME Model for 2031. Lack of accommodation of pedestrians and cyclists, and traffic operations. Therefore, Alternative 2 fails to address the identified deficiencies.
- **Alternative 3:** The provision of additional alternative modes of transportation in this area has the potential to attract some growth. The Town of Oakville has assumed a 10% modal split to year 2021 and a 20% modal split to year 2031. This planning alternative is not viable on its own but may be considered in conjunction with other alternatives proposed.
- **Alternative 4:** Additional improvements along the Lakeshore Road West corridor such as signal timing changes, active transportation facilities, horizontal alignment, roadside landscaping will not address key deficiencies, however, may be considered in conjunction with other alternatives proposed.
- **Alternative 5:** Widening Lakeshore Road West to 3 Lanes, one lane in each direction with a two-way-centre-left-turn will increase traffic capacity throughout the corridor and reduce conflicts with turning vehicles. The addition of active transportation facilities such as sidewalks, multi-use trails and bike lanes will provide pedestrian and cyclists with the means to travel throughout the study area.

5.4 Preferred Solution

Based on input provided by stakeholders, technical agencies and public participants, as well as based on an assessment by the study team, the Preferred Solution is a combination of alternatives 3, 4 and 5, as follows:

- Alternative 3: Multi-Modal Improvements
- Alternative 4: Additional Improvements to the Lakeshore Road West Corridor, including turning lanes
- Alternative 5: Widen Lakeshore Road West to 3 lanes (two-way left turn centre turning lane) with active transportation facilities (bike lanes, multi-use trails and sidewalks)

This alternative is also recommended in the Road Safety Performance Study for Lakeshore Road West completed in 2017. It is important to note that Preferred Solution is a combination of one or more of Alternatives 3, 4 and 5 in each section of the study corridor. Various design alternatives for Preferred Solution were prepared and assessed by the Study Team as a component of the next phase of the project.

It should be noted that the direction from Council and additional consultation resulted in a re-evaluation and subsequent modification of the preferred design which is presented in Section 6.0 and Section 7.0.

5.5 Public Consultation

As outlined in Section 2.0, public consultation was a key component to this study. To bring the information to a wider audience a total of three Public Information Centres (PICs) were held, the first during Phase 2 of the study and the second during Phase 3. Subsequent to the second PIC, as discussed in Section 6, further public feedback resulted in a re-evaluation and subsequent modification of the preferred design. Following the re-evaluation of revised alternatives, a third PIC was conducted to share the updated preferred design and receive public feedback. The PIC No. 3 is discussed in **Section 6.7.3**.

5.5.1 Public Information Centre No.1

Public Information Centre No. 1 (PIC No. 1) for the above project was held on Thursday April 20, 2017 from 6:00 p.m. to 8:00 p.m. at the Town of Oakville – Town Hall, South Atrium. Notification of the PIC was published in the local newspaper and mailed to review agencies and affected public on April 3, 2017. Copies of the newspaper advertisement, letters to stakeholders and agencies, a PIC summary, all comments received, and written responses are contained in Appendix A. The purpose of the PIC was to solicit public comments and suggestions on the following:

- the purpose of the study;
- profile of the study area;
- issues and concerns within the study area;
- road improvement alternative solutions and combinations of alternative solutions;
- criteria by which road improvement alternative solutions have been evaluated;
- the Project Team’s recommended road improvement solution; and
- next steps in the study process.

A total of 31 people signed the attendance sheet. At PIC No.1, a total of 14 comments sheets were submitted and numerous comments were submitted after the PIC to the Town. A summary of the PIC including comments received is included in Appendix A.

5.5.2 Public Information Centre No. 2

Public Information Centre No. 2 (PIC No. 2) for the above project was held on Wednesday November 29, 2017 from 6:00 pm to 8:00 pm at the Sir John Colborne Recreation Centre for Seniors. Notification of the PIC was published in the Oakville Beaver and mailed to agencies and the affected public on Thursday November 16, 2017. Copies of the newspaper advertisement, letters to stakeholders and agencies, a PIC summary, all comments received and written responses, are contained in Appendix A. The purpose of the PIC was to solicit public comments and suggestions on the following:

- recommended road improvement design concept or combinations of concepts;
- criteria by which alternative design concepts of the preferred road improvement alternative have been evaluated; and
- the recommended design concepts.

A total of 81 people signed the register. A total of 18 comments sheets were submitted the night of the PIC, with additional comments and sheets submitted via mail and email within the comment period.

5.5.3 Key Issues

Table 5-3 provides a summary of the key issues identified based on comments received from the first two Public Information Centres.

Table 5-3: PIC No. 1 and PIC 2 - Summary of Key Issues and Responses

General Comments	Response
Cycling	
Amount of space provided for bicycle lanes needs to be sufficient for safety, and may need to have a barrier	<p>The proposed cross-sections for this corridor provide sufficient space for all users of Lakeshore Road West. Bike boxes promote safety for turning cyclists and will be further reviewed by the town at the detailed design phase.</p> <p>The Ontario Traffic Manual and the TAC Geometric Design Guide for Canadian Roads – Chapter 5 Bicycle Integrated Design specify a design domain of 1.8m to 3.5m for the width of a buffered bike lane. The proposed design for Lakeshore Road West is a 1.5m bike lane with a 0.5m buffer (2.0 buffered bike lane).</p>
Including bicycle lanes in the cross-section	On road bicycle lanes are included along the entire study corridor. This provides continuity with the road cross-sections to the east and west.
Safety	
Safety at the Pioneer Gas Bar	The Pioneer Gas Bar on the northeast corner of Lakeshore Road West currently has two accesses to their property from Lakeshore Road West. A Road Safety analysis for the section of Lakeshore Road West between Bronte Road and Jones Street was completed and no collisions were recorded for the study period from vehicles turning in or out of the Pioneer Gas Bar.
Pedestrians	
Number and placement of pedestrian crossings	<p>To provide a corridor that supports all users, including cyclists and pedestrians of all ages, safe infrastructure is required. There is a very high number of pedestrians crossing Lakeshore Road West and pedestrian crossings are warranted.</p> <p>The town completed a Pedestrian Safety Study in 2017 that identified potential locations for pedestrian crossings throughout the Town of Oakville. Some of the locations listed in this report are along Lakeshore Road West, within the limits of the Class EA.</p> <p>Comments on the number of crossings in this short section is noted and will be discussed with the town. There are opportunities to upgrade the PXO crossings with pedestrian signals to be coordinated with the traffic lights, so that delay to east-west is minimized.</p> <p>The proposed pedestrian crossing locations and crossing types identified in this report are to be reviewed further during detailed design. The timing of these installations is to be prioritized and phased over time.</p>
Safety of pedestrian crosswalks	<p>The town completed a Pedestrian Safety Study in 2017 that identified potential locations for pedestrian crossings throughout the Town of Oakville. Some of the locations listed in this report are along Lakeshore Road West, within the limits of the Class EA.</p> <p>The type of crossing selected are in line with The Ontario Traffic Manual – Book 15</p>
Three Lane Cross Section	
Lane reduction 4 lanes to 3 with center two way left turn lane (Mississauga St. to Bronte Rd.)	The current mandate is providing a corridor that supports the use for all users, including, vehicles, pedestrians, transit of all ages including people with disabilities. This can only be done by reconfiguring the current right-of-way.

General Comments	Response
	<p>The alternative to Do Nothing, i.e. leave the existing four lane cross-section was not brought forward for further evaluation as it did not address the need for overall roadway improvements to replace aging infra-structure, include active transportation and transit facilities, and improve overall road safety.</p> <p>The findings of the 2021 and 2031 assessment confirmed that the critical year is 2021 with marginally lower volume expected by 2031. Preliminary analysis indicates that a four-lane Wyecroft Road extension would create sufficient additional capacity to satisfy 2031 travel needs and result in a diversion of some through traffic from the Lakeshore Road West corridor.</p> <p>The lane reduction from 4 lanes to 3 lanes from Mississauga Street to Dorval Drive may be deferred until which time the east / west extension Wyecroft bridge is completed.</p>
Opposition to the centre median island	The proposed center median island includes landscape plantings and is used as a traffic calming measure. It also prevents vehicles from using the two-way-left turn lane to pass a vehicle stopped at the pedestrian crossing.
Financing	
Property takings and cost	Proposed property takings are primarily narrow frontage strips along the roadway and daylight triangles at intersections. The full extent and cost of property acquisition is to be confirmed during detailed design. A list of proposed property takings based on the preliminary design is also presented in the ESR.
Underground Hydro	
Use this opportunity to bury Hydro lines	Utility relocation requirements will be clarified and finalized during detailed design. Additional investigation into public requests for buried hydro lines will be undertaken.
Traffic	
Access to Lakeshore (Walton Church)	During implementation the combining of accesses at Walton Memorial United Church and the Bronte Harbour Club Condominiums and installing a traffic signal in place of the proposed pedestrian signal will be further reviewed as a possible solution to vehicles exiting those sites.
Strongly recommend working with Halton to synchronize traffic signals.	A recommendation for the implementation phase is that traffic signal timings and a review traffic progression should be reviewed and optimized
Parking	
Maintain parking on Lakeshore Rd. within Bronte Village	To the extent possible, existing parking spaces have been maintained as part of the proposed streetscape design, with additional lay-by parking added.
Bronte Rd. Intersection	
The re-alignment of the Bronte road intersection will much improve safety at this intersection.	
Representatives of Walton United Church expressed their support for the re-alignment of Bronte Road as it approaches Lakeshore Road from the north. At present, drivers' sight lines in some directions are blocked especially for drivers making left turns westward onto Lakeshore Road. Walton Church representatives noted that when two vehicles are trying to turn left, one westward and the other eastward, onto Lakeshore Road they cannot face each other and still see other oncoming vehicles that intend to drive straight north or south through the intersection. They noted that in their opinion the re-alignment will much improve safety at this intersection.	

General Comments	Response
Roundabouts	
Roundabouts	<p>A high-level screening assessment for roundabouts was completed for the following intersections:</p> <ul style="list-style-type: none"> • Mississauga Street • Bronte Road • East Street • Third Line • Fourth Line • Dorval Drive <p>While some of these options were brought forward to PIC #2, the final assessment concluded that none of the intersections within this section of Lakeshore Road are considered appropriate for roundabouts.</p>
Urbanization	
Removal of street trees.	<p>Wherever possible, the existing trees located along the Lakeshore Road corridor will be preserved. Where tree removals are required these trees will be replaced following the Town of Oakville’s Tree Protection During Construction Procedure. The ESR provides further information on the tree protection mitigation measures, the approach to tree removals where required, and the restoration and additional tree planting measures forming part of the streetscape improvements</p> <p>The ESR includes preliminary design drawings indicating potential tree removals required to accommodate the proposed physical improvements to the road cross section. No tree removals are final at this point, and during detail design efforts will be made to preserve as many mature trees as possible.</p>
Urbanization east of Bronte Village	<p>The objective for the design of the suburban section of the corridor, from east of East Street to Dorval Drive, is to maintain a streetscape typical of the existing roadway while improving safety, and satisfying future needs, for drivers, pedestrians, and cyclists. The proposed design includes several median planting beds, which will include trees, and a multi-use path extending along the south side of Lakeshore Road.</p>
Execution	
Phasing/Timing of the project	<p>The Town of Oakville Capital Forecast identifies completion of the project in four phases. The recommended phasing schedule differs from the schedule contained in the Capital Forecast due to the need to accommodate the future Berta Point Pumping Station and 2 twin forcemains along Lakeshore Road West to East Street from West River Street / Triller Place. The timing of construction has not been confirmed. The recommended phasing is as follows:</p> <ul style="list-style-type: none"> Phase 1 – Lakeshore Road West from Fourth Line to Dorval Drive (including replacement of McCraney Creek Bridge) Phase 2 – Lakeshore Road West from Fourth Line to Sandwell Drive Phase 3 – Lakeshore Road West from Sandwell Drive to Third Line Phase 4 – Lakeshore Road West from Mississauga Street to Third Line
Gateway plans for Bronte Village	<p>Gateway plans were not included in the scope of the Class EA. The towns’ urban design staff have commented that gateway features (with themes found in the cultural heritage resources and landscape of the historic village of Bronte) will be developed by the town as part of the ongoing Bronte Village Growth Area Review.</p>

5.5.3.1 Walton Memorial United Church

Walton Memorial United Church identified the following key items in their communications regarding the project:

- Objection to narrowing the roadway from four-lanes to three-lanes between Bronte Road and Mississaga Street;
- Approval of the re-alignment of the Bronte Road intersection;
- Objection to the elimination of no right turn on red light control at Bronte Road;
- Requested that the project team review the Bronte Road and Mississaga Street intersections, as well as the parking lot accesses along Lakeshore Road West between those intersections;
- Concern about the ability of the roadway to accommodate the amount of traffic accessing the Walton lot.

The project team has noted these concerns in developing the preliminary design. In particular:

- As part of the realignment of the intersection, the removal of the right turn channelization, island, and traffic pole was necessary. The southbound right turn lane will be signed “No Right Turn on Red”. This will provide the same momentary halting of right turning vehicles onto Lakeshore Road West as currently exists, providing a similar break in traffic to accommodate entry into Lakeshore Road traffic.
- Traffic analysis completed for the proposed three lane configuration for Lakeshore Road West shows that traffic would operate at an acceptable level of service. The proposed three lane design provides drivers with the opportunity to complete a two-stage left turn (with initial positioning in the continuous two-way left turn lane, followed by merging into the through-lane).
- Access management at this location would benefit by combining the two entrances into a single access point and installation of a traffic signal in place of the proposed pedestrian crossing. This will be investigated further in the detailed design phase.

5.5.3.2 Coronation Park Resident’s Association

The Coronation Park Resident’s Association identified the following key issues in their communications regarding the project:

- Objection to widening the roadway to accommodate a centre left turn lane;

- Concern that the road speed would be increasing to 60km/h;
- Objection to the loss of mature trees along the corridor;
- Objection to the expropriation of land from Lakeshore Road West residents;
- Greater consideration needed to the Scenic Corridor designation of Lakeshore Road West; and,
- Greater consideration needed to Context Sensitive Design.

The project team has given due consideration to these issues in progressing the study. In particular:

- Centre left turn lane has been removed from the preferred design between East Street and Dorval Drive;
- The posted speed limit will remain 50 km/h; and,
- The preferred design gives due consideration to the Scenic Corridor Designation, tree protection, and provision of facilities for all users.

5.5.3.3 Oakville Christian School

Oakville Christian School expressed concerns about student safety when walking and cycling to school as well as the safety impact of the conversion of the Third Line intersection to a roundabout. As an outcome of the preliminary design process the conversion of the intersection to a roundabout was eliminated from further consideration, and improvements for safe cyclist and pedestrian use have been included.

5.5.3.4 Sir John Colborne Seniors Centre

Sir John Colborne Seniors Center identified access issues with the proposed three lane cross section, as well as concern with the proposed roundabout at third line relating to pedestrian access, due to the high number of seniors in the area. Through continued work on this study both of these options have been removed from the technically preferred design.

6.0 Development and Evaluation of Alternative Design Concepts

Phase 3 of the Municipal Class EA process involves development and evaluation of alternative design concepts for the Preferred Solution. For this study, an initial Assessment of Alternatives was completed, which identified a Preferred Design Concept for the Study corridor. However, as a result of further consultation with the public and direction from the Town Council, a revised set of alternatives was developed, and a more rigorous assessment of those alternatives was completed. Accordingly, this section discusses the following:

- Initial Evaluation of Alternative Design Concepts
- Re-Evaluation of Revised Alternative Design Concepts, based on direction from the Council to develop Alternative Design Concepts that would further reduce impacts (for example, number of tree removal, etc.)
- Technically Preferred Design Concept

6.1 Initial Evaluation of Alternative Design Concepts

The Initial Evaluation of Alternative Design Concepts is documented in detail in Assessment of Cross-Section Elements (Appendix P) and summarized below.

6.1.1 Development of Alternative Design Concepts

Initial Alternative Design Concepts were developed to accommodate the Preferred Solution for the Study corridor. A three-lane cross-section was carried forward for the full corridor, connecting with the three-lane cross-sections at the east and west limits of the study area. Recommendations associated with the following assessments (as discussed in Section 3.3.2 and Appendix F) were incorporated into the development of Alternative Design Concepts:

- Roundabout Evaluation
- Traffic Signal Justification
- Intersection Analysis
- Pedestrian Crossing Assessment

The following alternatives were identified for evaluation based on a three-lane cross-section:

- Alternative 1: On-road Bike Lanes
- Alternative 2: On-road Bicycle Lanes with a buffer

- Alternative 3: Off-road One-Way Cycle Tracks
- Alternative 4: Off-road Multi-Use Path
- Alternative 5: Combination - On-road Bicycle Lanes with a buffer with sidewalk on the north side and a multi-use path on the south side

Given the distinct character of the corridor, alternatives were considered separately for the following sections of the roadway:

1. Bronte Village Section: Mississaga Street to East Street
2. Suburban Section: East Street to Dorval Drive.

6.1.1 Evaluation Criteria for Alternative Design Concepts

The same criteria listed in **Table 5-1** were generally used in the Initial Evaluation of Alternative Design Concepts. The project team also considered criteria identified through consultation to be important to stakeholders and agencies, including:

- Focus on pedestrian safety;
- Retain boulevard trees;
- Improve stormwater management;
- Accommodate transit, cyclists and pedestrian requirements;
- Minimize impacts to the environment, including terrestrial and aquatic life;
- Minimize impacts to adjacent properties;
- Minimize the need to acquire additional property;
- Minimize the impacts to McCraney Creek;
- Optimize project capital cost;
- Accommodate Bronte Village Growth Area development concepts as set out in the Livable Oakville Plan*;
- Accommodate or enhance Bronte Harbour access as outlined in the Oakville Harbours Master Plan (currently on hold) and Halton Regional Official Plan

* Note: The Livable by Design Manual Part B – Urban Design Direction for Bronte Village Growth Area (2018) implements the policy goals, objectives and urban design policies as set out in the Bronte Village (S. 24) and Urban Design (S.6) sections of the Livable Oakville Plan, as amended.

6.1.2 Initial Evaluation of Alternative Design Concepts

Alternative Design Concepts identified above were evaluated to identify the Preferred Design Concept for each section of the Study corridor. A Detailed Assessment of Cross-Section Elements is provided in Appendix P.

6.1.3 Preferred Design Concept Based on Initial Assessment of Alternatives

6.1.3.1 Bronte Village Section: Mississaga Street to East Street

Based on the detailed Assessment of Cross-Section Elements, provided in Appendix P, the following design elements were identified for the Preferred Design for this section of Study corridor:

- 3.3 metre through lanes, with a 3.5 metre centre turn lane
- 2.0 metre sidewalks and on-road 1.5 metre on road bike lanes with a 0.5m painted buffer in both directions
- Intersection improvements at Bronte Road

6.1.3.2 Suburban Section: East Street to Dorval Drive

Based on the detailed Assessment of Cross-Section Elements, provided in Appendix P, following design elements were identified for the Preferred Design for this section of Study corridor:

- 3.3 metre through lanes, with a 3.5 metre centre turn lane
- On-road 1.5m bike lane with a 0.5m painted buffer in both directions
- 1.5m sidewalk on the north side and a 3.0m multi-use trail on the south side

6.2 Consultation Regarding Design Revision

6.2.1 Council's Direction Regarding Additional Consultation

A Draft Environmental Study Report was prepared in 2018, which included details of the Preferred Design identified by the Initial Assessment of Alternatives. On May 22, 2018, the Town of Oakville staff presented the Draft Lakeshore Road West Environmental Study Report (ESR) to the Community Services Committee (CSC) for approval. After a review of the draft report, the following resolution was passed by the committee:

'That this item be referred back to staff to consult with the community regarding the implications on tree preservation, property expropriation, daylight triangles and the selected locations for a centre turn lane and report back in September 2018'

A summary of the meeting was recorded and can be viewed in Appendix A.

6.2.2 Public Meeting

A public open house was held on July 25, 2018 at the Sir John Colborne Recreation Centre for Seniors on Lakeshore Road West to receive public input on the design and to discuss what changes need to be made to the design of Lakeshore Road West. Notification of the meeting was sent to stakeholders, local residents and agencies by mail and email. Information regarding the Public Meeting was also provided on the Town of Oakville project website. The purpose of the meeting was to outline the new direction the project was taking in response to the resolution from the CSC, as well as to address community concerns about the potential impacts of the project, and to answer questions. A short formal presentation was held, followed by a question and answer session, which is detailed in the meeting summary included in Appendix A. Key issues addressed were:

- McCraney Creek,
- Revisions to the study to address CSC direction, and,
- General information regarding how consultation for projects is managed.

6.2.3 Council's Direction Regarding Re-Evaluation of Alternatives

Subsequent to the public meeting, on August 7, 2018, the town's Planning and Development Council provided the following direction:

"That staff be directed to complete additional consultation on the Lakeshore Road West Improvements (Mississaga Street to Dorval Drive) Class Environmental Assessment and report back to Council in early 2019, with recommendations that include at least one option reflecting no continuous centre turn lane, no loss of trees and no expropriation of property while maintaining cycle lanes and reflecting sidewalks/multiuse paths on at least one side and minimizing impervious surfaces."

Accordingly, the Study Team developed and evaluated a revised set of Alternative Design Concepts that aimed at maintaining Scenic Corridor values of the Study Corridor. The revised Evaluation of Alternative Design Concepts was presented at Stakeholder Meetings in March/April 2019 and is discussed below.

6.3 Evaluation of Revised Alternative Design Concepts

6.3.1 Development of Revised Alternative Design Concepts

For the re-evaluation, alternative design concepts were developed to accommodate the evaluation criteria indicated above. Four alternatives were developed for evaluation:

6.3.1.1 Alternative Design A – No Impact

The design elements of this alternative are outlined below and illustrated in **Figure 6-1**, **Figure 6-2** and **Figure 6-3**.

- 3.3 metre through lanes (no centre left turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Maintain existing sidewalk (no new sidewalk or multi-use-path)
- Convert to urban-standard curb & gutter cross-section with storm sewer

6.3.1.2 Alternative Design A1 – Minimal Impact

The design elements of this alternative are outlined below. A rendering of this alternative is provided in **Figure 6-4**.

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Addition of 1.5m sidewalks (where missing)
- Intersection improvements
- Convert to urban-standard curb & gutter cross-section with storm sewer

6.3.1.3 Alternative Design B – Hybrid

The design elements of this alternative are outlined below and illustrated in **Figure 6-5**, **Figure 6-6** and **Figure 6-7**.

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Intersection improvements
- Convert to urban-standard curb & gutter cross-section with storm sewer

Figure 6-1: Alternative Design A – No Impact (Cross-Section)

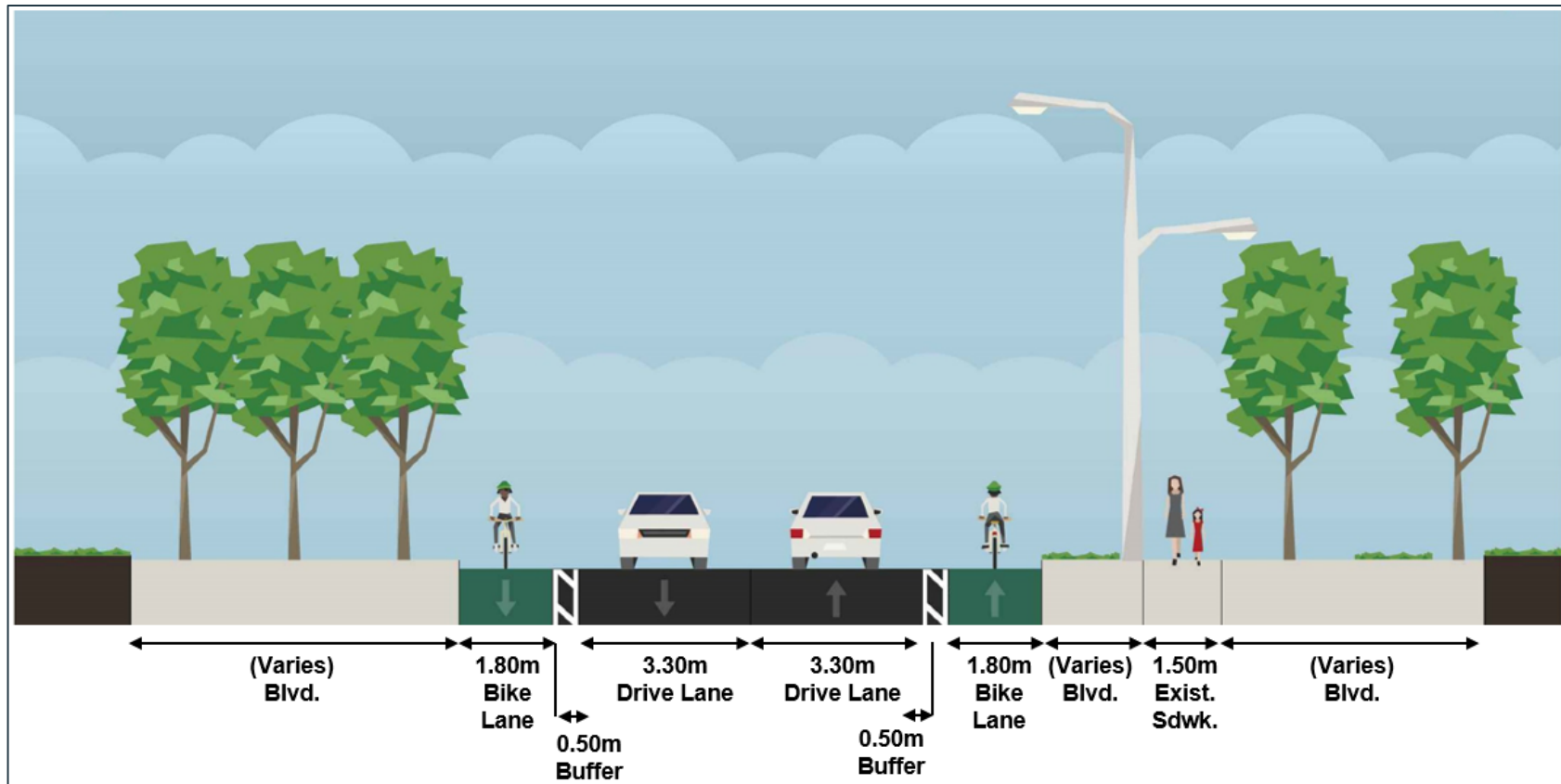


Figure 6-2: Alternative Design A – No Impact (Plan View)

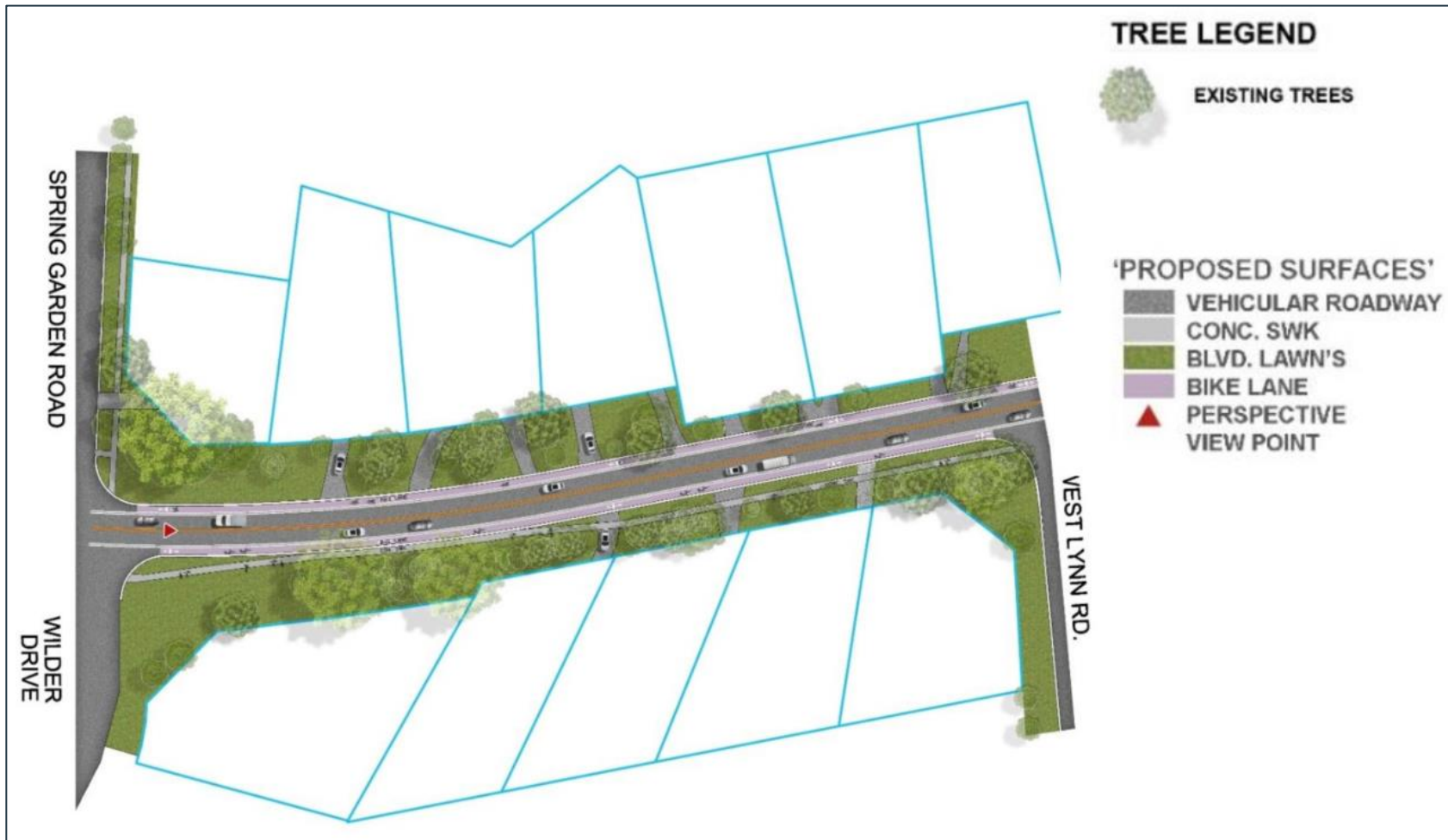


Figure 6-3: Alternative Design A – No Impact (Rendering)



Figure 6-4: Alternative Design A1 – Minimal Impact (Rendering)



Figure 6-5: Alternative Design B – Hybrid (Cross-Section)

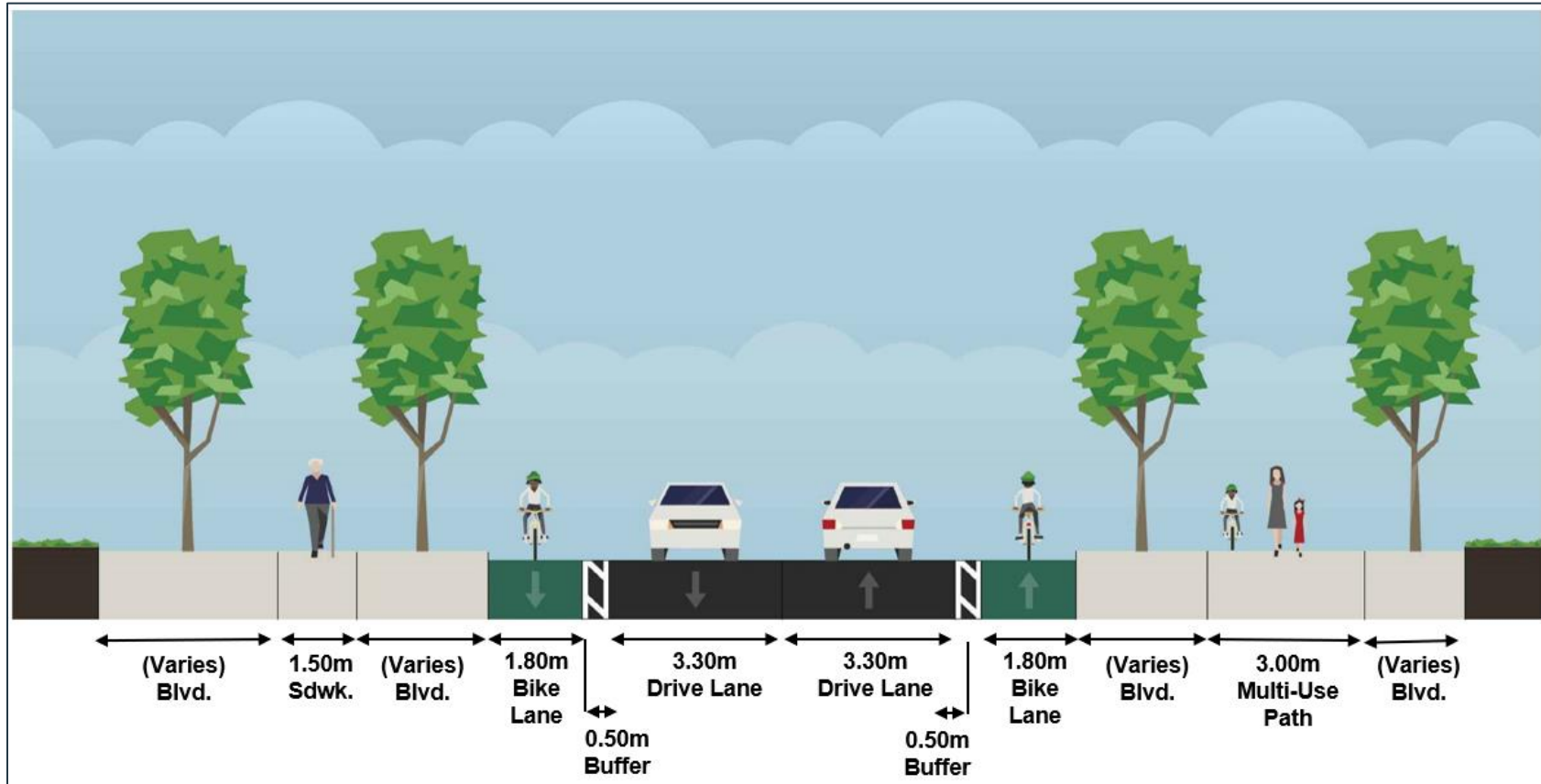


Figure 6-6: Alternative Design B – Hybrid (Plan View)



Figure 6-7: Alternative Design B – Hybrid (Rendering)



6.3.2 Traffic Operations Analysis and Safety Assessment (2019)

The inclusion of the Two-Way-Left-Turn-Lane (TWLTL) was recommended in the initial Traffic and Transportation Report (Amec Foster Wheeler, 2018) to promote/improve safety for left turning vehicles into the many intersections and driveways along the Lakeshore Road corridor. The key consideration was given to the high driveway density along the study corridor, particularly between East Street and Dorval Drive.

A reassessment of the previously submitted technical reports (Traffic and Transportation Report and Road Safety Performance Assessment Report) was completed to re-evaluate the justification and feasibility outlined in the 2017/2018 traffic analysis and safety reports based on input received from stakeholders.

An update to traffic operational analysis and road safety assessment was conducted to review the effectiveness of the addition of a TWLTL on Lakeshore Road West between East Street and Dorval Drive. Results indicated that the traffic volumes entering and exiting driveway accesses along the corridor do not presently compromise capacity. Even though the TWLTL could improve general traffic flows by removing turning traffic from the through lanes within the study limits, such improvement is considered as nominal. As a result, the traffic operational analysis does not warrant the implementation of a TWLTL.

A safety performance assessment was also undertaken using the most recent historical collision data between 2013 and 2017. Locations of collisions by impact types were reviewed in detail to identify safety risks that are attributable to driveway access. The results of the safety assessment did not show an overrepresentation of access-related collisions. Particularly, only segments between East Street and Wood Haven Park will likely benefit from measures to reduce access-related collisions.

The updated Traffic Operations Analysis/Safety Assessment for Lakeshore Road West Improvements Class EA can be found in Appendix F.

6.3.3 Cycling Reassessment (2019)

As part of the right-of-way reassessment, a reassessment of possible cycling facility types was completed to determine if other cycling facility options would minimize the impacts to trees and property, and disruption to the scenic corridor viewshed. The following four options were assessed as shown in **Figure 6-8**, **Figure 6-9**, **Figure 6-10**, and **Figure 6-11**:

Figure 6-8: Option 1 – 1.5m Separated On-Road Bike Lane with 0.5m Painted Buffer



Figure 6-9: Option 2 – 1.5m Separated (Protected) On-Road Bike Lane with Fixed Curbs and Delineators



Figure 6-10: Option 3 – 3m Separated Off-Road Dual Multi-Use Trail

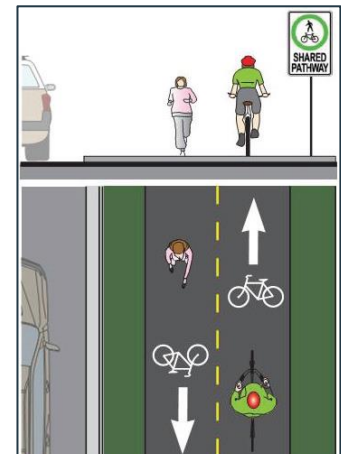
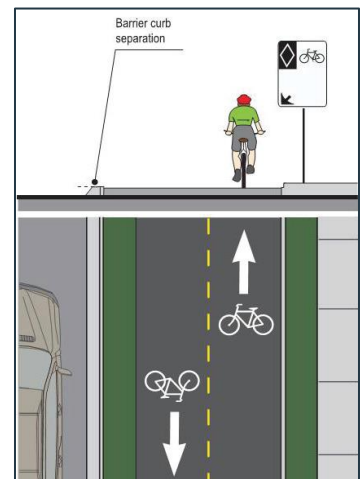


Figure 6-11: Option 4 - 3m Separated Two-Way Cycle-Track



The assessment of the four options used factors such as right-of-way requirements, trees, utilities and property impacts, vehicle, pedestrian and cyclists' operations and safety, aesthetics (impacts to scenic corridor) and capital and maintenance costs. A detailed assessment table is provided in Appendix P.

Based on the re-assessment of cycling facilities, Option 1 was identified as preferred. The design elements of Option 1 are as follows:

- Separated On-Road Bike Lanes with painted buffers
- Sidewalk on north side (1.5m)
- Multi-use Trail on south side (2.40m - 3.0m)
- Road Lane Width (3.30m)

6.3.4 Evaluation Criteria for Revised Alternative Design Concepts

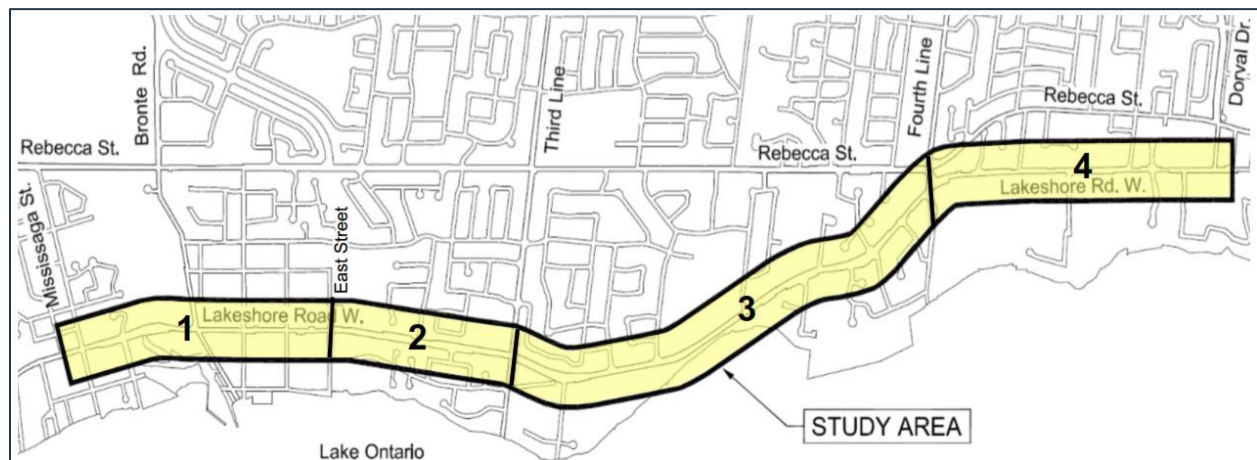
For the re-evaluation, the same criteria, listed in **Table 5-1** was generally used and based on the direction from council, the project team focused on the following evaluation criteria for the new alternative design concepts:

- No continuous centre left turn lane;
- No loss of trees (zero impact alternative);
- Minimize tree removals;
- No expropriation of property;
- Continuous on-road bike lanes or possible alternatives;
- Continuous sidewalk or multi-use trail on at least on one side;
- Minimize loss of green space (while also preventing an increase in impervious area)
- Accommodate transit, cyclists and pedestrian requirements, and
- Improve stormwater management.

For the Evaluation of Revised Alternative Design Concepts, the Study corridor was divided into following four (4) blocks (ref. **Figure 6-12**):

- Block 1 - Mississaga Street to East Street;
- Block 2 - East Street to Third Line;
- Block 3 - Third Line to Fourth Line; and
- Block 4 - Fourth Line to Dorval Drive.

Figure 6-12: Study Corridor Blocks



To evaluate the alternatives with no continuous centre left turn lane criteria, an update to the Traffic and Transportation Report and Road Safety Performance Assessment Report was completed, and is provided in Appendix H.

To evaluate the tree criteria, a more detailed assessment of existing trees was completed using the Town of Oakville's tree database. This assessment was based on impacts to trees due to encroachment into the Tree Protection Zone (TPZ). The tree assessment is provided in Appendix Q.

To eliminate the need to purchase property, the alternative concepts considered all existing property lines as a constraint.

To reduce conflicts with trees, utilities and property, a reassessment of the appropriate cycling infrastructure was completed to assess any opportunities that would reduce the boulevard conflicts. The re-assessment of cycling facilities is provided in Appendix P.

To evaluate and quantify the loss or gain of green space within the corridor, a comparison of existing impervious areas was conducted with impervious area generated from the alternative concepts being evaluated. This is discussed in Section 6.3.6.

6.3.5 Property Requirements Reassessment

A reassessment of property requirements was completed for all alternatives using the criteria that the alternative designs should avoid, wherever possible, the need to acquire any private property. The reassessment determined that no property would be required to implement Alternative A. For Alternative A1 and Alternative B, narrow property requirements were identified along frontages of land to implement sidewalk where gaps exist. Property requirements associated with Alternative A1 and Alternative B are outlined in **Table 6-1** and **Table 6-2**. The property requirements are unrelated to the Official Plan designated standard ROW width.

Table 6-1: Property Acquisition – Alternative A1

Address	Study Corridor Block	Area (m ²)
1031 Lakeshore Road	Block 3	11
1015 Lakeshore Road	Block 3	25
1009 Lakeshore Road	Block 3	34
1003 Lakeshore Road	Block 3	3
Public Property - Lakeshore Road & Fourth Line	Block 4	20
	Total Area (m²)	93
	Total Area (ha)	0.0093

Table 6-2: Property Acquisition – Alternative B

Address	Study Corridor Block	Area (m ²)
83 East Street	Block 2	61
2022 Lakeshore Road	Block 2	35
2014 Lakeshore Road	Block 2	70
Public Property (Coronation Park) Lakeshore Road	Block 3	90
1031 Lakeshore Road	Block 3	11
1015 Lakeshore Road	Block 3	25
1009 Lakeshore Road	Block 3	34
1003 Lakeshore Road	Block 3	3
	Total Area (m²)	329
	Total Area (ha)	0.0329

6.3.6 Increase/Decrease in Impervious Area Assessment

Lakeshore Road West is designated as a “Scenic Corridor” and a key component of this designation is the amount green space. To quantify the impacts to the existing green space, an assessment was completed to measure the amount of impervious area lost or gained for each of the alternatives. This was completed by measuring the existing impervious area and comparing it to the new impervious area for each of the three alternatives. In general, impervious area is being added through the addition of sidewalk and multi-use trail. As indicated below, Design Alternative A, which provides no new sidewalk or multi-use trail, results in a small decrease in impervious area, since existing hard packed shoulders are considered impervious. A summary is provided in **Table 6-3**.

Table 6-3: Increased/Decreased Impervious Area

Study Corridor Block	Design Alternative A (m ²)	Design Alternative A1 (m ²)	Design Alternative B (m ²)
Study Block 2 East Street to Third Line	410	601	2,246
Study Block 3 Third Line to Fourth Line	-2,584	-1,760	1,697
Study Block 4 Fourth Line to Dorval Drive	974	1,681	2,569
TOTAL	-1,200	5,22	6,512

6.3.7 Tree Protection Assessment

Tree protection zones (TPZ) are determined by arborists based on the size and type of tree. The larger the tree, the larger the diameter of the TPZ. In general, any work within the TPZ should be avoided, to minimize the risk of short or long term damage to the tree. For this study, the TPZ for each tree within the corridor determined and drawn on the design drawings. The degree to which the proposed design overlapped with the TPZ was then determine, to assess the degree of impact to the viability of the tree. The detailed tree protection assessment can be found in Appendix Q.

6.3.8 Evaluation of Revised Alternative Design Concepts

With the exception of Block 1- Mississaga Street to East Street, Alternative Design Concepts were evaluated separately for each of the Study corridor blocks. Block 1 -

Mississaga Street to East Street was excluded from the reassessment as this section is already urbanized and currently has a three-lane cross-section. The preferred design for this section was carried forward from the initial evaluation of alternatives. An assessment of alternatives for Blocks 2 to 4 was completed to determine which alternative best fits the specific road section and will accommodate the overall alternative solution for the study corridor while limiting the impacts to the scenic corridor, large trees and property.

6.3.8.1 Block 1 - Mississaga Street to East Street

As noted above, the Preferred Design for Block 1 - Mississaga Street to East Street was identified via the initial assessment of alternatives. The assessment of the preferred design for this section, based on the evaluation criteria developed for re-assessment of alternatives, is provided in **Table 6-4**.

Table 6-4: Block 1 - Mississaga Street to East Street

Factor	Impact
Potential Tree Removals >20 Diameter at Breast Height (dbh)	11*
Potential Trees Removals </=20 dbh	9*
Total Land Required (m ²)	2,657
Increase of Impervious Surface (m ²)	0
Multi-use Path (South Side)	N/A
On-road Bike Lanes	Y
Continuous Sidewalk	Y
Drainage Improvements	N/A
Intersection Improvements	Y

* Does not include trees within the Bronte BIA area which may be preserved or replaced, subject to streetscaping design (in accordance with Livable by Design Manual (Part B) – Urban Design Direction for Bronte Village (2018))

6.3.8.2 Block 2 - East Street to Third Line

The re-assessment of alternatives for Block 2 is provided in **Table 6-5**. Based on the re-assessment, Alternative B – Hybrid was identified as preferred design for Block 2 – East Street to Third Line.

Table 6-5: Block 2 – East Street to Third Line

Factor	Alternative Design A No Impact	Alternative Design A1 Minimal Impact	Alternative Design B Hybrid
Potential Tree Removals >20 dbh	0	10*	30
Potential Trees Removals </=20 dbh	0	5*	7
Total Land Required (m ²)	0	0	166 m ²
Increase of Impervious Surface (m ²)	410 m ²	601 m ²	2,246 m ²
Multi-use Path (South Side)	N	N	Y
On-road Bike Lanes	Y	Y	Y
Continuous Sidewalk	N	Y	Y
Drainage Improvements	Y	Y	Y
Intersection Improvements	N	Y	Y
Recommendation			Preferred

* Estimated – to be confirmed

6.3.8.3 Block 3 - Third Line to Fourth Line

The re-assessment of alternatives for Block 3 is provided in **Table 6-6**. Based on the re-assessment, Alternative B – Hybrid was identified as the preferred design for Block 3 – Third Line to Fourth Line.

Table 6-6: Block 3 – Third Line to Fourth Line

Factor	Alternative Design A No Impact	Alternative Design A1 Minimal Impact	Alternative Design B Hybrid
Potential Tree Removals >20 dbh	0	5*	20
Potential Trees Removals </=20 dbh	0	5*	22
Total Land Required (m ²)	0	73 m ²	163 m ²
Increase of Impervious Surface (m ²)	-2,584 m ²	-1,760 m ²	1,697 m ²
Multi-use Path (South Side)	N	N	Y
On-road Bike Lanes	Y	Y	Y
Continuous Sidewalk	N	Y	Y
Drainage Improvements	Y	Y	Y
Intersection Improvements	N	Y	Y
Recommendation			Preferred

* Estimated – to be confirmed

6.3.8.4 Block 4 - Fourth Line to Dorval Drive

The re-assessment of alternatives for Block 4 is provided in **Table 6-7**. Based on the re-assessment, Alternative Design A1 – Minimal Impact was identified as preferred design for Block 4 – Fourth Line to Dorval Drive.

Table 6-7: Block 4 - Fourth Line to Dorval Drive

Factor	Alternative Design A No Impact	Alternative Design A1 Minimal Impact	Alternative Design B Hybrid
Potential Tree Removals >20 dbh	0	9*	45
Potential Trees Removals </=20 dbh	0	8*	77
Total Land Required (m ²)	0	20 m ²	0
Increase of Impervious Surface (m ²)	974 m ²	1,681 m ²	2,569 m ²
Multi-use Path (South Side)	N	N	Y
On-road Bike Lanes	Y	Y	Y
Continuous Sidewalk	N	Y	Y
Drainage Improvements	Y	Y	Y
Intersection Improvements	N	Y	Y
Recommendation		Preferred	

* Estimated – to be confirmed

6.4 Technically Preferred Design Concept

As discussed previously, the preferred design for Block 1 – Mississaga Street to East Street was identified via the initial assessment of alternative design concepts. The Preferred design for Blocks 2, 3 and 4 was identified via the evaluation of revised alternative concepts. The technically preferred design concept for the entire study corridor is summarized below.

6.4.1 Block 1 - Mississaga Street to East Street

The design elements of the technically preferred design concept for this block are outlined below and illustrated in **Figure 6-13**:

- 3.3 metre through lanes, a 3.5 metre centre turn lane
- 2.0 metre sidewalks and on-road 1.5 metre on road bike lanes with a 0.5m painted buffer
- Intersection improvements at Bronte Road

Urban Design elements of this section are discussed in **Section 7.6**.

6.4.2 Block 2 - East Street to Third Line

The design elements of the technically preferred design concept for this block are outlined below and illustrated in **Figure 6-14**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewers
- Intersection improvements

6.4.3 Block 3 - Third Line to Fourth Line

The design elements of the technically preferred design concept for this block are outlined below and illustrated in **Figure 6-14**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewers
- Intersection improvements

6.4.4 Block 4 - Fourth Line to Dorval Drive

The design elements of the technically preferred design concept for this block are outlined below and illustrated in **Figure 6-15**:

- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- Convert to urban-standard curb & gutter cross-section with storm sewers
- Addition of 1.5m sidewalks (where missing)
- Intersection improvements

Figure 6-13: Block 1 - Mississaga Street to East Street – Preferred Design



Figure 6-14: Blocks 2 and 3 - East Street to Fourth Line – Preferred Design

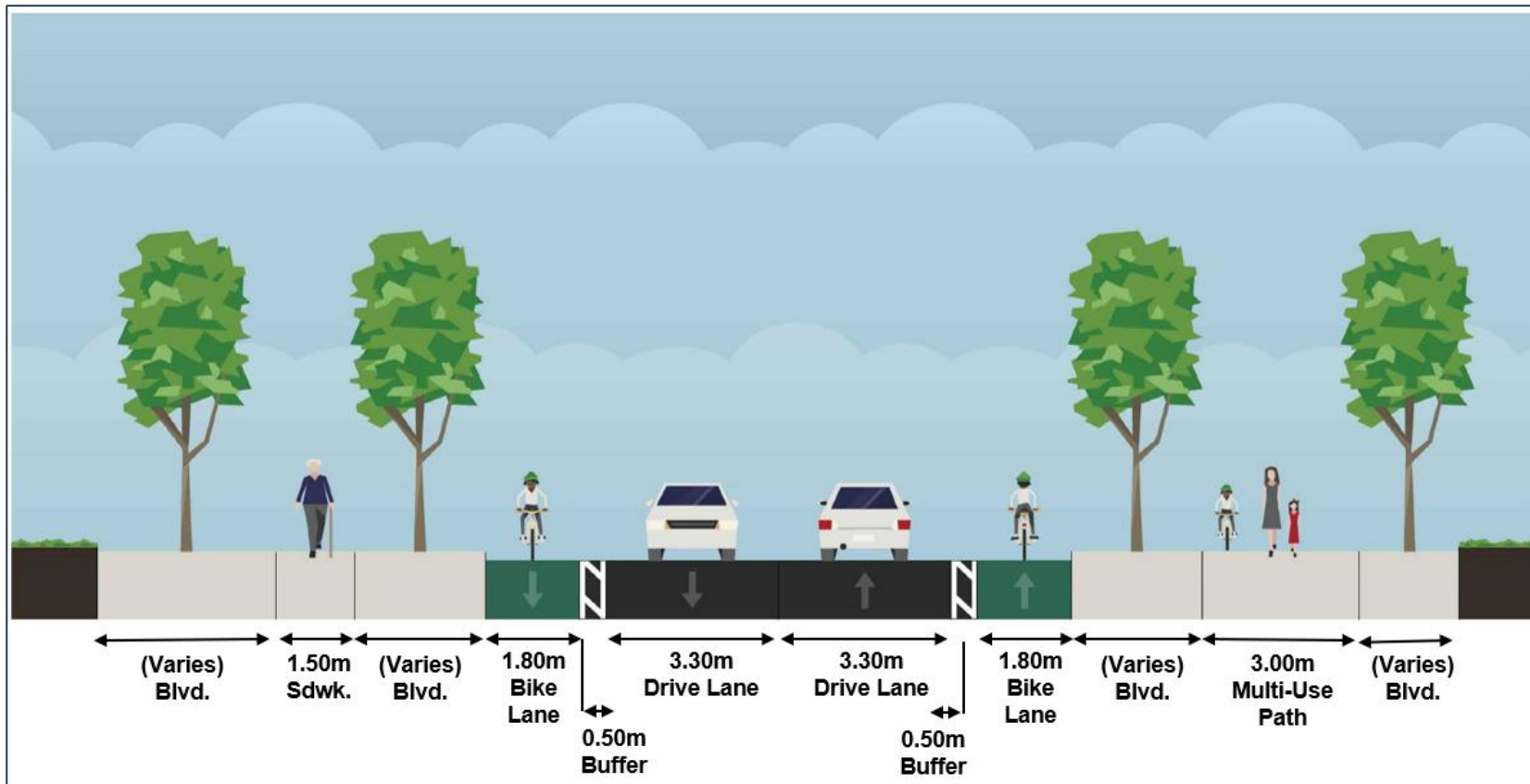
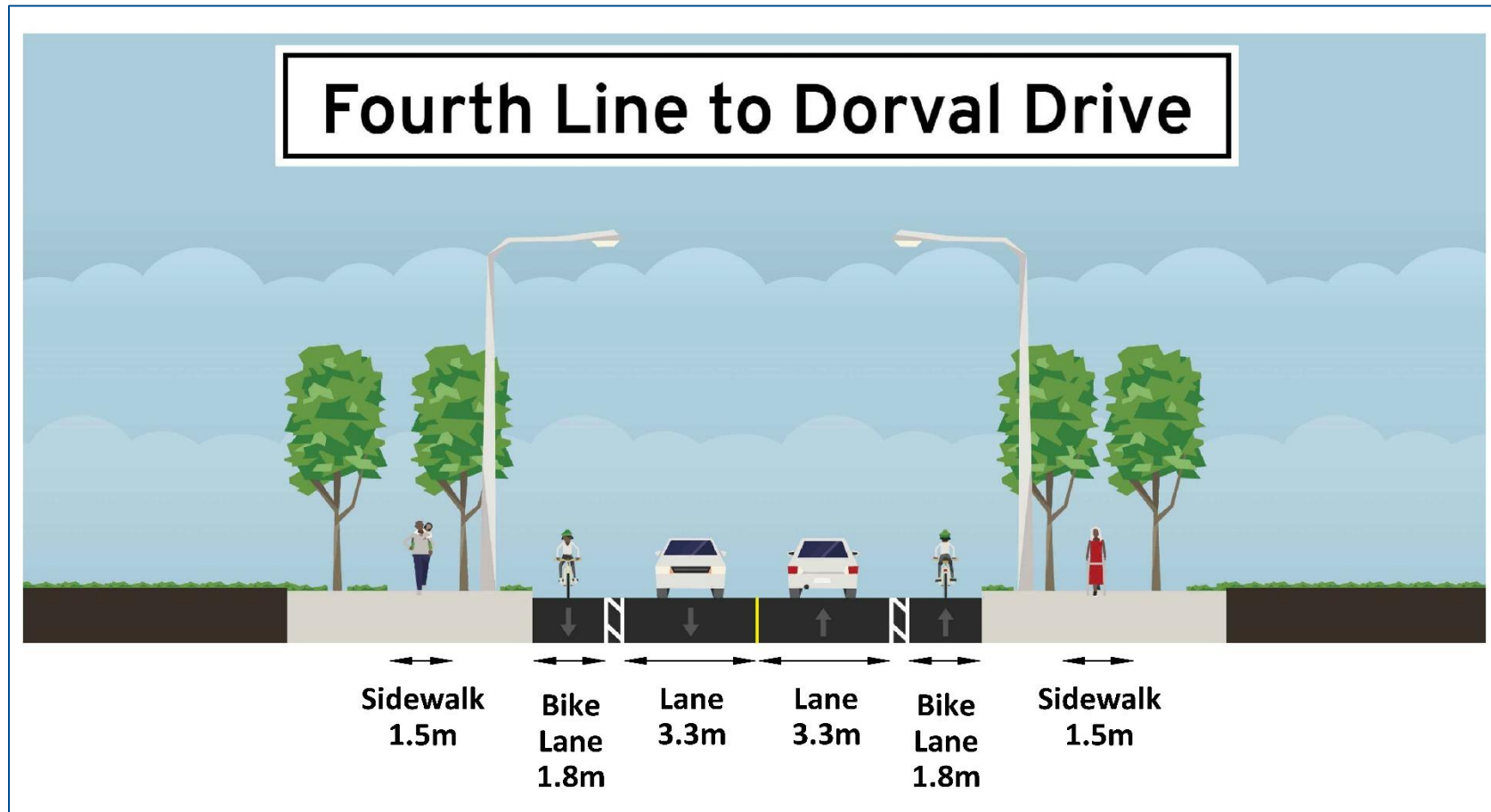


Figure 6-15: Block 4 - Fourth Line to Dorval Drive – Preferred Design



6.5 Scenic Corridor Considerations

As noted in Section 3.10, Scenic Corridors Study was completed in February 2020 by the town staff to examine the Lakeshore Road and Trafalgar Road corridors to identify and evaluate the roadway, streetscape and framing elements that contribute to the scenic value. The findings of the Scenic Corridors Study are intended to inform current and future road improvement projects within the scenic corridor areas, as well as guide future Liveable Oakville Plan policy and urban design direction. The study provides information with respect to elements of the road corridor that contribute to its function as a Scenic Corridor to ensure this role can be considered and balanced against competing priorities through the EA process, such as stormwater management, active transportation, traffic safety, etc. The technically preferred design concept was reviewed against the themes and considerations identified in the Scenic Corridors Study (Section 3.10) to determine how it incorporates those considerations. This review is provided in **Table 6-8**.

Table 6-8: Scenic Corridor Considerations

	Scenic Corridors Study Themes and Considerations	Lakeshore Road West Technically Preferred Design Concept
Importance of maintaining trees and vegetation	Retain healthy mature trees within the municipal right-of-way and on abutting private properties, where possible	The technically preferred design was selected following the re-evaluation of alternatives that considered impacts to mature trees and other vegetation. The existing trees located along the Lakeshore Road corridor are preserved, where possible.
	Foster the overall health of trees through ongoing assessments and, where necessary, interventions	The tree health assessment is outside the scope of this study.
	Identify open space areas along the right-of-way where future planting of trees, shrubs or understory vegetation can be accommodated	A Landscape Planting Plan will be developed during the detailed design phase to integrate vegetation plantings into the overall design of corridor improvements.
	Plan for tree succession by developing a replacement plan to account for tree death and/or strategic removals	Where tree removals are required these trees will be replaced. A Tree Replacement Plan will be developed during the detailed design phase. The Tree Replacement Plan will recommend native trees and vegetation and identify areas for their planting.
	Promote the planting of native tree, shrub and plant species within the municipal right-of-way and on abutting private properties	The promotion of vegetation plantings is outside the scope of this study.
Importance of maintaining and complementing the historical attributes	The identified heritage features shall continue to be protected and managed through the Ontario Heritage Act, the Conservation District Plans, the Livable Oakville Plan policies and the heritage permit approvals process.	The technically preferred design was selected following the evaluation of alternatives that considered impacts on archaeological and cultural resources. A Stage 2 archaeological assessment will be required during detailed design prior to any form of land alteration within the areas of archaeological potential. In addition, cultural heritage features identified via this study should be depicted on project drawings during detailed design phase and appropriate notes should be included that state that impacts on these features should be avoided.
Importance of maintaining connectivity for pedestrians and cyclists	Provide continuity of and variety in travel modes so that users have different ways to experience the corridor, whether as a pedestrian, cyclist, or driver, which can greatly contribute to their experience and connection to that place findings as part of a broader transportation policy review and update. Staff will also identify opportunities to create urban design direction document(s) to implement the policy framework, where necessary.	The technically preferred alternative proposes continuity of and variety in travel modes, including vehicular traffic lanes, on-road bike lanes with painted buffer, sidewalks, pedestrian crossings and a multi-use trail.
Importance of Maintaining the Proportions of the Existing Roadway	Maintain the current number and width of the existing vehicle travel lanes, where possible	The technically preferred alternative maintains Lakeshore Road West to three lanes (two-way left turn centre turning lane) within Bronte Village Section and two lanes from East Street to Dorval Drive. It also recommends active transportation facilities (bike lanes, multi-use trails and sidewalks).
	Limit road widenings to only accommodate vehicle turning lanes at intersections, where necessary	
	Incorporate necessary active transportation improvements for predictable and continuous cycling and pedestrian movement	
	Maintain an appropriate balance between landscaped spaces and hard surface spaces (roadway, sidewalks, etc.) which currently form part of the scenic character of the corridors	The technically preferred alternative incorporates the following design elements: <ul style="list-style-type: none"> • Recommendations for potential LID installations. • Retention of existing ditch/swale features to the extent possible based on design constraints tied to tree protection and provision of continuous sidewalks, multi-use trails, and on-road cycling facilities. • Addressing storm runoff and drainage, both in-corridor, and the broader drainage system.
Where physically feasible, incorporate low impact development features/facilities to enhance the 'greening' of the boulevard		

6.6 Proposed Pedestrian Crossings

Potential locations for pedestrian crossings were assessed and a total of 10 pedestrian crossings were recommended for the Study corridor. The type of pedestrian crossing is based on a combination of traffic volumes and posted speed, in accordance with warrants contained in the Ontario Traffic Manual Book 15. Pedestrian crossing locations and types for each block are discussed below:

Block 1 - Mississauga Street to East Street

- Intersection Pedestrian Signal at Bronte Creek Trail (west of Bronte Road) (**Figure 6-16**).
- Pedestrian Crossover Level 2 Type B Midblock at locations west of Jones Street, west of Nelson Street and west of East Street (**Figure 6-17**).

Block 2 - East Street to Third Line

- Pedestrian Crossover Level 2 Type B Midblock west of Bronte Athletic Park Walk (east of East Street) (**Figure 6-17**).

Block 3 - Third Line to Fourth Line

- Intersection Pedestrian Signal at Westminster Drive (**Figure 6-16**)
- Pedestrian Crossover Level 2 Type C Intersection at Sandwell Drive (**Figure 6-18**).

Block 4 - Fourth Line to Dorval Drive

- Intersection Pedestrian Signal at Suffolk Avenue and Morden Road (**Figure 6-16**)
- Pedestrian Crossover Level 2 Type B Intersection at Holyrood Avenue (**Figure 6-19**).

Figure 6-16: Intersection Pedestrian Signal

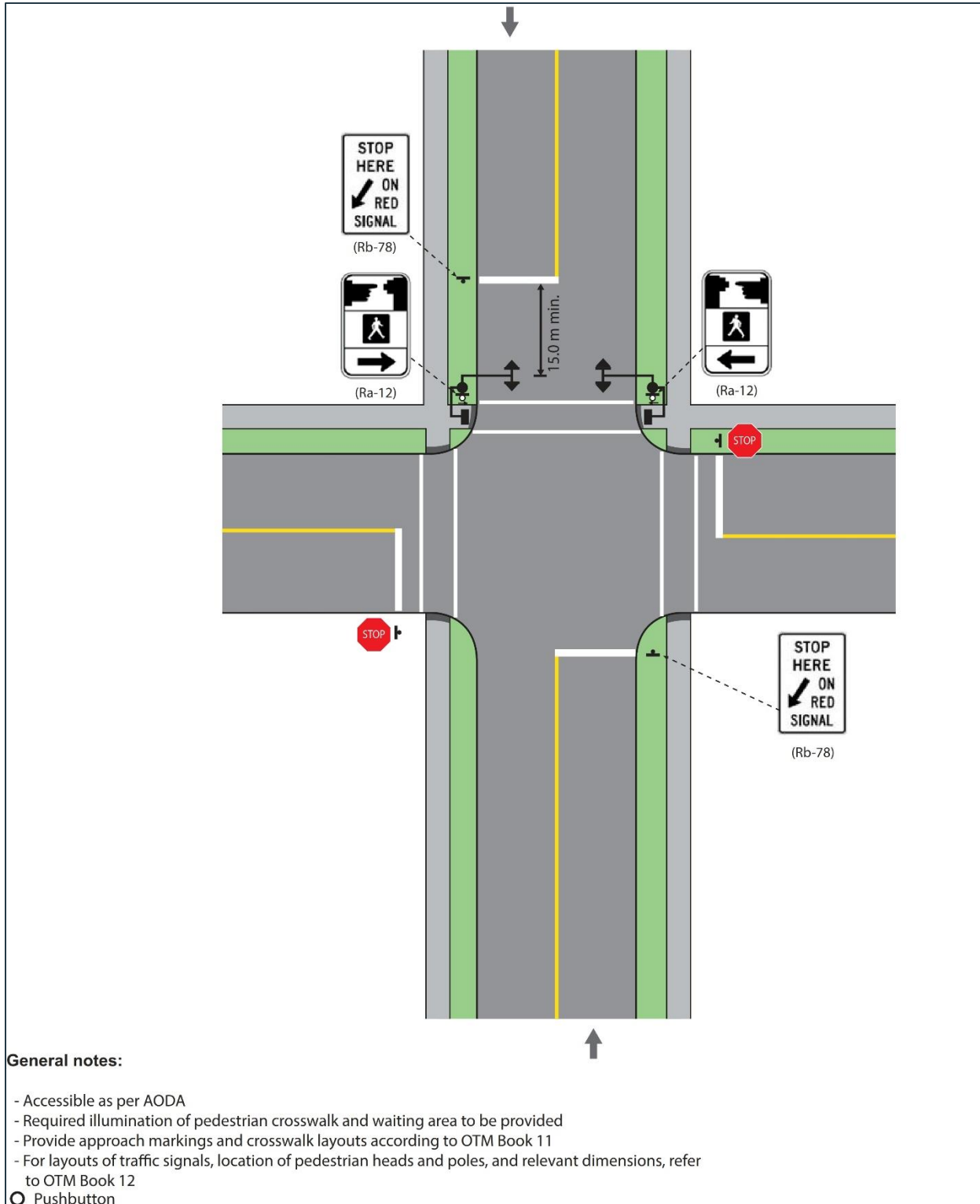


Figure 6-17: Pedestrian Crossover Level 2 Type B Midblock

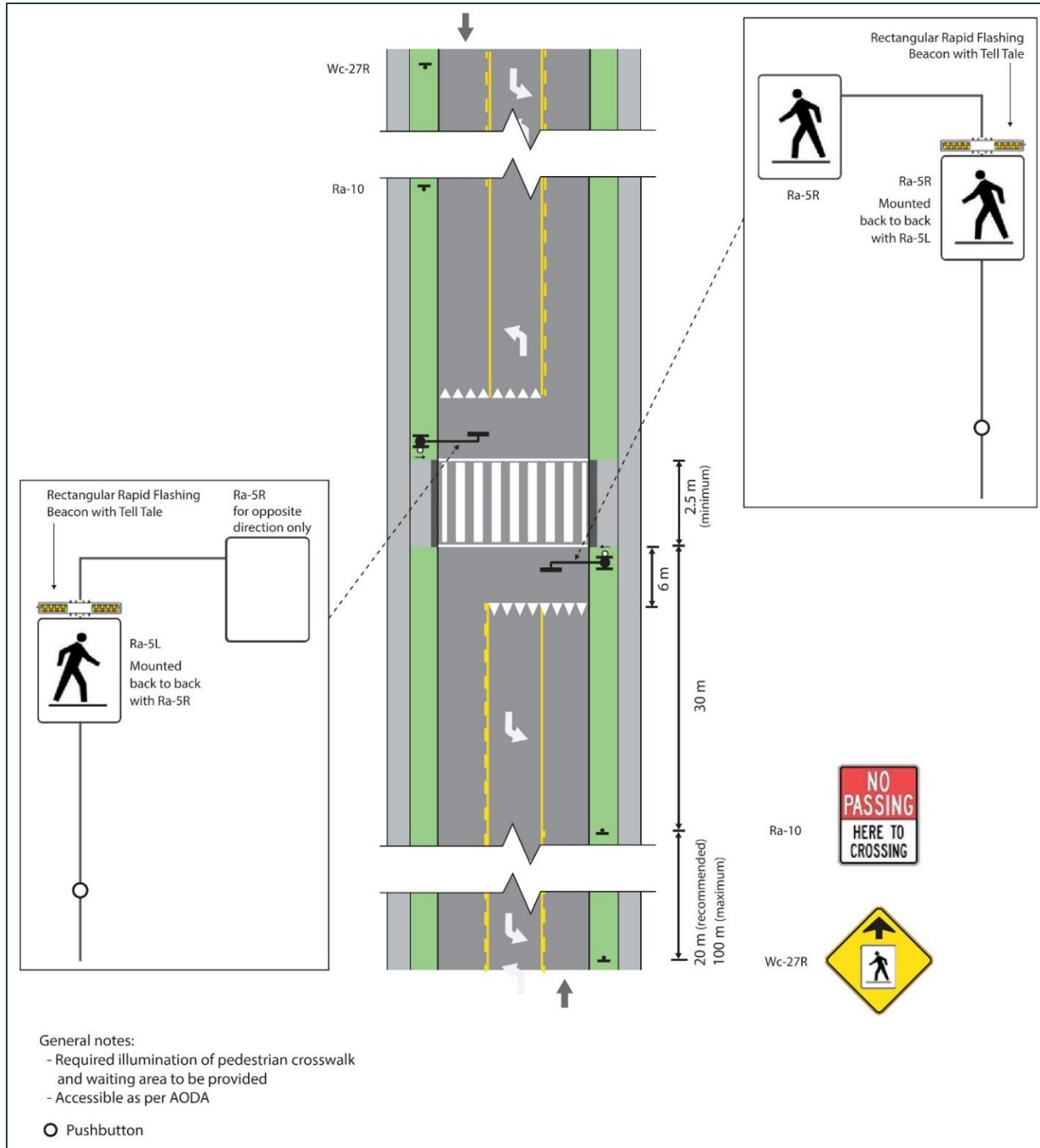


Figure 6-18: Pedestrian Crossover Level 2 Type C Intersection

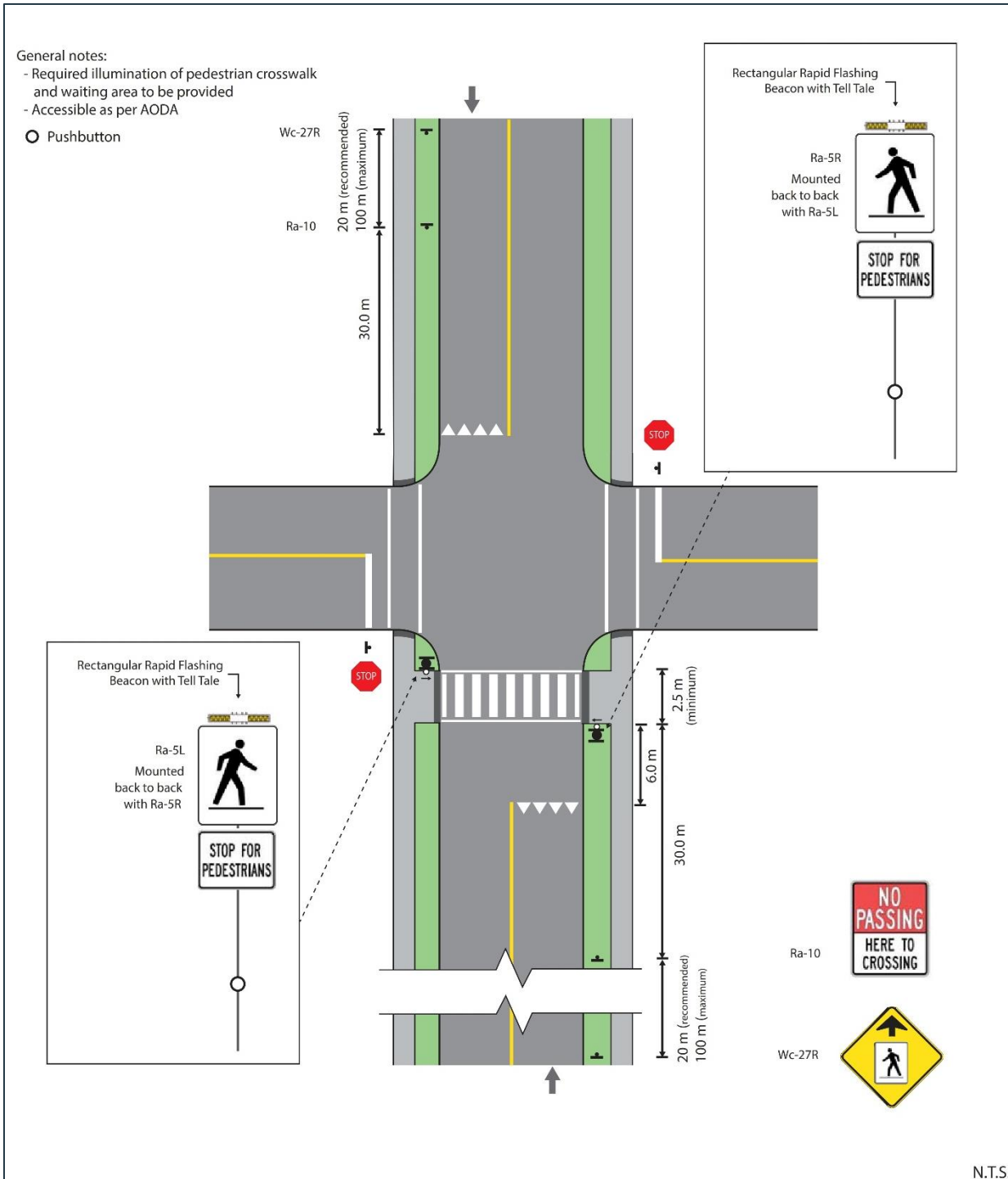
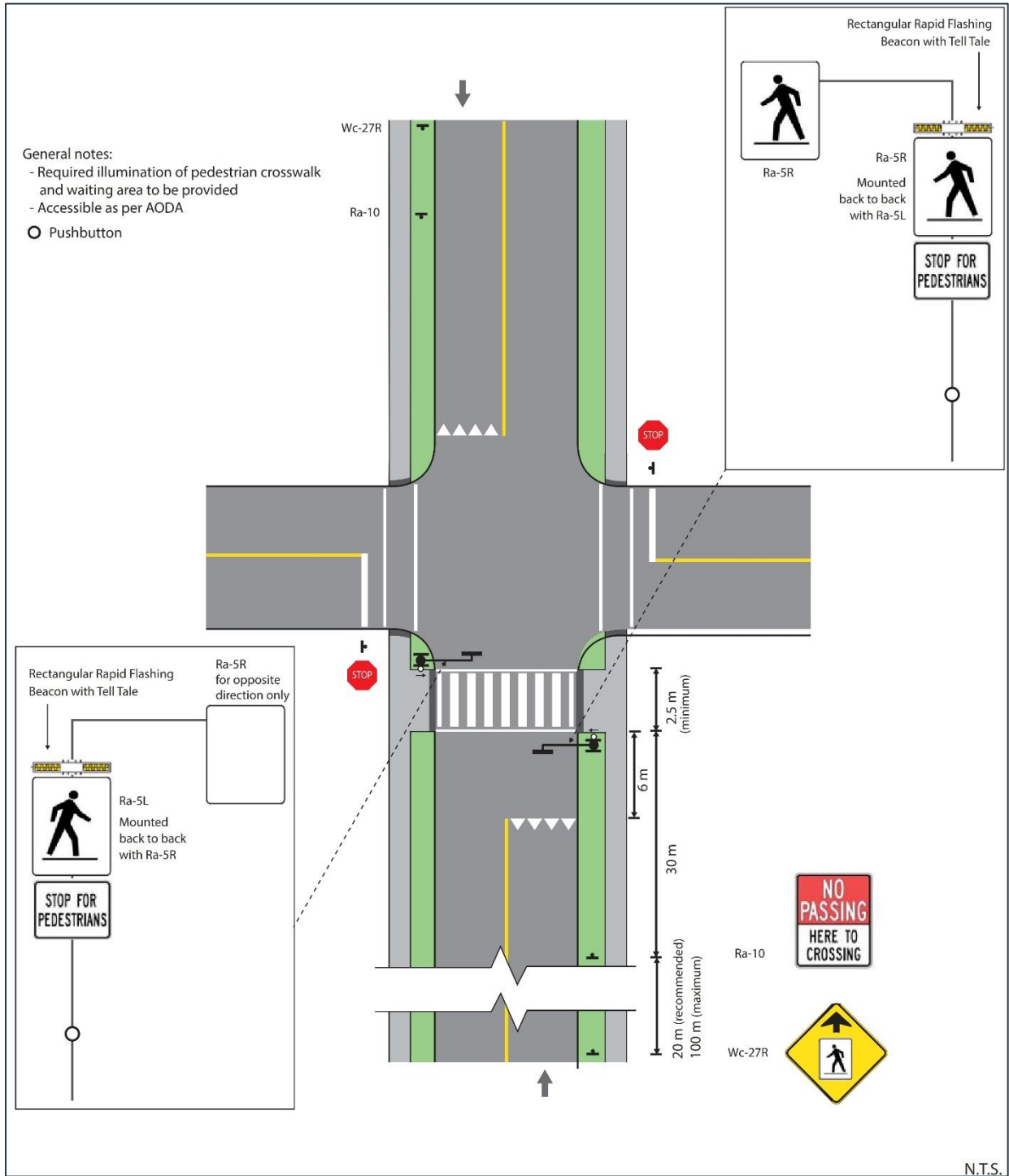


Figure 6-19: Pedestrian Crossover Level 2 Type B Intersection



6.7 Alternative Design Consultation

6.7.1 Stakeholder Meetings

Meetings were held on March 29 and April 1, 2019, to present the revisions and updates to the study, in particular to present the evaluation of the alternative design concepts developed for the three corridor segments. The alternative design concepts that were presented were developed in response to the Council direction as outlined in **Section 6.2.3**. The presentation material for each meeting was the same, but the invited attendees and the focus of the meeting was on the specific corridor block:

- Meeting 1: East Street – Third Line (meeting also included stakeholders representing Mississaga Street – East Street);
- Meeting 2: Third Line – Fourth Line; and,
- Meeting 3: Fourth Line – Dorval Drive.

Stakeholders were presented with a summary of the impacts of the design alternatives considered, the revised preferred alternative based on the corridor block, as well as the updates to the protected bike lane assessment. Minutes and presentation from these meetings are included in Appendix D.

6.7.2 Site Meetings With Residents

The purpose of these meetings was to discuss concerns of residents regarding the roadway design and how it will impact their property and trees in front of their properties. Staff from the Town of Oakville and Wood, along with the Town Councillors (Cathy Duddeck and Ray Chisholm) attended these meetings with residents. Meeting materials and minutes can be found in Appendix D.

6.7.3 Public Information Centre No. 3

The purpose of the Public Information Centre No. 3 (PIC No. 3) was to solicit public comments and suggestions on the revised evaluation of alternative design concepts, and the updated preferred design. PIC No. 3 was held in an online format through the Town of Oakville's website. The PIC materials were posted online, and the public was invited to review information materials and provide comments starting April 6 and extending to April 20, 2021. Due to public's significant interest in the Study, the Town of Oakville staff encouraged the public to continue to provide comments after April 20, 2021. The Notice of PIC was published in the local newspaper, issued via email to the review agencies and stakeholders, and mailed to the area residents. The Notice of PIC No. 3, PIC slides and all comments received are provided in Appendix A. Approximately 190 comments were received from the members of public.

PIC 3 comments were summarized into key themes, which are provided in **Table 6-9**.

Table 6-9: PIC No. 3 - Summary of Key Issues and Responses

Summary of Comments	Response
Impacts to trees	<p>The Study Team would like to note that the tree removals are not final at this point. The tree impacts associated with the preliminary design are potential tree removals only. Detailed plans will be developed during the detailed design stage and every effort will be made to preserve as many trees as possible.</p> <p>We would also like to note that some tree removals will be necessary to accommodate sidewalks and bike lanes with minimal impact to private land. Many of the trees identified for potential removal are trees that are less than 20 dbh (diameter at breast height) and those that are already marked for removal due to safety issues or ill health. Where tree removals are required, these trees will be replaced following the Town of Oakville’s Tree Protection During Construction Procedure and associated town by-laws.</p>
Suggestion for design refinements	<p>A number of suggestions/comments were received regarding design refinements. The current design is preliminary design only, and will be reviewed and refined in the next phase of the project. Public input received related to the design refinements, will be considered in the next phase of the project.</p>
Disagreement with the project	<p>The town's Livable Oakville Plan and Active Transportation Master Plan both identified the need for improvements along Lakeshore Road West between Mississauga Street and Dorval Drive to meet the town's growth demands to 2031 and provide safe and accessible travel options for motorists, pedestrians and cyclists.</p> <p>Lakeshore Road requires upgrading to meet today’s standards and use. The improvements proposed are to maintain a streetscape typical of the existing roadway while improving safety and accessibility of pedestrians, cyclists, motorists and transit users of all ages including people with disabilities. The improvements align with the Scenic Corridors Study completed in February 2020.</p> <p>Improvements are necessary to address long stretches of the area that have no sidewalks, where pedestrians and cyclists are obligated to use the gravel shoulder on the road. This is especially dangerous in the wintertime when there is piled-up snow, or for pedestrians who use a mobility aid such as a walker or wheelchair, or a parent with small children. As well, there are currently limited intersections or crosswalks to assist pedestrians crossing the road.</p>
Dissatisfied that Multi Use Path is not continuous	<p>Alternative Design B (Hybrid) was identified as the preferred design for Blocks 2 and 3. It includes two traffic lanes, a continuous sidewalk (north side), a multi-use path (south side), dedicated on-road bike lanes with painted buffers and minor intersection improvements. A multi-use trail was included in the preferred design due to feedback received from area residents identifying the importance of providing a safe space for families, commuter cyclists and recreational cyclists to travel by foot or by bike. Consistent with the considerations identified in the Scenic Corridors Study, this alternative will provide continuity of and variety in travel modes so that users have different ways to experience the corridor as a pedestrian, cyclist, or driver.</p> <p>Alternative Design A1 (Minimal Impact) was identified as the preferred design for Block 4. It includes two traffic lanes, dedicated on-road bike lanes with painted buffers, new sidewalk where gaps exist in the existing sidewalk, and intersection improvements to address intersection safety and to improve traffic operations. This alternative was selected as the preferred design for Block 4 in order to minimize tree removals, particularly the removal of 36 additional trees greater than 20cm diameter at breast height (dbh), and property taking. Although provision of a multi-use trail within this block was also considered important by the area residents, the greater number of trees to be removed for a multi-use-path, compared to within Blocks 2 and 3, was not considered to be warranted by the benefit provided by a multi-use-path. Addition of a multi-use path in Block 4 will also have a greater impact on the scenic character of the corridor, since the corridor is more constrained than in Blocks 2 and 3. This alternative will require less tree removal than Alternative B, and it will assist in achieving the consideration identified in the Scenic Corridors Study, related to retaining healthy mature trees within the municipal right-of way and on abutting private properties, where possible.</p>
Dissatisfaction with the proposed active transportation facilities	<p>In 2017, an assessment of road cross-section elements was completed as part of the Lakeshore Road West Improvements Class Environmental Assessment study. This assessment identified and evaluated various alternatives for cycling facilities on Lakeshore Road within the Study Area. The following five cycling facility alternatives were identified and evaluated:</p>

Summary of Comments	Response
	<ul style="list-style-type: none"> • Alternative 1: On-road Bike Lanes • Alternative 2: On-road Bicycle Lanes with a buffer • Alternative 3: Off-road One-Way Cycle Tracks • Alternative 4: Off-road Multi-Use Path • Alternative 5: Combination - On-road Bicycle Lanes with a buffer with sidewalk on the north side and a multi-use path on the south side <p>These alternatives were generated based on various factors, relevant policies, guidelines from Ontario Traffic Manual Book 18 – Cycling Facilities, the Town of Oakville Active Transportation Master Plan, sound engineering judgement and input from the public. For Alternative 5, a multi-use trail was identified to be preferred on the south side of Lakeshore Road as opposed to the north side of Lakeshore Road, in order to provide ready access to Lake Ontario and adjacent parks, as well as connectivity to the Great Lakes Waterfront Trail. Locating the multi-use trail on the north side of Lakeshore Road would increase the frequency of crossings for cyclists and other multi-use trail users.</p> <p>Based on the evaluation of these alternatives, the preferred cycling facility for the section of Lakeshore Road West from Mississaga Street to East Street was identified as “On-Road Bike Lanes with a painted buffer”. The preferred cycling facilities for the section of Lakeshore Road West from East Street to Dorval Drive were identified as “On-road bike lanes with a painted buffer and a multi-use path on the south side”.</p>
Disagreement with the preferred design	<p>The revised preferred design significantly reduces impacted trees compared to the design presented in 2017. Each Corridor Block was evaluated to review the benefits of adding sidewalks or multi-use path against the impacts to trees. At the detailed design stage, where multi-use path or sidewalks are proposed, additional work will be undertaken to determine where the multi-use path or sidewalk can be reduced in width or where the alignment can be shifted to further mitigate tree impacts. Construction best practices under the direction of a licensed arborist can reduce impacts. Impacted trees will be replaced in accordance with the town’s tree bylaw.</p> <p>The preferred design reduces purchase of land across property frontages by maintaining the current right-of-way width, where possible. The right-of-way along Lakeshore Road will not be consistently widened. Small parcels of property are required at a total of 10 public and 30 private properties.</p> <p>By removing the centre left turn lane from the proposed design, the amount of new impervious area is significantly reduced. New impervious area is primarily related to the proposed new sidewalks, bike lanes or multi-use paths. In some sections, the amount of pavement on the road will actually decrease.</p> <p>This Class EA proposes continuous bike lanes and sidewalks (north side) along the length of the corridor, as well as a multi-use path (south side) between East Street and Fourth Line (please see proposed cross-sections and sample renderings on following slides). These active transportation facilities provide space for families, commuter cyclists and recreational cyclists to travel by foot or by bike along the corridor. Controlled pedestrian crossing locations are also provided along the corridor to improve accessibility for pedestrians. Accessibility will also be improved through provision of curbs, which will separate pedestrian sidewalks/multi-use path from traffic lanes, provide critical safety to the people with physical disabilities such as wheelchair users and those who require directional information due to vision impairment.</p>

7.0 Major Features of the Recommended Plan

7.1 Description of the Preferred Design

The following sections detail the proposed design for Lakeshore Road, based on the preferred design alternatives identified in Section 5.

7.1.1 Design Criteria

The proposed design criteria for the reconstruction of Lakeshore Road West, based on a design speed of 60km/h, is shown in **Table 7-1**. The design criteria are based on the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (2017), Town of Oakville, and the Region of Halton design standards.

Table 7-1: Design Criteria

Classification	Design Standards	Proposed
Road Classification	UAU	UAU
Design Speed (km/h)	60	60
Posted Speed (km/h)	50	50
Minimum Stopping Sight Distance (m)	85/140*	85/140
Number of Lanes	2	2 - 3
Minimum Centre Line Radius (m)	130 - 250	340
Through Lane Width (m)	2.7 – 4.0	3.30
Left Turn Lane Width (m)	2.7 – 4.0 (min 3.25)	3.5
Two-Way-Left Turn Lane Width (m)	2.7 – 4.0 (min 3.50)	3.5
Right Turn Lane Width (m)	2.7 – 4.0 (min 3.25)	3.25
On Street, Parallel Parking Stall Length (m)	7.0*	7.0
On Street, Parallel Parking Stall Width (m)	2.7*	2.7
Sidewalk Width (m)	1.5 – 2.0	1.5/2.0
Buffered Bike Lane (M)	2.1 – 3.0	1.5 Mississaga to East 1.8 East to Dorval
Multi-Use Path (m)	N/A	2.4 - 3
Grade _{MAX}	6.0%*	2.45%
Grade _{MIN}	0.50%*	0.50%
Sag Vertical Curve K _{MIN}	18	25
Crest Vertical Curve K _{MIN}	11	25
Curb Radius Arterial to Arterial (m)	10.5*	18
Crosswalk Width _{MIN}	2.5	2.5
Daylighting Triangle _{MIN}	15 x15*	Maintain Existing

Classification	Design Standards	Proposed
Official Plan Right-Of-Way Width (m)	26	Maintain Existing except where required for sidewalk or MUP

* Town of Oakville Standard

7.1.2 Horizontal Alignment

The proposed horizontal alignment will shift the centreline where required within the existing right-of-way to reduce the impacts on property, utilities and trees. No significant changes to horizontal alignment are proposed.

7.1.3 Vertical Alignment

The existing vertical alignment of Lakeshore Road is generally maintained. Minor adjustments are to be reviewed during detailed design as necessary to provide a minimum grade of 0.5%, to allow for positive drainage of the curb and gutter, to accommodate the pavement rehabilitation recommendations and to match driveway gradients. Minimum 'K' factors are to be maintained for the 60km/h design speed as per the design criteria.

7.1.4 Typical Cross Sections for Lakeshore Road West

Block 1 - Mississaga Street to East Street

A typical 3 lane cross section was developed for Lakeshore Road West from Mississaga Street to East Street. The cross-section was developed based on the *TAC Geometric Design Guide for Canadian Roads, 2017* and the Town of Oakville and Region of Halton design standards. The typical cross section proposed for this block is illustrated in **Figure 7-1**. The typical cross section where on-street parking is proposed is illustrated in **Figure 7-2**.

Key elements of the proposed cross-section include the following:

- 3.3 m through lanes (1 lane in each direction);
- 3.5 m centre two-way-left-turn-lane;
- 3.25 m right turn lanes as required;
- 0.5 m concrete curb and gutter;
- 2.25m on-street parking between Bronte Road and Nelson Street where possible;
- 3.5 m planted median at selected locations;
- 1.5 m buffered bike lane on both sides
- 1.5m - 2.0m wide concrete sidewalk north and south sides

Figure 7-1: Mississauga Street to Bronte Road Typical Cross-section

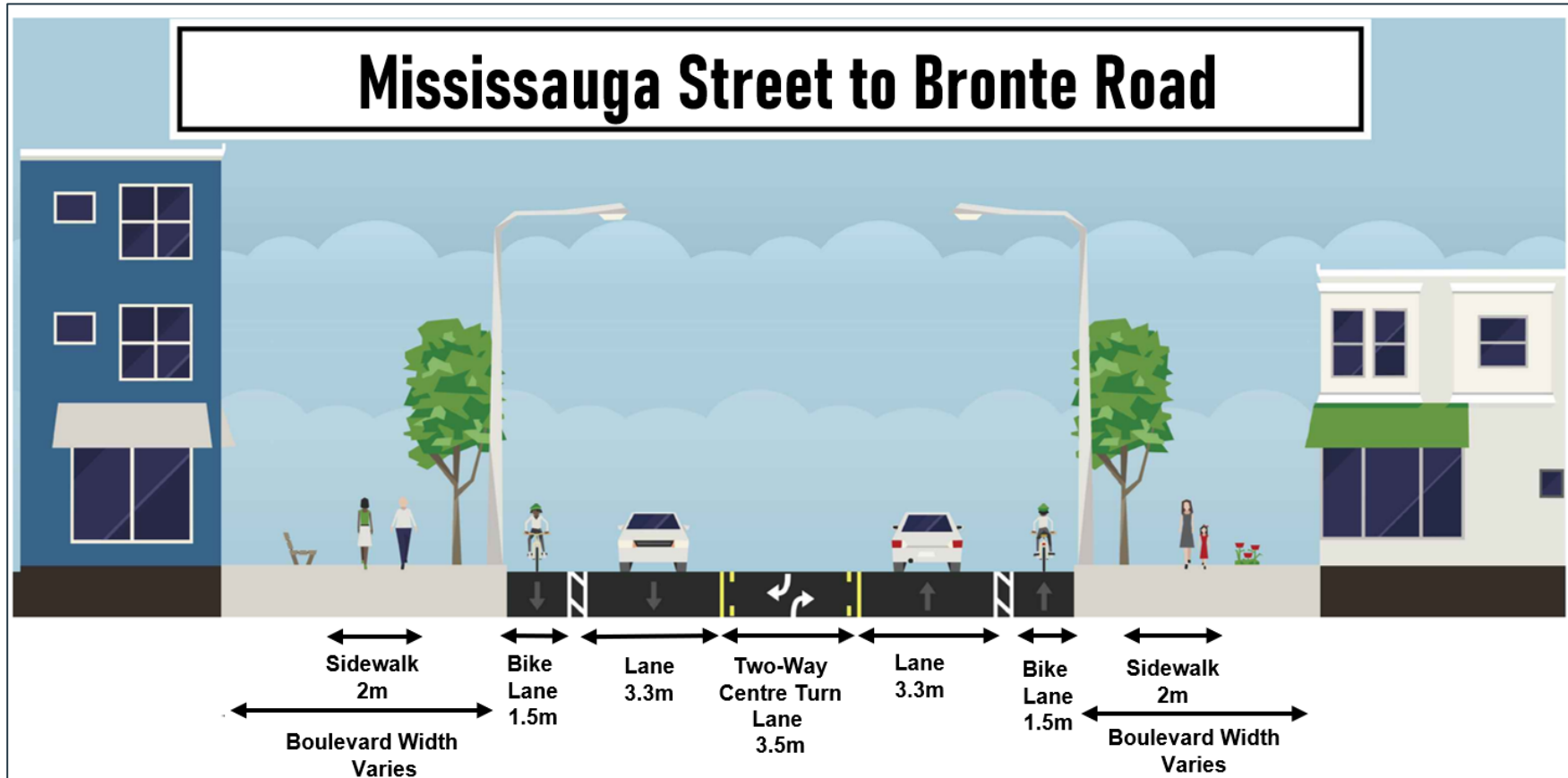


Figure 7-2: Bronte Road to East Street Typical Cross-section (with parking either side or both)



Block 2 - East Street to Third Line and Block 3 – Third Line to Fourth Line

A typical 2 lane cross section was developed for Blocks 2 and 3. The cross-section was developed based on the *TAC Geometric Design Guide for Canadian Roads, 2017* and the Town of Oakville and Region of Halton design standards. The typical cross sections proposed for Block 2 (East Street to Third Line) and Block 3 (Third Line to Fourth Line) are illustrated in **Figure 7-3** and **Figure 7-4**, respectively .

Key elements of the proposed cross-section include the following:

- 0.5 m concrete curb and gutter;
- 3.3 m through lanes (1 lane each direction);
- 3.50 m left turn lanes as required;
- 1.8 m (including 0.3m gutter) bike lane with 0.5 m buffer on both sides
- 2.4 m - 3.0 m asphalt multi-use trail on the south side of Lakeshore Road West;
- Existing 1.5m – 2m wide concrete/asphalt sidewalk/trail on the north side of Lakeshore Road West to be maintained; and
- New 1.5m wide concrete sidewalk required where no sidewalk currently exists on the north side of Lakeshore Road West within this section.

Block 4 – Fourth Line to Dorval Drive

A typical 2 lane cross section was developed for this section of Lakeshore Road West from Fourth Line to Dorval Drive. The cross-section was developed based on the *TAC Geometric Design Guide for Canadian Roads, 2017* and the Town of Oakville and Region of Halton design standards. The typical cross section proposed for Lakeshore Road West is illustrated in **Figure 7-5**.

Key elements of the proposed cross-section include the following:

- 0.5 m concrete curb and gutter;
- 3.3 m through lanes (1 lane each direction);
- 3.50 m left turn lanes as required;
- 1.8 m (including 0.3 m gutter) bike lane with 0.5 m buffer on both sides;
- Existing 1.5m wide concrete sidewalk on the north side of Lakeshore Road West to be maintained;
- New 1.5m wide concrete sidewalk to be constructed where no sidewalk currently exists on the north side of Lakeshore Road West;

- Existing 1.5m wide concrete sidewalk on the south side of Lakeshore Road West to be maintained where possible and reconstructed where the sidewalk is impacted by roadway construction.

Figure 7-3: East Street to Third Line Typical Cross-section

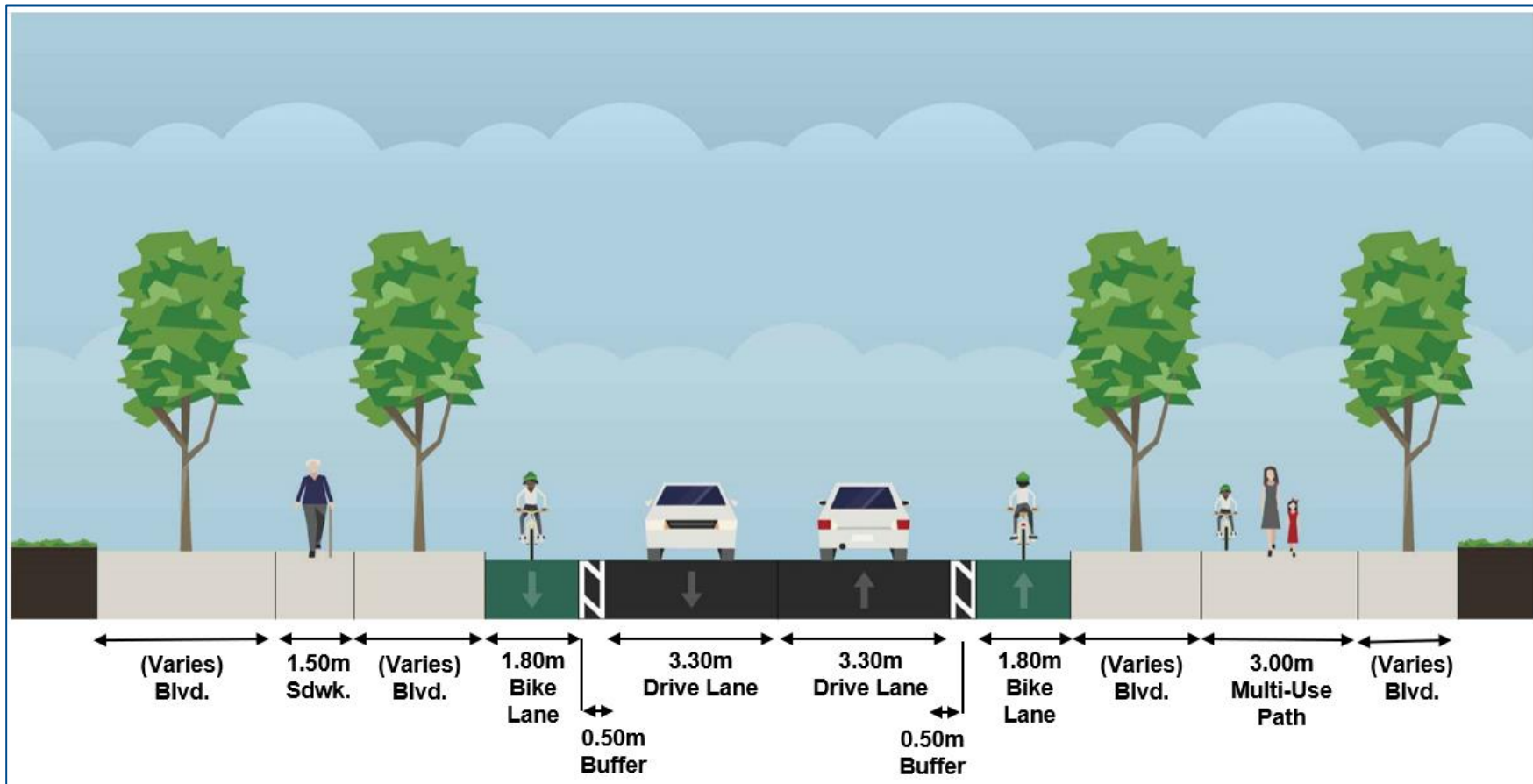


Figure 7-4: Third Line to Fourth Line Typical Cross-section

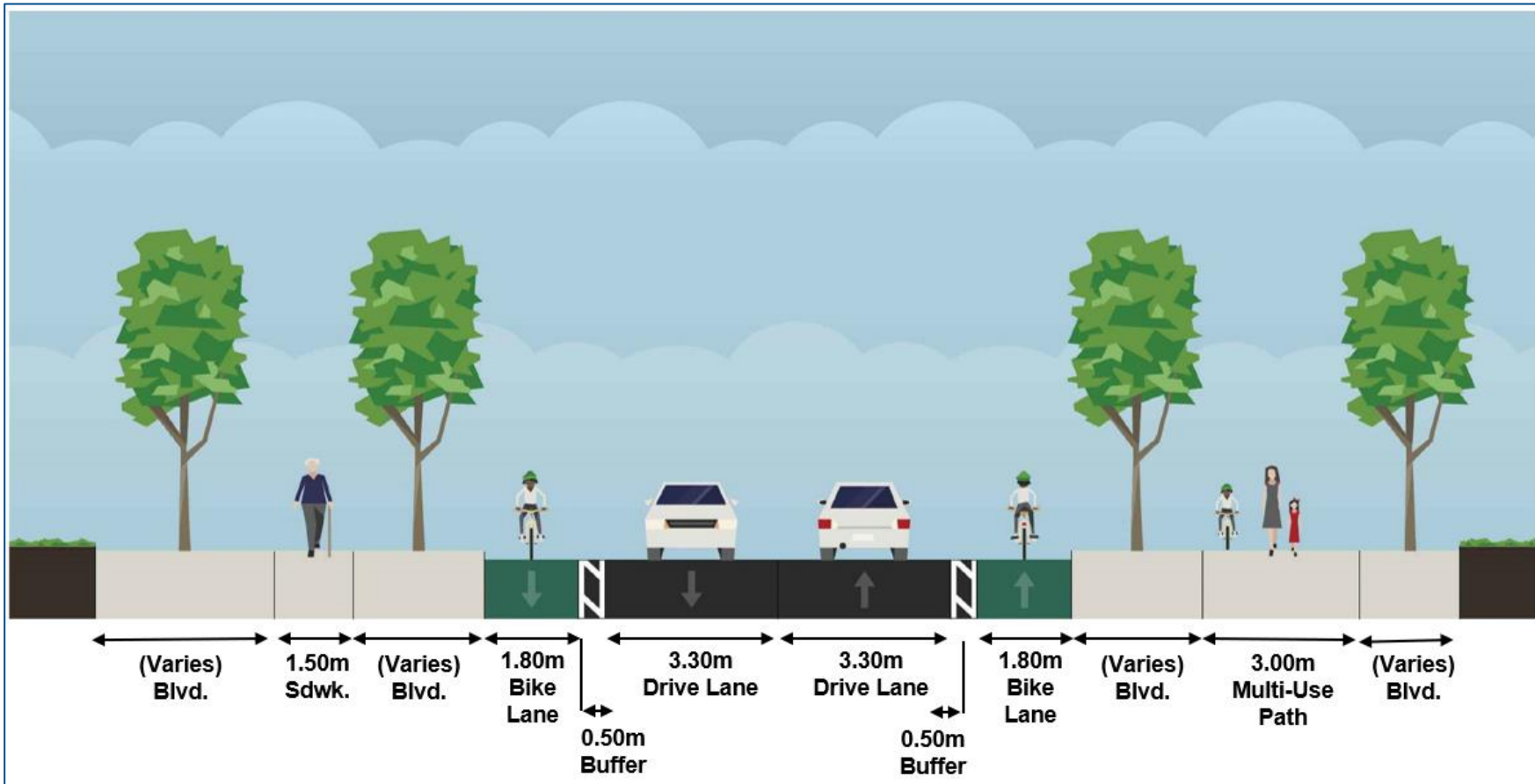
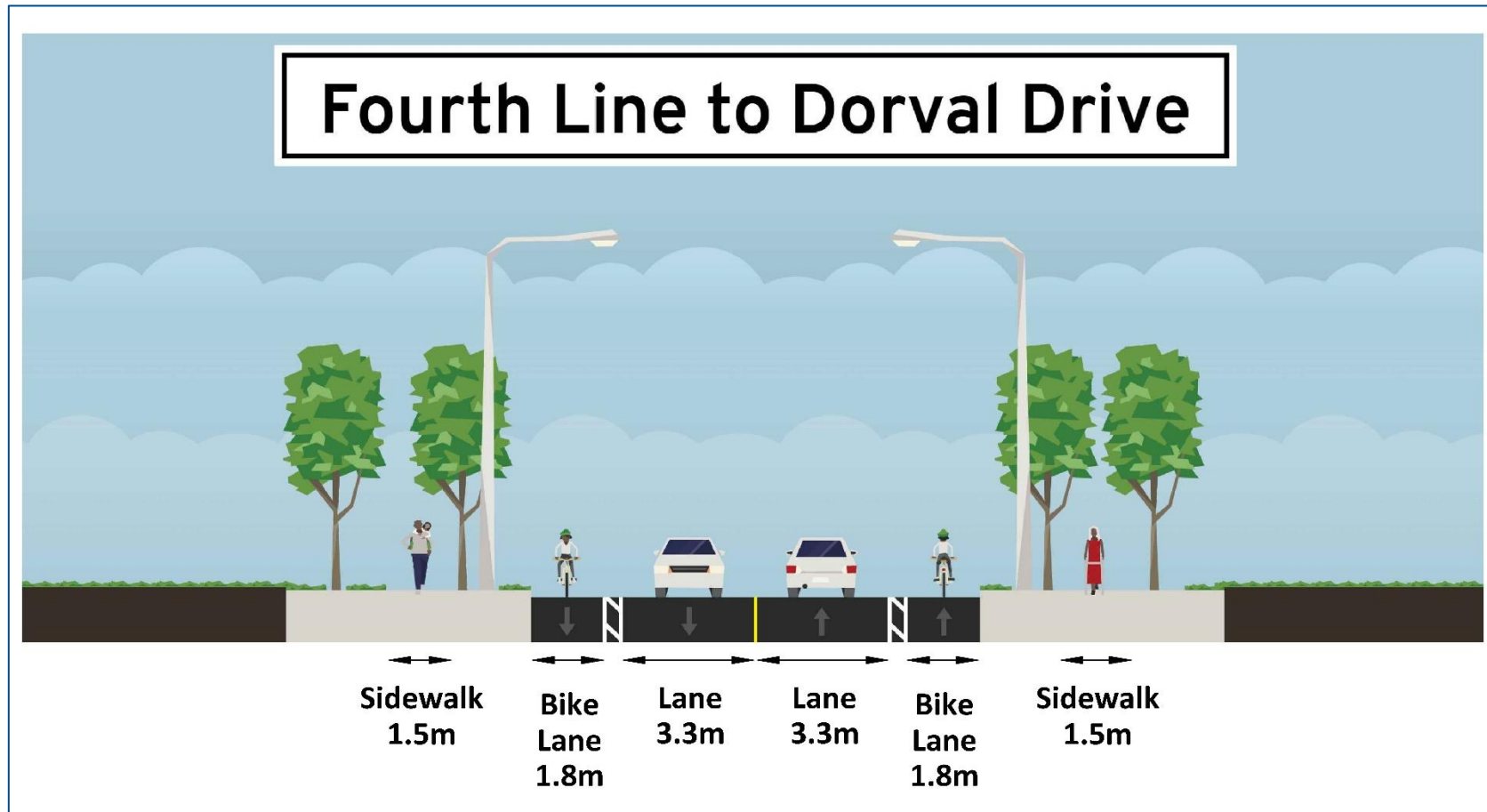


Figure 7-5: Fourth Line to Dorval Drive Typical Cross-section



7.1.5 Intersections and Side Streets

Intersection designs have been developed to provide an acceptable level of service at each intersection. Turning lane storage lengths were calculated based on 95th percentile queue lengths. Signal warrants completed for major non-signalized intersections concluded no new traffic signals were warranted.

7.1.6 Transit Stops

The existing transit stop locations along the Lakeshore Road West corridor, outlined in **Section 3.3.2.3**, will be maintained, and transit infrastructure, (for example, landing pad, bench and shelter), will be improved, wherever possible. The Town of Oakville Standards will be applied for reconstructed bus pads and/or bus bays.

7.1.7 Private Entrances

In general, existing private entrances will be reconstructed based on the following criteria:

- Match original driveway width at the property line;
- Match original driveway material at the property line, and
- Driveway grades in accordance with municipal and provincial standards.

The Bronte Village Revitalization Study has proposed the consolidation of existing entrances and modification of roadway access from Lakeshore Road West to side streets as a priority. However, for purposes of this study, all existing entrances are being maintained, pending further development of the revitalization plans.

7.1.8 Active Transportation Facilities

7.1.8.1 Sidewalks and Multi-Use Trail

Sidewalks 1.5m - 2.0m in width will be constructed on both sides of Lakeshore Road West between Mississaga Street and East Street.

On the north side of Lakeshore Road West from East Street to Dorval Drive, the existing sidewalk will be retained and new 1.5m sidewalk will be constructed where gaps currently exist. A 3.0m multi-use trail will be constructed on the south side of Lakeshore Road West between East Street and Fourth Line. The existing 1.5m sidewalk on the south from Fourth Line to Dorval Drive to be maintained where possible and reconstructed where the sidewalk is impacted by roadway construction.

Ten (10) pedestrian crossings are being recommended for construction or upgrade, to provide better connection between the north and south sides of Lakeshore Road West. A list of the proposed crossing locations and types is included as **Table 7-2. Figure 7-6**

shows the approximate locations of the crossings within the corridor. The pedestrian crossings will be implemented as required and when warranted by future traffic studies.

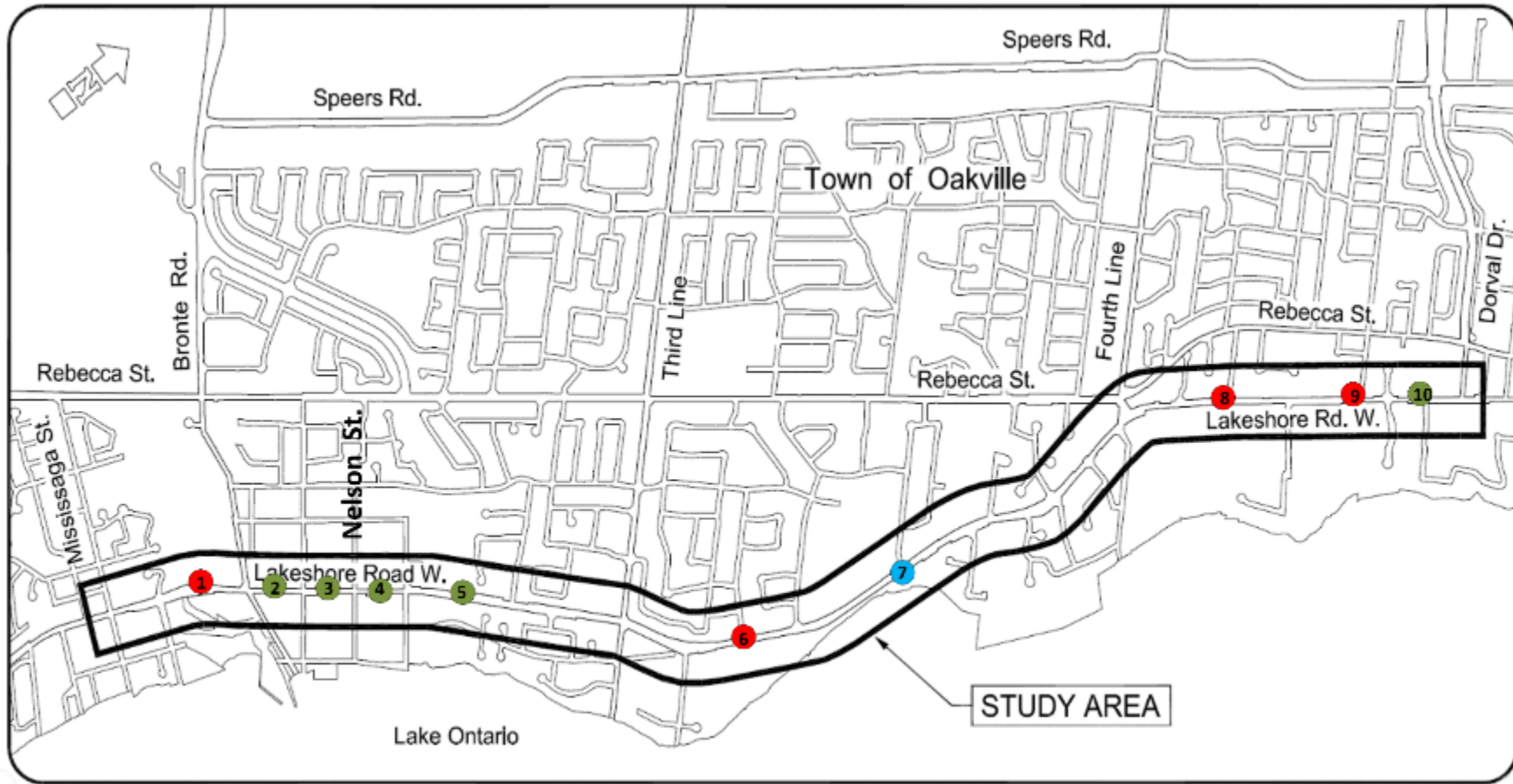
Table 7-2: Pedestrian Crossing Locations and Types

Location	Area	Crossing Type
Bronte Creek Trail	Midblock	Intersection Pedestrian Signal
West of Jones Street	Midblock	Level 2 Type B Crossing
West of Nelson Street	Midblock	Level 2 Type B Crossing
West of East Street	Midblock	Level 2 Type B Crossing
Bronte Athletic Park	Midblock	Level 2 Type B Crossing
Westminster Drive	Intersection	Intersection Pedestrian Signal
Sandwell Drive	Intersection	Level 2 Type C Crossing
Suffolk Avenue	Intersection	Intersection Pedestrian Signal
Morden Road	Intersection	Intersection Pedestrian Signal
Holyrood Avenue	Intersection	Level 2 Type B Crossing

Note: The pedestrian crossings at Bronte Athletic Park and Suffolk Avenue were installed in 2018 and 2019, respectively. These pedestrian crossings will have to be maintained during construction.

The pedestrian crossings identified in the ESR should be considered to be a “long list” of potential locations, with ultimate list of pedestrian crossings to be identified during the detailed design phase. Potential interaction between the pedestrian signals and existing traffic signals should be further evaluated at the detailed design phase.

Figure 7-6: Approximate Proposed Pedestrian Crossing Locations



Proposed Pedestrian Crossing Types:

- Intersection Pedestrian Signal (IPS)
- Level 2 Type B Crossing
- Level 2 Type C Crossing

Proposed Pedestrian Crossing Locations:

- | | | |
|-----------------------|------------------------------|-------------------|
| 1. Bronte Creek Trail | 5. Bronte Athletic Park Walk | 9. Morden Rd. |
| 2. West of Jones St. | 6. Westminster Dr. | 10. Holyrood Ave. |
| 3. West of Nelson St. | 7. Sandwell Dr. | |
| 4. West of East St. | 8. Suffolk Ave. | |

Accessibility for Ontarians with Disabilities Act Measures

The Accessibility for Ontarians with Disabilities Act (AODA) requires that all barriers in the built environment (public spaces and buildings) be removed. The Integrated Accessibility Standards Regulation identifies the specific requirements that must be implemented for public spaces and the associated timelines. AODA requirements specifically provide criteria for pedestrian facilities including ramps, tactile plate at intersections (**Figure 7-7** and **Figure 7-8**). The AODA requirements will be confirmed during the detailed design phase. The Oakville Universal Design Standards for Town Facilities will also apply.

Figure 7-7: Tactile Plate (TWSI)

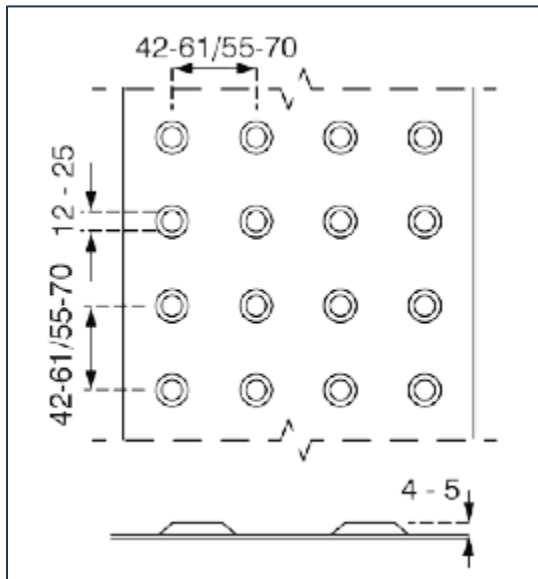
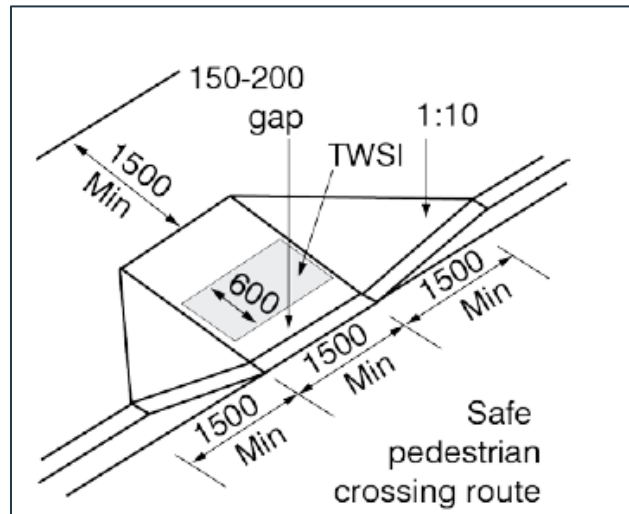


Figure 7-8: Example Midblock Crossing Ramp



7.1.8.2 Cycling Facilities

1.5m – 1.8m on street bike lanes with a 0.5m painted buffer will be constructed in both directions along Lakeshore Road West from Mississaga Street to Dorval Drive.

Figure 7-9: Option 1 – 1.5m Separated On-Road Bike Lane with 0.5m Painted Buffer



7.2 Stormwater Management

As discussed in Section 3.9, a Stormwater Management Report was completed as part of this study, and is provided in Appendix M. Stormwater Management practices (SWMPs) for the management of roadway runoff generally fall into two categories: those that address stormwater quantity (including erosion) and those that manage stormwater quality of surface runoff. In addition, Low Impact Development (LID) best management practices (BMPs) are designed to provide water quality treatment and quantity control for smaller, more frequent storm events (i.e. typically the 25 mm storm event). Various BMPs or stormwater management practices are available to address both the quantity and quality of runoff from roadways. Due to the linear nature of roadway corridors however, not all stormwater management practices are considered to be appropriate.

7.2.1 Alternative Stormwater Management Practices

The advantages and disadvantages of the various BMPs associated with both quantity and quality control measures were assessed. The following erosion, infiltration and water quality controls were short-listed:

- Enhanced Grass Swales
- Oil and Grit Separators
- Bioretention Systems
- Infiltration Trenches
- Silva Cells
- Permeable Pavers/Pavement (For MUP)

- Pervious Pipes (used with infiltration trenches)

7.2.2 Managing Impacts from Land Use Intensification and Climate Change

The Town of Oakville Stormwater Management Master Plan (Wood, 2020) noted a performance reduction within the focus area due to the increased runoff potential associated with land use intensification, and increased precipitation depth/runoff associated with climate change. The minor system upgrade recommendations provided in the town's Stormwater Management Master Plan address mitigating existing land use and climate hydraulic deficiencies and have not been assessed for land use intensification and climate change rainfall. The town's Stormwater Master Plan (Wood, 2020) recommended implementing LID BMP source controls in both the private and public realm to offset the impacts due to land use intensification and climate change. Implementing further minor system upgrades and storage could be used as a method of building resiliency within the town's infrastructure, however this would be accomplished at a considerable financial cost to the town. Given that land use intensification changes are gradually being advanced by the private sector, the town's philosophy is that the private sector should finance the mitigation works at no cost/impact to the town. Similarly, infrastructure renewal of roadways, through roadway reconstruction works will require the implementation of contemporary forms of stormwater management.

The Stormwater Management Master Plan (Wood, 2020) recommended a minimum capture of 25 mm of precipitation within the focus area, including the Lakeshore Road corridor, at all developed and undeveloped areas, as should be applied within the Town of Oakville. The 25 mm capture should be applied to existing developments and proposed developments in the private realm in addition to buildings and roadways within the public municipal realm. It is anticipated that every road and town owned property will undergo reconstruction or rehabilitation at the end of their operational lifecycle. It is during this time that town should consider implementing source controls as a mitigation strategy, such as the proposed reconstruction of Lakeshore Road.

There are limitations to the application of the 25 mm source control capture as it inherently does not address the existing hydraulic deficiencies and should be applied in addition to the recommended storm sewer upgrades (balanced approach of "grey" and "green" infrastructure). Furthermore, the source control capture has been designed to protect the municipality against impacts to land use intensification and climate change primarily to the minor system during the 5-year design storm event. Source controls, and more specifically LID BMPs, are typically used for mitigating the more frequent storm events and will not address the full impacts associated with the less frequent storm events.

While LID BMP source controls can provide a water quality benefit, the implementation of the 25 mm source controls have been recommended to offset the minor system quantity control impacts, and partially offset the major system quantity control impacts due to land use intensification and climate change. Based on the foregoing, the following infiltration practices were short-listed:

- Enhanced Grass Swales
- Bioretention Systems
- Infiltration Trenches
- Silva Cells
- Permeable Pavers/Pavement (For MUP)
- Pervious Pipes (used with infiltration trenches)

The following figures illustrate typical examples of the recommended LID BMP source controls:

Figure 7-10: Enhanced Grass Swale (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-11: Enhanced Grass Swale (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-12: Bioretention Facility (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-13: Bioretention Facility (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-14: Infiltration Trench Construction (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-15: Silva Cell Construction (www.smartcitiesdive.com, 2020)



Figure 7-16: Silva Cell Cross Section (info.cambrianrisevt.com, 2020)

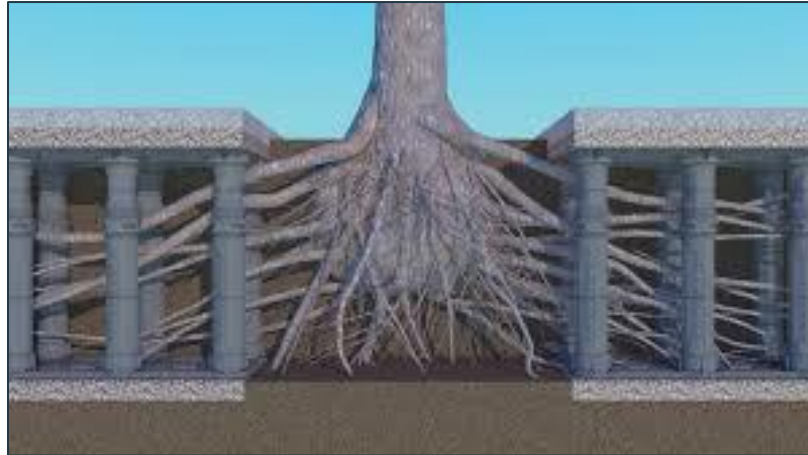


Figure 7-17: Permeable Pavers (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



Figure 7-18: Permeable Pavement (Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0, CVC and TRCA, 2010)



7.2.3 Proposed Minor System Modifications and Upgrades

Details of minor system upgrades and revisions are provided in **Table 7-3**. The existing and proposed storm sewer sizes have been provided, with sewer location depicted by road Stations within the table. Surcharging of the proposed storm sewer system does occur for some of the sewer sections, that said, most of the surcharge is considered minimal and just above the pipe obvert. Two (2) locations that will need evaluation further during detailed design are:

- The section of Lakeshore Road between Stations 1+400 and 1+850 is surcharged due to the sewer system on Sarah Lane, and further optimization of the proposed Lakeshore Road sewer system may be considered.
- The section of Lakeshore Road between Stations 1+850 and 2+660 just east of Third Line. The storm sewer system may need to be increased slightly, but due to cover constraints, a detailed plan and profile for this road section is required.

Table 7-3: Minor System Modifications and Upgrades

Drainage Outlet	Road Stations	Chainage		Conduit ID		Sewer	
		From Station	To Station	Conduit ID in Existing Model	Conduit ID in Proposed Model	Existing Sewer Diameter(mm)	Proposed Sewer Diameter(mm)
West to Bronte Creek	0+000 - 0+300	0+000	0+300	-	-	As Is	As Is**
East to Bronte Creek	0+310 - 0+700	0+340	0+360	O_0200_6614	Same as Existing	600	1050
		0+360	0+425	O_0200_400708	Same as Existing	600	1050
		0+425	0+470	O_0200_400707	Same as Existing	600	1050
		0+470	0+490	O_0200_400706	Same as Existing	600	825
		0+490	0+490	O_0200_400705	Same as Existing	525	825*
		0+490	0+580	O_0200_10	O_0200_400765_2	375	600
		0+580	0+600	O_0200_9	O_0200_400765_1	375	600
		0+600	0+650	O_0200_7357	Same as Existing	375	450
East to Nelson Creek	0+780 - 1+090	0+700	0+780	Does not Exist	C-Prop_1	-	375
		0+840	0+890	Does not Exist	C-Prop_3	-	375
		0+890	0+960	O_0200	O_0200_6477	375	450
		0+960	1+020	O_0200_6478	Same as Existing	375	900
		1+020	1+020	C6_13	Same as Existing	300	900*
		1+020	1+035	C7_13	Same as Existing	1000	900
West to Nelson Creek	1+090 - 1+400	1+035	1+060	O_0200_6481	Same as Existing	750	900
		1+060	1+075	O_0200_15	O_0200_6993_2	675	1050
		1+075	1+135	O_0200_14	O_0200_6993_1	675	1050
		1+135	1+145	O_0200_17	O_0200_7023_5	600	900
		1+145	1+155	O_0200_19	O_0200_7023_4	600	900
		1+155	1+170	O_0200_20	O_0200_7023_3	600	900
		1+170	1+180	O_0200_21	O_0200_7023_2	600	900
		1+180	1+205	O_0200_18	O_0200_7023_1	600	900
		1+205	1+215	O_0200_22	O_0200_7022_3	600	750
		1+215	1+220	O_0200_24	O_0200_7022_2	600	750
		1+220	1+280	O_0200_23	O_0200_7022_1	600	750
		1+280	1+290	O_0200_7021	O_0200_7021	525	600
Sarah Lane	1+400 - 1+850	1+290	1+300	O_0200_25	O_0200_6482_2	300	450
		1+300	1+340	O_0200_16	O_0200_6482_1	300	450
		1+415	1+435	O_0200_26	O_0200_6524_1	750	1800
		1+435	1+475	O_0200_28	O_0200_6524_2	750	1800
		1+475	1+490	O_0200_29	O_0200_6524_3	750	1800
		1+490	1+520	C1_6	O_0200_7226_1	825	1800

Drainage Outlet	Road Stations	Chainage		Conduit ID		Sewer	
		From Station	To Station	Conduit ID in Existing Model	Conduit ID in Proposed Model	Existing Sewer Diameter(mm)	Proposed Sewer Diameter(mm)
		1+520	1+530	C1_18	O_0200_7226_2	825	1800
		1+530	1+535	O_0200_31	O_0200_7226_4	825	1800
		1+535	1+560	O_0200_30	O_0200_7226_5	825	1800
		1+560	1+585	O_0200_33	O_0200_7226_6	825	1800
		1+585	1+640	O_0200_32	O_0200_6525_1	825	1800
		1+640	1+660	O_0200_35	O_0200_6525_2	825	1800
		1+660	1+690	O_0200_34	O_0200_6525_3	825	1800
		1+705	1+775	O_0200_36	O_0200_6525_4	825	1800
		1+775	1+795	O_0200_38	O_0200_6525_5	825	1800
Coronation Park West Channel	1+850 - 2+660	1+925	2+000	Does not Exist	C-Prop_4	-	375
		2+000	2+080	Does not Exist	C-Prop_5	-	375
		2+080	2+155	Does not Exist	C-Prop_6	-	525
		2+155	2+240	Does not Exist	C-Prop_7	-	525
		2+240	2+265	C36_CP	C36	900	1050
		2+265	2+265	O_0200_400175	Removed	900	-***
		2+265	2+400	Does not Exist	PROP-01	-	1050
		2+400	2+400	O_0200_6144	Removed	1200 x 1000 Rec	-***
		2+400	2+530	PROP-02	Same as Existing	1050	1350
		2+530	2+655	PROP-03	Same as Existing	1050	1350
		2+655	2+655	O_0200_1CP	PROP04	900	1200*
		2+655	2+655	O_0200_1CP	C614_CP	900	1200*
Coronation Park East Channel	2+660 - 2+950	2+655	2+665	C76	Same as Existing	975	1350
		2+665	2+775	PROP-05	Same as Existing	975	1350
		2+775	2+775	O_0200_6228	Same as Existing	400	2400 x 1500 Rec
		2+775	2+840	Does not Exist	C-Prop_8	-	525
		2+840	2+900	Does not Exist	C-Prop_9	-	450
Coronation Park East Parking Lot	2+950 - 3+280	3+100	3+180	Does not Exist	C-Prop_11	-	450
		3+180	3+260	Does not Exist	C-Prop_10	-	375
Drainage Easement	3+280 - 3+760	3+360	3+430	Does not Exist	C-Prop_12	-	450
		3+430	3+540	Does not Exist	C-Prop_13	-	600
		3+540	3+570	Does not Exist	C-Prop_14	-	525
		3+570	3+650	Does not Exist	C-Prop_15	-	525
		3+650	3+730	Does not Exist	C-Prop_16	-	450

Drainage Outlet	Road Stations	Chainage		Conduit ID		Sewer	
		From Station	To Station	Conduit ID in Existing Model	Conduit ID in Proposed Model	Existing Sewer Diameter(mm)	Proposed Sewer Diameter(mm)
East to Fourteen Mile Creek	3+760 - 3+980	3+860	3+930	Does not Exist	C-Prop_17	-	375
		3+930	3+950	Does not Exist	C-Prop_18	-	375
		3+950	3+965	O_0200_400459_1	Same as Existing	450	600
		3+965	3+980	O_0200_400459_2	Same as Existing	450	600
West to Fourteen Mile Creek	3+980 - 4+560	4+020	4+125	Does not Exist	C-Prop_19	-	600
		4+125	4+220	Does not Exist	C-Prop_20	-	600
		4+220	4+290	Does not Exist	C-Prop_21	-	525
		4+290	4+350	Does not Exist	C-Prop_22	-	450
		4+350	4+425	Does not Exist	C-Prop_23	-	450
		4+425	4+550	Does not Exist	C-Prop_24	-	375
East to McCraney Creek	4+560 - 4+780	4+560	4+780	-	-	As Is	As Is**
West to McCraney Creek	4+780 - 5+090	4+925	5+000	Does not Exist	C-Prop_25	-	375
Birch Hill Lane	5+090 - 5+700	5+475	5+550	Does not Exist	C-Prop_30	-	450
		5+550	5+630	Does not Exist	C-Prop_31	-	375
		5+630	5+675	Does not Exist	C-Prop_32	-	375
Remnant Channel West of Dorval Drive	5+700 - 6+100	5+725	5+800	Does not Exist	C-Prop_33	-	375
		5+800	5+850	Does not Exist	C-Prop_34	-	450
		5+810	5+850	O_0200_5877	Same as Existing	525	675
		5+850	5+925	O_0200_6188_1	Same as Existing	525	750
		5+925	5+935	O_0200_6188_2	Same as Existing	525	750
		5+935	6+015	O_0200_5879	Same as Existing	525	825
		6+015	6+025	O_0200_5880	Same as Existing	525	825
		6+075	6+125	O_0200_400596	Same as Existing	750	900
		6+125	6+150	O_0200_9858	Removed	750	_***
		6+125	6+150	Does not Exist	CProp_1007	-	900
South of Lakewood Dr. and St. Jude's Cemetery	~6+300	~6+300	C15_29	Same as Existing	900	1524 x 965 (Horizontal Ellipse)	

Minor system modifications along the Lakeshore Road for Catchbasins

- 2 sets of double catchbasins added on each side of Lakeshore Road at Station 0+175.
- 2 sets of double catchbasins added on each side of Lakeshore Road at Station 1+020.
- 1 set of double catchbasins added on north side of Lakeshore Road at Station 1+075.
- 1 set of double catchbasins added on north side of Lakeshore Road at Station 3+430.
- 1 set of double catchbasins added on north side of Lakeshore Road at Station 5+375.
- 1 set of double catchbasins added on north side of Lakeshore Road at Station 6+125.

* : This Conduit is placed perpendicular to the eastbound and westbound lanes

** : There are no changes in sewer pipes as the minor system is non-surcharged for the future conditions.

*** : The removed culverts/sewers are to facilitate the reduction in overland drainage for 100-year storm event to the existing drainage outlet.



7.2.4 Proposed Major System Improvements

In addition to the minor system upgrades, the major system also requires various improvements to reduce existing flooding conditions along the Lakeshore Road right-of-way. To reduce overland flooding the storm sewer system has been upgraded, localized drainage diverted, offsite channels upgraded, and road sections and curb height altered at Coronation Park. A summary of the major system improvements, not including profile revisions and urbanizing the road cross-section is as per the following:

- Changes in sewer sizes have been made east of Third Line (Station 2+220) reduce the overland peak flows in the Coronation Park West Channel. The existing culverts near Stations 2+275 and 2+400 would be removed to further reduce the overland drainage through Coronation Park West Channel.
- Lakeshore Road in the vicinity of Westminster Drive would require a 1 % crossfall from the north to south side of the road and would also require a reduced curb height of 0.05 m for (Stations 2+700 to 2+840); this would allow runoff from the road to be conveyed to the constructed channel in Coronation Park during less frequent storm events
- The Easterly Channel through Coronation Park commencing at the intersection of Westminster Drive and Lakeshore Road (Station 2+775) has been modified from Lakeshore Road to the outlet at Lake Ontario. The Coronation Park Class Environmental Assessment (EA) preliminary design is provided in Appendix A of the Stormwater Management Report (Appendix M). As of 2019 the Easterly Channel has been upgraded in accordance with the Coronation Park Class EA.
- The 900 mm diameter sewer at Station 6+100 would be connected to a sewer of the same dimension that discharges to the remnant channel located in St. Jude's Cemetery. The existing culvert crossing of Lakewood Drive will need be replaced to reduce the overland flow depth in the remnant channel in St. Jude's Cemetery.

7.2.5 Proposed Stormwater Quality Management

Water quality measures to provide an Enhanced Level of water quality protection for the proposed increase in pavement to each drainage outlet have been selected with consideration to the contributing drainage area, magnitude in the increase in paved area, R.O.W. spatial constraints, effectiveness of water quality measures and input from the Town of Oakville regarding the type, number and location of LID BMPs.

Table 7-4 provides the water quality measures for the Lakeshore Road West corridor. In addition to the water quality measures, permeable pavement for the multi-use-trail should be used to reduce runoff to the major and minor drainage systems.

Table 7-4: Proposed Stormwater Quality Management

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
0+000 to 0+310	0+300	West of Bronte Creek	49.85	0.90	0.6362	0.6963	0.0601	9.45%	601 m ² (+/-) of additional pavement proposed at intersections. Minor system on Lakeshore Road West is a 1500 mm dia. sewer with a nearly 50 ha contributing area, which is not conducive for retrofitting due to area and lack of space. Could do offsite improvements. Options include providing a water quality retrofit of Triller Place at 1.55 ha of drainage area using an oil/grit chamber prior to 1500 mm dia. sewer on Lakeshore Road West. Another option could be a water quality retrofit of the Bronte Harbour parking lot, which could use an oil/grit chamber and various LID measures.	Water quality retrofit of Triller Place with O/G EF4 chamber (601 m ²) \$ ²	Water quality retrofit of Bronte Harbour parking area using O/G chamber and/or LID measures. \$\$	SWM Alternative 1
0+310 to 0+450	0+350	East of Bronte Creek	0.49	0.18	0.2932	0.2830	-0.0102	-3.48%	Stormwater quality measures not required as there is a decrease impervious area from the existing conditions to the proposed conditions.	No SWM required	No SWM required	No SWM required
0+450 to 0+700	0+350		17.09	0.91	0.5483	0.6362	0.0879	16.03%	Same minor system outlet as the road between Stations 0+310 to 0+450. The minor system contributing area is 17.09 ha to the 600 mm dia. sewer on Lakeshore Road West, as such a retrofit of the sewer outlet with an oil/grit chamber would not meet Enhanced Level water quality requirements for 879 m ² (+/-) increase in pavement. Water quality alternatives include a retrofit of the existing 600 mm dia. sewer on the northeast side of Bronte Creek	Water quality retrofit of 600mm sewer with O/G EF4 chamber (for DA=1.06 ha) (1,140 m ²), on north side of Lakeshore Road West east of Bronte Creek and an enhanced	Water quality retrofit of the Bronte Harbour and Chris Vokes Memorial Park parking area using an O/G chamber and/or LID measures. \$\$	SWM Alternative 1

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									and Lakeshore Road West using an oil/grit chamber, combined with enhanced swale of 50 m (+/-) length. Another option would be a partial water quality retrofit of the east Bronte Harbour parking lot and the Chris Vokes Memorial Park parking lot (1.6 ha +/- paved) with an oil/grit chamber and could include LID measures within green spaces.	swale at the outlet. \$		
0+700 to 0+780	0+350			0.15	0.1660	0.1921	0.0261	15.72%	Overland drainage to Bronte Harbour, with the same minor system outlet as for the road between Stations 0+310 to 0+700. Combined increase in impervious coverage for road Stations 0+310 to 0+780 would be 1,083 m ² (+/-).			
0+780 to 0+890	1+060	Nelson Street	41.00	0.38	0.2353	0.2717	0.0364	15.47%	There is a proposed increase in paved area of 364 m ² draining overland to the storm sewer between road Stations 0+780 to 0+890 and then to the storm sewer system on Nelson Street which discharges to Lake Ontario.	O/G EF4 Chamber (126 m ²) \$	Tree Silva Cells \$\$	SWM Alternative 1
0+890 to 1+400	1+060	Nelson Street		1.29	1.1129	1.0891	-0.0238	-2.14%	The proposed combined change in impervious coverage from road Stations 0+890 to 1+400 is a decrease of 238 m ² (+/-). The sewer west of Nelson Street would collect drainage from 2.6 ha (+/-) which could be treated using an oil/grit chamber.			
1+400 to 1+850	1+820	Sarah Lane	151.17	1.40	0.6998	0.7458	0.0460	6.57%	Proposed increase in paved area is 460 m ² , which would drain overland to the storm sewer within road Stations 0+890 to 1+400 and then to	Roadside bioretention system (460 m ²)	Tree Silva Cells \$\$	Alternative 1

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									the storm sewer system on Nelson Street. A bioretention system on the north side of Lakeshore Road at or near Station 1+500 could be used for water quality treatment of the additional paved area.	\$		
1+850 to 2+210	2+270	Coronation Park east channel (Proposed Condition)	7.98	1.50	0.4967	0.6495	0.1528	30.76%	The proposed increase in paved area is 1,528 m ² (+/-) which will drain to the storm sewer to discharge at Coronation Park. The sewer west of Third Line would collect drainage from 1.63 ha (+/-) which could be treated using an oil/grit chamber.	LID BMP retrofits in Coronation Park (1883 m ²) \$	Two (2) O/G chambers at west of Third Line EF4 and East of Westminster Drive EF4 (1883 m ²) \$\$	Combined Alternatives
2+210 to 2+270	2+270			0.18	0.1640	0.1898	0.0258	15.73%	Drainage will be conveyed easterly from Third Line within a new storm sewer to the east channel in Coronation Park as per Coronation Park Class EA. The proposed increase in pavement west of Westminster Drive would be 352 m ² (+/-). The proposed increase in pavement east of Westminster Drive would be 3 m ² (+/-). The sewer east of Westminster drive collects drainage from 1.22 ha which could be treated using an Oil/grit chamber. The total proposed increase in pavement to the west channel in Coronation Park would be 355 m ² (+/-) not including the 1528 m ² (+/-) west of Third Line. Stormwater quality could be provided through 2 oil/grit chambers, 1 west of Third Line and the other east of Westminster Drive. Alternatively, or in combination with oil/grit chambers, drainage			
2+270 to 2+400	2+400		10.43	0.56	0.2181	0.2279	0.0098	4.49%				
2+400 to 2+660	2+660	Coronation Park east channel	16.08	1.14	0.4430	0.4426	-0.0004	-0.09%				
2+660 to 2+950	2+780	Coronation Park east channel	13.90	0.92	0.4930	0.4933	0.0003	0.06%				

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									improvements and other LID measures in Coronation Park could be used for bioretention and water quality treatment of aforementioned 352 m ² (+/-).			
2+950 to 3+280	3+100	Coronation Park East Parking Lot	15.50	1.08	0.5684	0.5593	-0.0091	-1.60%	The Coronation Park east parking lot includes both the minor and major drainage system outlets for 330 m of Lakeshore Road West and an external drainage area off Woodhaven Park Drive. The parking lot has the existing wastewater treatment plant 1800 mm dia. outlet, a 900 mm dia. abandoned wastewater outlet and a 600 mm dia. storm sewer outfall. There is a decrease in the paved are of 91 m ² and stormwater quality treatment is not required.	No SWM required	No SWM required	No SWM required
3+280 to 3+760	3+430	Drainage Easement	49.69	1.47	0.7206	0.7992	0.0786	10.91%	This portion of the road has a rural cross-section and will become urbanized. There is an increase in paved area of 786 m ² (+/-). 240 m ² (+/-) of the increased paved area is conveyed to the sewer west of the Easement and the easement would collect drainage from 0.79 ha (+/-) which could be treated using an oil/grit chamber. 547 m ² (+/-) of the increased paved area is conveyed to the sewer east of the Easement and the easement would collect drainage from 2.99 ha (+/-) which could be treated using an oil/grit chamber. Alternatively, underground infiltration and storage under the multiuse trail for the 25 mm storm	Two (2) O/G EF4 chambers (786 m ²) \$\$	Tree Silva Cell \$	Combined Alternatives

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									event could be provided (20 m ³) and potentially combined with an oil/grit chamber.			
3+760 to 3+940	3+770	Fourteen Mile Creek west	6.80	0.49	0.3033	0.3065	0.0032	1.06%	There is increase of 20 m ² (+/-) in pavement on the west side of Fourteen Mile Creek. Since the drainage area is too large for an Oil/Grit chamber, a combination of oil/grit chambers and erosion control infiltration trenches for the 25 mm storm event runoff response (175 m ³) have been considered to provide water quality. On the east side of Fourteen Mile Creek, the existing road is a rural cross-section with the west bound lanes draining to Fourteen Mile Creek, while the east bound lanes, between both legs of Westdale Drive drain to the local side roads (Westdale Dale Drive (west leg), Wilder Drive, and West Lynn Road). Under the proposed conditions the road will be urbanized as such the overland drainage system outlets will not change, but the minor system will convey drainage from the east bound lanes. As such 0.93 ha at 0.65 ha impervious (70% imp.) will be redirected to Fourteen Mile Creek in the minor system (5 year storm event). On the east side of Fourteen Mile Creek, the increase of 590 m ² (+/-) in impervious cover could be addressed with an Oil/Grit chamber	Underground Infiltration and storage trench system \$	One (1) O/G EF4 Chambers (610 m ²) \$\$	Underground Infiltration and storage trench system
3+940 to 3+980	3+980		2.43	0.32	0.0775	0.0763	-0.0012	-1.55%				
3+980 to 4+120	4+020		0.46	0.21	0.2167	0.2313	0.0146	6.74%				
4+120 to 4+240	4+120		0.93	0.55	0.2315	0.2363	0.0048	2.07%				
4+240 to 4+560	4+460	Fourteen Mile Creek east	3.12	1.03	0.4984	0.538	0.0396	7.95%				

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									as the drainage area of 3.62 ha is within considerable limits for such mitigation. Note: The existing drainage outlet to the east ditch and remnant channel at Stirling Drive (3+780) will not receive drainage from the Lakeshore Road due to urbanization (addition of curb and gutter).			
4+560 to 4+780	4+770	McCraney Creek west	1.49	0.46	0.4157	0.4452	0.0295	7.10%	Similar to Fourteen Mile Creek, to provide erosion control and Enhanced water quality control for the proposed 1156 m ² (+/-) total increase in paved area, a combination of oil/grit chambers with infiltration trenches (20 m ³) have been proposed. The infiltration trenches would provide control for the 25 mm storm event. An Oil/Grit chamber at the east outlet (drainage area = 3.82 ha (+/-)) of McCraney creek could provide quality control for the increased pervious area of 861 m ² (+/-).	Two (2) O/G EF4 Chambers (1156 m ²) \$\$	Underground Infiltration and Storage Trench System (East Side) \$	Combined Alternatives
4+780 to 5+090	4+770	McCraney Creek east	3.82	0.86	0.3877	0.4738	0.0861	22.21%				
5+090 to 5+270	5+375	Birch Hill Lane	3.19	0.37	0.2751	0.3046	0.0295	10.72%	One (1) Oil/Grit chamber has been recommended near Station 5+225 to treat the 295 m ² (+/-) of additional pavement to the 300 mm storm sewer through private property. One (1) OGS unit has been recommended to treat the 250 m ² (+/-) on additional pavement area contributing to the west side of Birch Hill Lane. Similarly, an Oil/Grit chamber has been recommended at the east outlet of Birch Hill to treat	Three (3) EF4 chambers (360 m ²) \$\$	Underground infiltration and storage trench system (East side of Birch Hill Lane) \$	Combined
5+270 to 5+375	5+375		7.75	0.84	0.3865	0.4115	0.0250	6.47%				
5+375 to 5+700	5+375		2.30	0.65	0.2011	0.2371	0.0360	17.90%				

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	Stormwater Management Alternatives Discussion	SWM Alternative 1 ₁	SWM Alternative 2 ₁	Preferred solution
									the increased pavement area of 360 m ² (+/-). Alternatively, to address the 360 m ² (+/-) proposed increase in paved area east of Birch Hill Lane, an underground infiltration systems (50 m ³) has been considered West on the south side of the road.			
5+700 to 5+800	6+010	Remnant Channel west of Dorval Drive	0.84	0.42	0.1532	0.1527	-0.0005	-0.33%	The existing minor and major drainage systems at Dorval Road/ Lakeshore Road West intersection are considered inadequate with significant surcharging of the sewer system and flooding of the road during the 100 year storm. As such, the remnant channel located west of the Lakeshore Road West and Dorval has been considered to be disconnected from the existing 1200/1350 mm dia. sewer on Lakeshore Road West and connected to the existing channel within the cemetery. Twinning of the existing 1350 mm dia. sewer is being considered from Dorval to the end of the storm sewer outlet south of Brock Road. A decrease in the impervious area of 85 m ² does not necessitate stormwater quality treatment.	No SWM required	No SWM required	No SWM required
5+800 to 6+100	6+100	Remnant Channel West of Dorval Drive/ Sewer on Lakeshore	5.72	0.47	0.4796	0.4716	-0.008	-1.67%				
		TOTALS	406.56	18.78	10.4218	11.1607	0.7389	7.09%				

Notes: ₁ Area in brackets represents the additional paved area requiring treatment

₂ Cost estimates have not been provided for each alternative, however, the alternative with a likely lower implementation cost has been identified with a "\$" while the alternative with a likely greater implementation cost has been identified with "\$\$".

7.2.6 Proposed Low Impact Development Best Management Practices

The implementation of LID BMP source controls to offset the hydraulic impact of land use intensification and climate change have been proposed based on a detailed review of the proposed increase in pavement to each drainage outlet, as well as a review of the site-specific spatial and grading constraints of constructing the LID BMPs within the ROW. This assessment has not confirmed whether the identified LID BMP measures would be sufficient to offset the 25 mm of precipitation as required by the town's Stormwater Master Plan (Wood, 2020) for each of the sections of Lakeshore Road West; the size and level of treatment provided by each of the LID BMP units can be assessed at the next stages of planning and design. Furthermore, this assessment has not considered the seasonally high ground water elevation and how it may impact the bottom elevation or depth of the proposed LID BMP source controls as groundwater surface elevation data has not been collected as part of this study. The Credit Valley Conservation LID Stormwater Management Planning and Design Guide indicates that the invert of stone reservoirs, for LID features such as infiltration trenches, should be located at a minimum of one (1) metre above the seasonally high water table. Groundwater monitoring data should be collected at the next stages of planning and design to confirm the feasibility of the noted LID features.

Due to the limited spatial constraints within the ROW, should the infiltration trenches or other infiltrative LID features with a stone reservoir not be suitable for the specified locations due to the seasonally high-water table, it would be advantageous if road-side ditches could be maintained where possible or converted to enhanced swales to provide a water quality benefit. Following locations within the existing Lakeshore Road West ROW where road-side ditches have been identified are provided:

- Bronte Athletic Park to Solingate Drive (Stations 1+500 to 1+750)
- Solingate Drive to Third Line Belvedere Drive (Stations 1+750 to 2+500)
- Belvedere Drive to Westminster Drive (Coronation Park) (Stations 2+500 to 2+900)
- Woodhaven Park Drive to the Water Treatment Plant (Stations 2+900 to 3+300)
- Water Treatment Plant to Wolfdale Avenue (Stations 3+300 to 3+850)
- 14 Mile Creek to Spring Garden Road (Stations 4+050 to 4+300)
- Westdale Road (Stations 4+550 to 4+625)
- Birch Hill Lane to Morden Road (Stations 5+400 to 5+700)

The existing ditches at these locations should be maintained to the extent possible to provide an informal water quality benefit to treat runoff from the ROW prior to conveyance to the storm sewer system. Converting these existing ditches to enhanced swales would provide the opportunity to formalize the water quality benefits of the roadside ditches as per the recommendations of the town's Stormwater Master Plan.

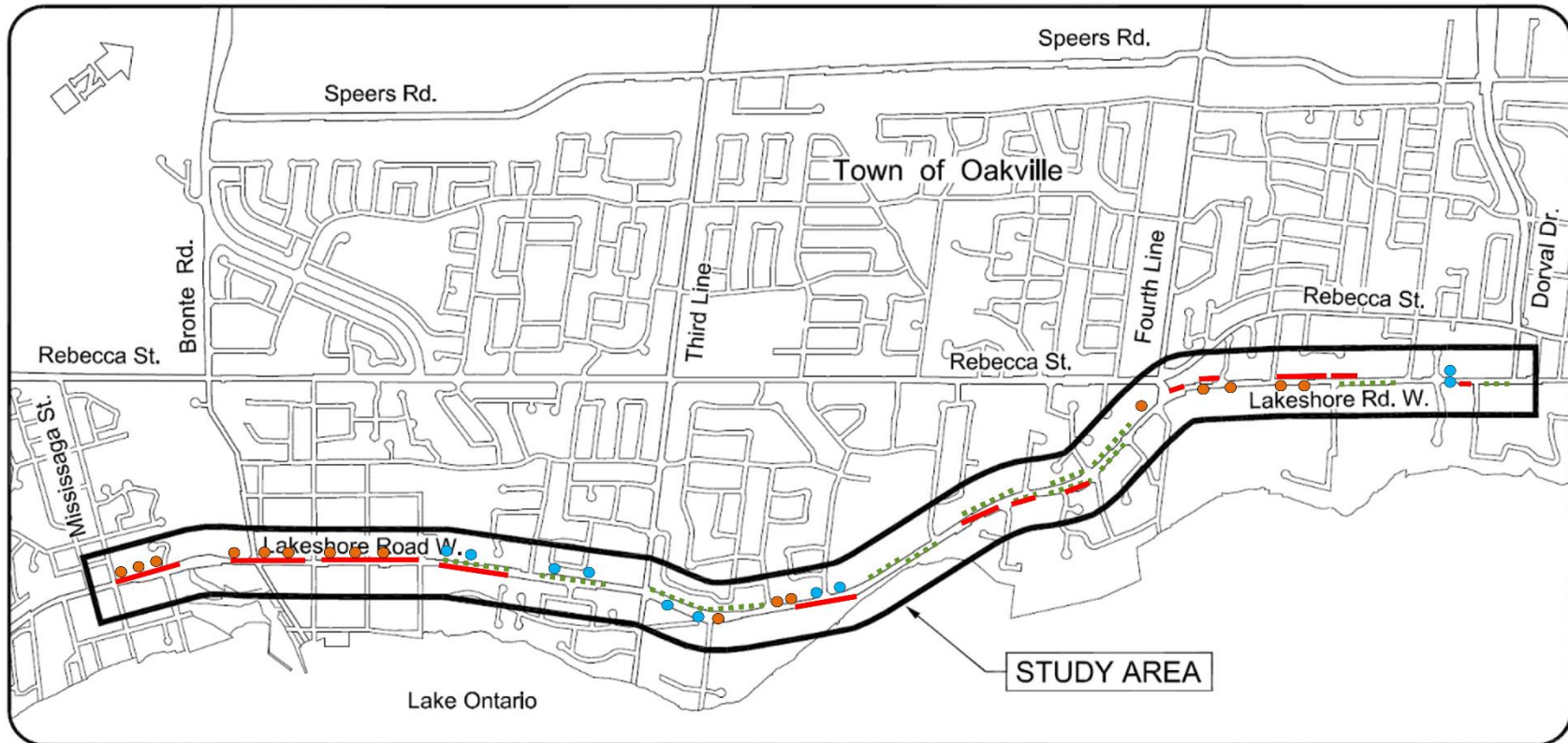
The location of the proposed LID BMP measures is shown in **Figure 7-19**, and details are provided in **Table 7-5**. The feasibility of implementing the LID BMP features (assessment of soil conditions, groundwater and bedrock depths, utilities configuration and depths) has not been undertaken for this study. The preliminary cost to implement the recommended LID BMP source controls has been estimated to be approximately \$9.3M.

7.2.7 Stormwater Management Commitments for Detailed Design

The following commitments will be addressed during detailed design:

- Maximize the use of LID towards the targets defined within the Town's Stormwater Master Plan.
- The study provided detailed recommendations with respect to the type and location of the possible LIDs that may be suitable along the corridor. The effectiveness of the LID relies on coordination with the road profile (i.e. low points) and/or cross-fall of the road to direct road drainage to the LID. As such, the locations of the LID features identified via this study be considered essential to the design and grading of the road.
- The Town currently does not have standards for the LIDs proposed via this study, particularly where road drainage is conveyed through a curb-cut. The Town has on-going pilot projects that will help to inform a standard in the future for bioretention facilities. This study has also proposed permeable pavers for which no standard/pilot currently exists. To ensure the performance of the proposed LID measures, standards should be developed at the detailed design stage taking into consideration long-term operations and maintenance.
- This study identified the locations where road-side ditches should be maintained. At detailed design, the Town will retain modified forms of the existing ditches as much as possible and consider opportunities to provide for their form and function where being removed.

Figure 7-19: LID BMP Recommended Implementation Location Plan



Recommended LID BMPs

- Enhanced Grass Swales
- Bioretention Systems
- Permeable Pavers/Pavement or Infiltration Trenches
- Silva Cells

Table 7-5: Proposed LID BMP Implementation Locations

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	25 mm Source Control (LID BMP) Implementation Strategy
0+000 to 0+310	0+300	West Bronte Creek	49.85	0.90	0.6362	0.6963	0.0601	9.45%	There is limited area for the implementation of swales/ditches as this section of road uses curb and gutter under existing conditions. Silva cells should be considered within the area between the proposed sidewalk and the roadway on the north side of Lakeshore Road West. Drainage from the road and sidewalk could be conveyed to the silva cells where appropriate grading permits. Similarly, permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the sidewalk, however this would not likely provide substantial infiltration benefit unless the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches.
0+310 to 0+450	0+350	East Bronte Creek	17.09	0.18	0.2932	0.283	-0.0102	-3.48%	There is limited to no area for the implementation of swales/ditches as this section of road uses curb and gutter under existing conditions. Furthermore, the sidewalk on the south side of Lakeshore Road West extends from the back of curb to the front of the buildings. Soil Cells should be considered within the area between the proposed sidewalk and the roadway on the north side of Lakeshore Road West between Station 0+600 and 0+780. Drainage from the road and sidewalk could be conveyed to the silva cells where appropriate grading permits. Similarly, permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the sidewalk on the south side of Lakeshore Road West where there is existing interlocking brick adjacent to the sidewalk. However, this would not likely provide substantial infiltration benefit unless the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches. An enhanced swale has been recommended for stormwater quality treatment (ref, Table 6.5 and Figure 7 in Appendix M) at the storm sewer outfall to Bronte Creek; these LID BMPs could be implemented to compliment the treatment of the enhanced swale.
0+450 to 0+700	0+350			0.91	0.5483	0.6362	0.0879	16.03%	
0+700 to 0+780	0+350			0.15	0.166	0.1921	0.0261	15.72%	
0+780 to 0+890	1+060	Nelson Street	41.00	0.38	0.2353	0.2717	0.0364	15.47%	Silva cells should be considered within the area between the proposed sidewalk and the roadway where green space has been proposed, on the north and south sides of Lakeshore Road West, between Stations 0+780 and 0+950 and Stations 1+100 to 1+400. Drainage from the road and sidewalk could be conveyed to the silva cells where appropriate grading

Table 7-5: Proposed LID BMP Implementation Locations

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	25 mm Source Control (LID BMP) Implementation Strategy
0+890 to 1+400	1+060	Nelson Street		1.29	1.1129	1.0891	-0.0238	-2.14%	permits. Silva cells have also been recommended in the area of 0+780 and 0+950 for stormwater quality treatment (ref, Table 6.5 and Figure 7 in Appendix M). Similarly, permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the sidewalk on both sides of Lakeshore Road West, however this would not likely provide substantial infiltration benefit. unless the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches. Swales/ditches cannot be constructed in this area as this section of road uses curb and gutter under existing conditions and there is insufficient area to implement swales/ditches.
1+400 to 1+850	1+820	Sarah Lane	151.17	1.40	0.6998	0.7458	0.046	6.57%	Shallow existing swales could be converted to enhanced swales and facilities on the north side of Lakeshore Road West between Stations 1+540 and 1+700 and bioretention facilities between Stations 1+425 and 1+525 as there is sufficient area available between the road and the property line. Drainage from the road could be conveyed to the LID BMP features through curb cuts in the curb and gutter. Catch basins are recommended to be constructed in the LID BMP features to convey excess runoff to the storm sewer system (i.e. runoff greater than the capacity of the LID BMP feature). Permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the MUP; this may provide substantial infiltration benefit as the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches, particularly on the south side of Lakeshore Road West.
1+850 to 2+210	2+270	Coronation Park west channel (Proposed Condition)	7.98	1.50	0.4967	0.6495	0.1528	30.76%	An existing shallow swale could be converted to an enhanced swale and/or bioretention facilities on the north side of Lakeshore Road West between Stations 1+850 and 2+075 as there is sufficient area available between the road and the property line. Drainage from the road could be conveyed to the LID BMP features through curb cuts in the curb and gutter. Catch basins are recommended to be constructed in the LID BMP features to convey excess runoff to the storm sewer system (i.e. runoff greater than the capacity of the LID-BMP feature). Permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the MUP between Station 2+125 and 2+225 on the south side of Lakeshore Road West; this may provide substantial

Table 7-5: Proposed LID BMP Implementation Locations

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	25 mm Source Control (LID BMP) Implementation Strategy
									infiltration benefit as the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches.
2+210 to 2+270	2+270			0.18	0.164	0.1898	0.0258	15.73%	Enhanced swales could be implemented on the north side of Lakeshore Road West between Stations 2+250 and 2+750 as there is sufficient area available between the road and the existing sidewalk; as with all the recommended LID BMPs, the feasibility of the enhanced swale will have to be reviewed for conflicts with utilities and infrastructure particularly in this location as the proposed trunk storm sewer is shown to be located on the north side of Lakeshore Road West in the boulevard. Bioretention facilities could be implemented between Station 2+300 and 2+525 on the south side of Lakeshore Road West, opposite the MUP. Drainage from the road could be conveyed to the LID BMP features through curb cuts in the curb and gutter. Catch basins are recommended to be constructed in the LID BMP features to convey excess runoff to the storm sewer system (i.e. runoff greater than the capacity of the LID-BMP feature). Silva cells could be constructed south of the MUP on the south side of Lakeshore Road West between Stations 2+550 and 2+650, and on the north side of Lakeshore Road West between Stations 2+800 and 2+950.
2+270 to 2+400	2+400		10.43	0.56	0.2181	0.2279	0.0098	4.49%	
2+400 to 2+660	2+660	Coronation Park west channel	16.08	1.14	0.443	0.4426	-0.0004	-0.09%	
2+660 to 2+950	2+780	Coronation Park east channel	13.9	0.92	0.493	0.4933	0.0003	0.06%	
2+950 to 3+280	3+100	Coronation Park East Parking Lot	15.5	1.08	0.5684	0.5593	-0.0091	-1.60%	Bioretention facilities could be constructed between Stations 2+970 to 3+000 and 3+025 to 3+100. The location and invert elevations of the existing sanitary sewer pipes would need to be confirmed in this area to ensure LID BMPs would not interfere with the existing infrastructure. Permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the MUP; this may provide infiltration benefit as the grading of the ROW in this area could be conveyed to the permeable pavers/pavement or infiltration trenches, particularly on the south side of Lakeshore Road West.

Table 7-5: Proposed LID BMP Implementation Locations

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	25 mm Source Control (LID BMP) Implementation Strategy	
3+280 to 3+760	3+430	Drainage Easement	49.69	1.47	0.7206	0.7992	0.0786	10.91%	Enhanced swales could be implemented on the both the north and south sides of Lakeshore Road West between Stations 3+350 and 3+410 and 3+450 to 3+700 as there are existing swales located in these areas. The grading of the ROW between the MUP and private property on the south side of Lakeshore Road West may impact the width of the swales. Curb cuts could be implemented to convey runoff from the ROW to the swales. Should the proposed grading on the south side of the ROW not be conducive for the implementation of a swale, then permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the MUP to increase the potential for infiltration of runoff. A Silva Cell has been recommended in this area for stormwater quality treatment; the enhanced swales could compliment the treatment provided by the Silva Cell.	
3+760 to 3+940	3+770	Fourteen Mile Creek west	6.80	0.49	0.3033	0.3065	0.0032	1.06%	Enhanced swales could be implemented on the both the north and south sides of Lakeshore Road West between Stations 3+870 and 3+950 and 4+000 to 4+500 as there are existing swales located in these areas. The grading of the ROW between the MUP and private property on the south side of Lakeshore Road West may impact the width of the swales. Curb cuts could be implemented to convey runoff from the ROW to the swales. Infiltration trenches have been recommended on both sides of Fourteen Mile Creek to mitigate erosion to the channel. Should the proposed grading on the south side of the ROW not be conducive for the implementation of a swale, then permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the MUP to increase the potential for infiltration of runoff in addition to the infiltration trenches recommended to mitigate erosion (ref. Table 6.4 and Figure 10 in Appendix M).	
3+940 to 3+980	3+980		2.43	0.32	0.0775	0.0763	-0.0012	-1.55%		
3+980 to 4+120	4+020	Fourteen Mile Creek east	0.46	0.21	0.2167	0.2313	0.0146	6.74%		
4+120 to 4+240	4+120		0.93	0.55	0.2315	0.2363	0.0048	2.07%		
4+240 to 4+560	4+460		3.12	1.03	0.4984	0.538	0.0396	7.95%		
4+560 to 4+780	4+770	McCraney Creek west	1.49	0.46	0.4157	0.4452	0.0295	7.10%		Silva cells could be implemented north of the sidewalk near Station 4+675 at the intersection of Fourth Line and Lakeshore Road West and on the south side of Lakeshore Road West between Stations 4+825 to 5+050 between the sidewalk and the roadway; as with all the recommended LID BMPs, the feasibility of the Silva Cells near Station 4+675 will have to be reviewed for conflicts with utilities and infrastructure particularly in this location as the existing storm sewer is shown to be located on the north
4+780 to 5+090	4+770	McCraney Creek east	3.82	0.86	0.3877	0.4738	0.0861	22.21%		

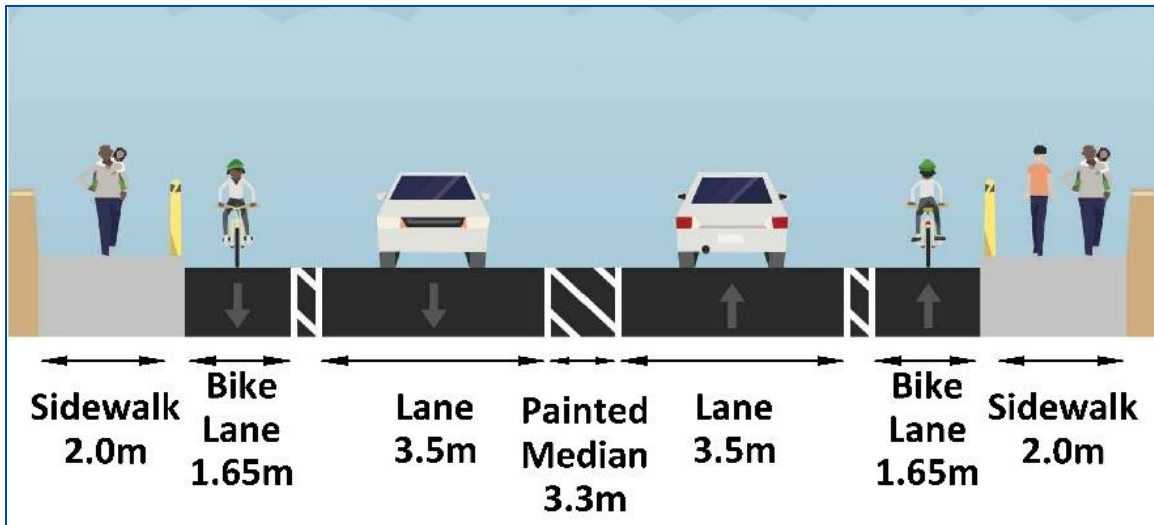
Table 7-5: Proposed LID BMP Implementation Locations

Road Stations	Drainage Outlet Station	Location	Drainage Area (ha)	Right of way Area (ha)	Existing Paved Area (ha)	Proposed Paved Area (ha)	Change in Paved Area (ha)	Percentage Change in Paved Area (%)	25 mm Source Control (LID BMP) Implementation Strategy
									side of Lakeshore Road West in the boulevard. Permeable pavers/pavement or pervious pipes with infiltration trenches could be installed in the sidewalk on the north side of Lakeshore Road West between Fourth Line and McCraney Creek (Station 4+725 and 4+760) and on the north side of Lakeshore Road West between Stations 4+825 to 4+925. The permeable pavers/pavement or pervious pipes with infiltration trenches could be implemented to compliment the infiltration trench recommended to mitigate erosion infiltration trench east of McCraney Creek (ref. Table 6.4 and Figure 10 in Appendix M).
5+090 to 5+270	5+375	Birch Hill Lane	3.19	0.37	0.2751	0.3046	0.0295	10.72%	Silva cells could be implemented on the south side of the Lakeshore Road West ROW between Stations 5+150 and 5+325. Permeable pavers/pavement or pervious pipes with infiltration trenches could be constructed in the sidewalk on the north side of Lakeshore Road West between Stations 5+200 and 5+350 and Stations 5+400 and 5+5+25. The permeable pavers/pavement or pervious pipes with infiltration trenches could be implemented to compliment the infiltration trench recommended at Station 5+400 (ref. Table 6.4 and Figure 11 in Appendix M). An existing shallow swale on the south side of Lakeshore Road West between Stations 5+400 to 5+550 could be converted to an enhanced swale with curb cuts in the curb and gutter to convey runoff from the ROW to the swale.
5+270 to 5+375	5+375		7.75	0.84	0.3865	0.4115	0.025	6.47%	
5+375 to 5+700	5+375		2.3	0.65	0.2011	0.2371	0.036	17.90%	
5+700 to 5+800	6+010	Remnant Channel west of Dorval Drive	0.84	0.42	0.1532	0.1527	-0.0005	-0.33%	Bioretention facilities could be constructed between Stations 5+800 and 5+860 on both the north and south sides of the Lakeshore Road West. Should the proposed grading on the either side of the ROW not be conducive to convey flow to the bioretention facilities, then permeable pavers/pavement could be constructed in the proposed sidewalks between Stations 5+875 and 5+925. An existing shallow swale on the south side of Lakeshore Road West between Stations 6+000 to 6+075 could be converted to an enhanced swale with curb cuts in the curb and gutter to convey runoff from the ROW to the swale.
5+800 to 6+100	6+100	Remnant Channel West of Dorval Drive/ Sewer on Lakeshore	5.72	0.47	0.4796	0.4716	-0.008	-1.67%	
		TOTALS	412.04	18.72	10.4218	11.1607	0.7389	7.09%	

7.3 Hydraulic Crossing and Structure Design

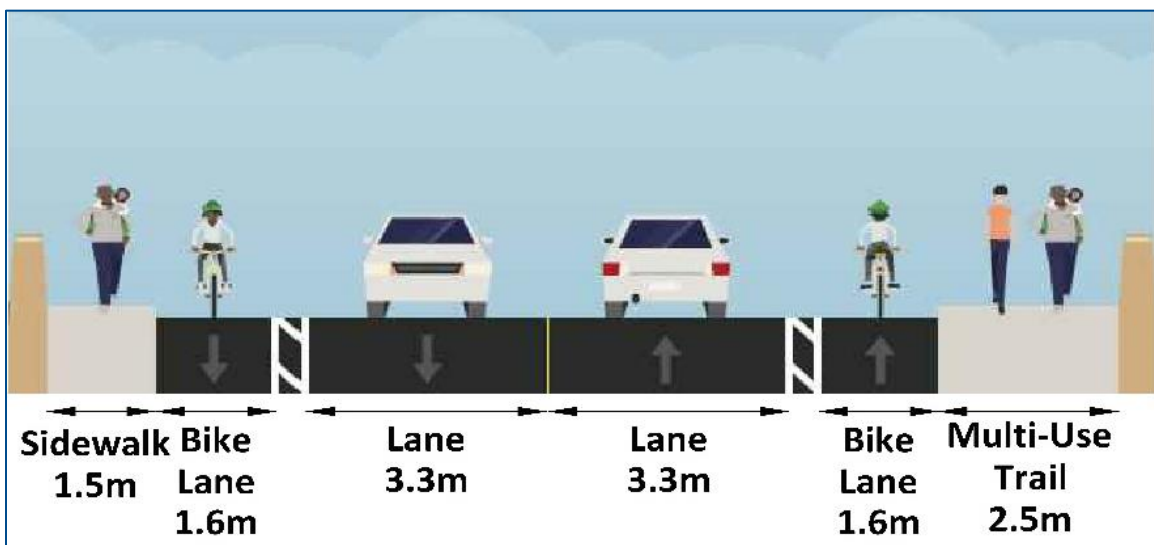
Bronte Creek Bridge: The existing Bronte Creek bridge requires no structural changes. It will be modified with a new pavement marking plan to accommodate the new cross-section (**Figure 7-20**). Pedestrian protection will also be provided by incorporating a pedestrian separation barrier wall or railing.

Figure 7-20: Bronte Creek Bridge Cross Section



14 Mile Creek Bridge: The existing 14 Mile Creek bridge requires no structural changes. The bridge deck will be modified with new pavement markings to accommodate the new cross-section (**Figure 7-21**).

Figure 7-21: 14 Mile Creek Bridge Cross Section

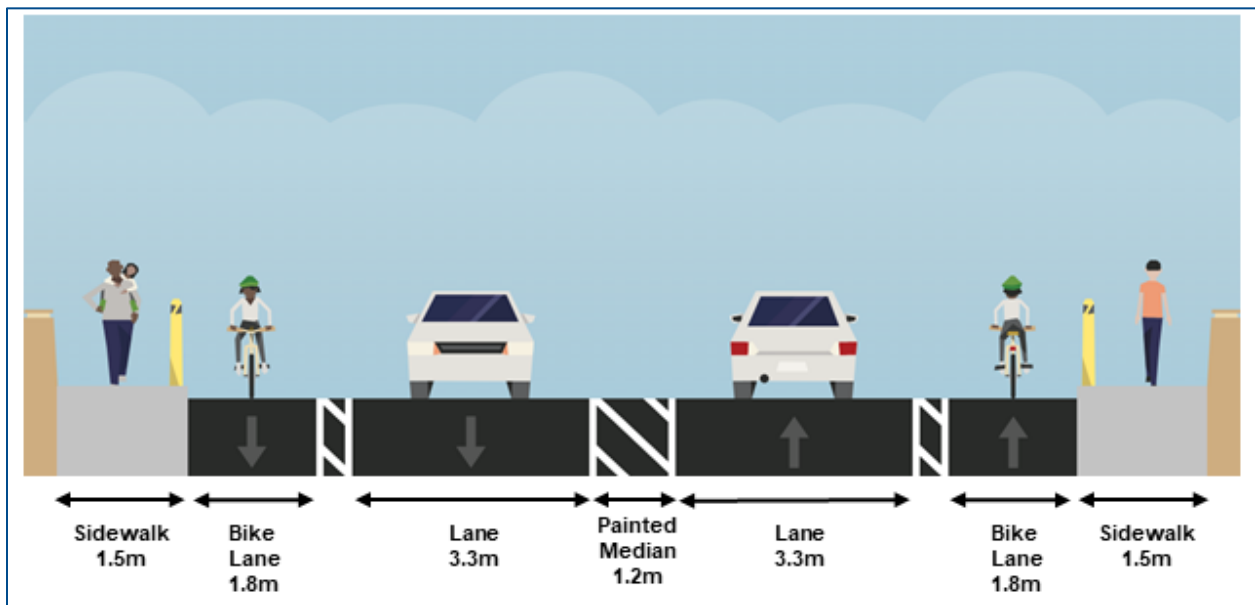


McCraney Creek Bridge: The McCraney Creek Bridge requires replacement due to poor condition and flooding potential which is outlined in section 6.1.12. The new structure will accommodate 2 lanes of traffic, on-road bike lanes, a sidewalk (north side) and a multi-use trail (south side). Pedestrian protection will also be provided by incorporating a pedestrian separation barrier wall or railing (**Figure 7-22**). The preferred alternative for this section of Fourth Line to Dorval Drive, as noted in section 6.1.4, is:

- 3.3 m through lanes (1 lane each direction);
- 1.8 m (including 0.3 m gutter) on-street bike lanes with 0.5 m painted buffer;
- 1.5m wide concrete sidewalk on the north side of Lakeshore Road West;
- 1.2m painted median; and
- 3.0m wide multi-use path on the south side of Lakeshore Road West.

However, being the life cycle of the bridge will be approximately 75 years, a wider cross section is recommended as depicted in Figure 7-10 to provide for future flexibility.

Figure 7-22: McCraney Creek Bridge Cross Section



7.4 Utilities

A utility coordination meeting for Lakeshore Road West, between Mississaga Street and Dorval Drive was held and minutes recorded (ref. Appendix E) The following utilities were identified in the right-of-way:

- Union Gas
- Bell
- Oakville Hydro
- Cogeco

Municipal Services Include:

- Water
- Storm sewer
- Wastewater

Utility relocation requirements will be clarified and finalized during detailed design. Additional investigation into public requests for buried hydro lines will be undertaken.

A meeting was held with Oakville Hydro to review the proposed design and document conflicts and would be dealt with through detailed design when a new survey would be available. Several changes to the preliminary design were made to minimize potential conflicts, as discussed in the meeting minutes.

7.5 Property Requirements

Some property acquisition will be required along the corridor. The proposed property takings are primarily narrow frontage strips along the roadway between Mississaga Street and East Street. Property acquisition will be required primarily to provide sidewalks, bike lanes and on-street parking. Demand for lay by parking spaces was raised by the BIA group during public meeting to provide parking spaces for the shoppers and restaurant visitors in the Bronte village/west of Bronte Road. **Table 7-6** to **Table 7-9** list the potential land area to be acquired by the town. However, the exact area required is subject to detailed design.

Table 7-6: Property Acquisition – Block 1

Street	Property #	Area (m ²)
Public Properties		
Lakeshore Road	Public Property (At Bronte Creek)	86
Lakeshore Road	Public Property (At Chris Vokes Park)	57
Lakeshore Road	Public Property (At Chris Vokes Park)	323
Lakeshore Road	Public Property (At Chris Vokes Park)	209
Lakeshore Road	Public Property (At Chris Vokes Park)	90
Lakeshore Road	Public Property (At Bronte Road Intersection)	24
Lakeshore Road	Public Property (At Bronte Gore Park)	79

Street	Property #	Area (m ²)
Private Properties		
Lakeshore Road	3063	56
Lakeshore Road	3039	35
Lakeshore Road	3014	24
Lakeshore Road	2514	709
Lakeshore Road	2484	148
Lakeshore Road	2489	47
Lakeshore Road	2457	37
Lakeshore Road	2451	56
Lakeshore Road	2447	133
Lakeshore Road	2448	31
Lakeshore Road	2446 / 2444	25
Lakeshore Road	2442	14
Lakeshore Road	2432	6
Lakeshore Road	2395 / 2393	55
Lakeshore Road	2381	55
Lakeshore Road	2377	55
Lakeshore Road	2373 / 2371 / 2369 / 2367 / 2365	142
Lakeshore Road	2361	31
Lakeshore Road	2359 / 2355	52
Lakeshore Road	2330	134
Lakeshore Road	2319	103
Lakeshore Road	2309 / 2307	63
	Total area (m²)	2879
	Total area (ha)	0.288

Table 7-7: Property Acquisition – Block 2

Street	Property #	Area (m ²)
Public Properties		
None		
Private Properties		
East Street	83	61
Lakeshore Road	2022	35
Lakeshore Road	2014	70
Total Area (m²)		166
Total Area (ha)		0.0166

Table 7-8: Property Acquisition – Block 3

Street	Property #	Area (m ²)
Public Properties		
Lakeshore Road	Public Property (At Coronation Park)	90
Private Properties		
Lakeshore Road	1031	11
Lakeshore Road	1015	25
Lakeshore Road	1009	34
Lakeshore Road	1003	3
Total Area (m²)		163
Total Area (ha)		0.0163

Table 7-9: Property Acquisition – Block 4

Street	Property #	Area (m ²)
Public Properties		
Lakeshore Road	Public Property (At Westgate Park)	20
Private Properties		
None		
	Total Area (m²)	20
	Total Area (ha)	0.002

7.6 Streetscape

A preliminary urban design plan was created by James McWilliam and is included in Appendix S. The preliminary design consists of typical streetscape treatments for the Bronte Village, the Sir John Colborne Recreation Centre for Seniors, and the Coronation Park area.

The preliminary streetscape design for the Bronte Village area strives to preserve existing trees, while providing a safe and attractive pedestrian precinct along this section of Lakeshore Road. The design elements include raised planter beds with concrete ‘sitting’ wall sections, median planting beds, new street trees, and concrete sidewalk. This sidewalk is flanked by coloured/textured contrasting unit pavers where space is available. Street furnishings for this urban section of Lakeshore Road will include benches, bike racks, waste receptacles, bollards, and wayfinding signage.

Streetscape will be provided in the planting beds and other available spaces, with the installation of native trees, shrubs, perennials and ornamental grasses.

East of the Bronte Village the streetscape will be more typical of the existing roadway. The proposed design will include several median planting beds and a multi-use path extending along the south side of Lakeshore Road. Amenity areas will be provided at strategic locations along the multi-use path. Where Lakeshore Road passes beside Coronation Park, the option for the multi-use path to pass through the parkland can be considered, providing a more attractive and safer route, with more separation from the roadway.

The existing trees located along the Lakeshore Road corridor will be preserved where possible. Where tree removals are required, these trees will be replaced following the Town of Oakville’s Tree Protection During Construction Procedure. Preliminary tree removals have been clearly outlined in the preferred preliminary design drawings,

subject to adjustment during detailed design. Additional native trees will be planted where space is available.

7.7 Illumination

U Tech Engineers prepared an Illumination Assessment and Report which can be found in Appendix T. This report outlines lighting levels and pole locations to provide light to the proposed design. Through Bronte Village, from Bronte Creek Bridge to East Street, 60W luminaries on existing poles are recommended. Along the rest of the corridor 32W luminaries in an opposite arrangement are recommended to provide better illumination distribution and maintain uniformity across the corridor. Additional lighting is required at some intersections to meet design values, including at Third Line where 108W luminaries are recommended to match the pre-existing wattage. Base mounted aluminum streetlight poles as per Town of Oakville standard drawing STD 9-8 are recommended. GE Evolve LED Roadway Lighting Fixtures of various wattages were used for all lighting calculations.

7.8 Cost Estimate

The estimated capital cost of the preferred design concept is \$43,434,300.00, not including costs for property acquisition, utility relocations and engineering. The high-level breakdown of the estimate is presented in **Table 7-10**.

Table 7-10: Breakdown of Construction Cost Estimate

Description	Cost
Full Road Reconstruction	\$8,905,000
McCraney Creek Structure Replacement	\$2,000,000
Storm Sewer including OGS	\$10,115,000
LID	\$9,261,000
Reinstall 8 Traffic Signals	\$880,000
Install 10 Pedestrian Signals	\$400,000
Illumination	\$1,850,000
Minor Items and Contingency 30%	\$10,023,300
TOTAL	\$43,434,300

8.0 Environmental Issues and Commitments

8.1 Land Use

Future land use within the study area will remain consistent with the current uses of commercial and residential, with increasing infill. The Bronte Mall, within the Bronte Village area, is currently undergoing improvements, and will be further integrated into the urban design of the roadway corridor, in the detailed design phase.

8.2 Noise Impacts

A traffic noise assessment was completed, using 41 representative receptors, for the proposed improvements to Lakeshore Road. Lakeshore Road West traffic data was provided for the existing condition (2016), Future with Development conditions (2021) and Future with Development conditions (2031). The year 2021 represents the peak traffic conditions with an expected decline in traffic volumes from 2031 onward. Therefore, the 2031 traffic volumes were not utilized for this noise assessment.

The results of the noise impact study indicated that the noise impacts along Lakeshore Road West are predicted be less than a 5 dB (noticeable) increase when comparing the Future “build” 2021 and Future “no build” 2021 scenarios. Therefore, in accordance with the project noise assessment criteria, consideration for noise mitigation is not required. The predicted Future “build” 2021 levels are above the 60 dBA at twelve locations, however, based on the project noise assessment criteria, consideration for noise mitigation is not required at these locations.

Construction noise impacts are temporary and largely unavoidable. However, the contract documents should identify the contractor’s responsibilities with respect to controlling noise, as well as recording, investigating and if possible, addressing complaints. The contract documents should also explicitly state that compliance with all applicable law is an expectation of the contract including adherence to the Town of Oakville Noise By-Law 2008-098.

Further noise impact information can be found in Road Traffic Noise Impact Study, Appendix U.

8.3 Aquatic Resources

An Aquatic Habitat Existing Conditions Report was completed as part of the preliminary design (ref. Appendix I). The improvement works of the crossing structures will likely require ‘in-water’ works, depending on the extensiveness of the structure modifications. In-water works should occur within appropriate timing windows for construction suitable to the thermal regime and fish species evident. Furthermore, any watercourse

where in channel work is required the works will require dewatering such that work can be completed 'in-the-dry'. In these instances, cofferdams and bypass pumping and/or flumes can be utilized to isolate the work areas. Isolating and dewatering work areas may require fish salvage programs to avoid the stranding of fish within work areas.

During the works, runoff from construction activities may lead to a temporary increase in erosion risk due to increased area of exposed soil and stockpiled materials. This poses an increased risk of siltation to the watercourse leading to increased surface water turbidity which would be harmful for fish. Spills and leaks such as the introduction of sediment, concrete outwash, and other deleterious substances (e.g., salt, paint, solvents, oil and grease) during construction could allow contaminated water to enter the river. The potential for such effects is low if appropriate mitigation and environmental protection planning measures are applied consistent with Ontario Provincial Standards.

Additionally, limited temporary and/or permanent removal of shrubs/trees and/or riparian vegetation will be required for access routes to culverts and roadway improvements. Where feasible, access routes would be selected to minimize vegetation disturbance. Vegetation removals can result in a temporary increase in erosion and sedimentation risk, and instability in channel banks. Furthermore, vegetation removal may cause a temporary loss of overhead cover for fish and could result in increased water temperatures and instability in channel banks.

Correspondence with MNRF and Conservation Halton occurred throughout preliminary design to ensure agency guidelines were met for providing necessary protection of aquatic resources. Comments provided by the agencies have been included in this reporting. During the detailed design phase, additional mitigation measures may be developed as the design approaches completion.

8.4 Terrestrial Resources

A Terrestrial Habitat Existing Conditions Report was completed as part of the preliminary design (ref. Appendix H). The proposed improvements for this project are expected to have minimal long-term impact on the natural environment due to the current existing ROW and traffic in the area; however, there is potential for direct and indirect effects on the terrestrial environment during construction activities. The work will result in both defined impacts and may include other potential impacts that are difficult to measure. These defined and potential impacts within the project study area include:

- Loss of natural and cultural vegetation along exiting ROW and potential ROW expansion areas;
- Loss of pervious surfaces leading to increased runoff;

- Disturbance, damage, or harm to wildlife species protected under the Migratory Bird Convention Act (MBCA), the Fish and Wildlife Conservation Act (FWCA), and/or the Endangered Species Act (ESA);
- Potential project encroachment on woodland features resulting in potential impacts to woodland dwelling species and land bird stopover areas;
- Loss and disturbance to bat maternity colonies through destruction and/or noise disturbance in forested habitats/treed areas within and adjacent to the ROW;
- Increased human presence near bat maternal roost sites may cause females to drop young for their protection or abandon young altogether if stressed;
- Potential encroachment of the road ROW into areas of the Project study area that may support turtle nesting;
- Potential increased noise and light disturbance to wildlife adjacent to the ROW;
- Potential increased dust generation and deposition on vegetation resulting in effects on photosynthesis, respiration, and transpiration;
- Potential increase in invasive species colonization within disturbed areas;
- Increased road mortality on birds, turtles, and amphibian associated with construction vehicles, increased road width, and increased traffic flows;
- Potential loss of amphibian breeding habitat adjacent to the ROW. Impacts may also include increased sedimentation; and
- Potential for direct loss of habitat for species of conservation concern. The footprint of the proposed works will result in loss of habitat. Indirect loss of habitat may occur through changes in hydrology, introduction of non-native plant species, introduction of sediments and other contaminants, and salt spray and runoff.

The intent of this preliminary effects assessment is to provide considerations for further effects evaluation based on significant natural features present within the project study area, environmental consideration relative to road widening projects, and regulatory considerations for wildlife protected under various federal and provincial legislation. Confirmation of habitat use within identified Significant Wildlife Habitats should be conducted at the detailed design stage of the project to support the effects assessment and the development of environmental protection measures consistent with the municipal, regional, and provincial regulations.

8.5 Tree Preservation

The technically preferred design was selected following the re-evaluation of alternatives that considered impacts to mature trees and other vegetation. The existing trees located along the Lakeshore Road corridor are preserved, where possible. Where tree removals are required these trees will be replaced, consistent with town policy. A Tree Replacement Plan will be developed during the detailed design phase. The Tree Replacement Plan will recommend native trees and vegetation and identify areas for their planting.

8.6 Fluvial Geomorphic Assessment

Fourteen Mile Creek and McCraney Creek have been investigated based on fluvial geomorphic considerations for crossing improvements in the Town of Oakville. Scoping level review of existing channel conditions, planform characteristics, crossing sizing and guidance for scour and erosion control, have been undertaken. The full assessment can be found in Appendix K.

The recommended meander belt limits for delineation of Fourteen Mile Creek related Redside Dace habitat are 75m, with 25m measured westerly and 50m measured easterly from the creek centreline along Lakeshore Road. The minimum crossing opening widths are recommended as 16.5m and 13.5m for Fourteen Mile Creek and McCraney Creek respectively, which encompass bankfull width targets of 9.5m and 6.5m with 3.5m overbanks on both sides. Larger crossing opening widths would also be suitable, with overbank width adjusted accordingly. Opening sizing is conditional on implementation of scour protection to the 100yr event design storm with an added FS=1.15. Additional erosion control is required on the upstream side of the McCraney Creek crossing based on the high-risk erosion site defining the confined slope embankment on the west side. The 100-year event design standard is recommended for treatment sizing. All channel works must incorporate integrated recommendations from a fish habitat and passage perspective.

8.7 Archaeology

A Stage 1 Archaeological Assessment has been completed for this study (ref. Appendix L). The study found that areas where potential has been removed because of previous road and sidewalk construction, disturbed shoulders, driveways and boulevards comprise approximately 88% (12.5 ha) of the total study area, while areas of low potential due to excessive slope constitute approximately 1% (0.13 ha). The potential for archaeological resources exists within 11% (1.1 ha) of the total Study Area. Considering these results, the following recommendations are made:

1. A Stage 2 archaeological assessment in accordance with Section 2.1 of the MTCS *Standards and Guidelines for Consultant Archaeologist (2011)* is required prior to

any form of land alteration within the areas of archaeological potential that are noted for portions of Lakeshore Road West. As the sections of the study area that retain archaeological potential cannot be ploughed due to their limited spatial extent and the presence of buried utilities, Stage 2 assessment should be carried out by means of hand shovel test pitting at 5-metre intervals.

2. If construction related activities extend past the current right-of-way fronting St. Jude's Cemetery (located at 258 Lakeshore Road West in Oakville), a cemetery investigation may be required. The preliminary design does not identify any construction outside of the current right-of-way; however, this is subject to detailed design.
3. No further archaeological assessment is required for the remainder of the study area. The above recommendations are subject to Ministry of Heritage, Sport, Tourism and Culture Industries approval, and it is an offence to alter any of the study area without Ministry of Heritage, Sport, Tourism and Culture Industries concurrence.

8.8 Cultural Heritage

As previously noted, a Cultural Heritage Evaluation Report was completed for this project in 2018 which identified 17 heritage properties (ref. Appendix M). Since the completion of the 2018 CHER, the heritage status of several properties in the Study Area has changed. A Cultural Heritage Update memo was completed by Wood in 2020 to provide updated heritage status for the 17 heritage properties, update inventory of built heritage resources and cultural heritage landscapes and discuss impacts and mitigation measures (Wood, 2020). The 2020 Cultural Heritage Update memo is provided in Appendix M.

The impact assessment was completed as part of the 2020 Cultural Heritage Update memo to determine direct or indirect impacts to identified cultural heritage resources by the proposed work. The impact assessment for this technical memo was prepared using the Ministry of Heritage, Sport, Tourism and Culture Industries' *InfoSheet #5: Heritage Impact Assessment and Conservation Plans* (InfoSheet #5) (2006).

The impact assessment determined that indirect impacts are anticipated to the following two (2) heritage properties:

- HP 1 - 3014 Lakeshore Road West (Bronte Bluffs and Bronte Harbour)
- HP 5 - 2457 Lakeshore Road West (Bronte Cenotaph)

In addition, one potential indirect impact was identified for HP 13 (372 Lakeshore Road West) due to the close proximity of the proposed work to landscape features associated with this property that are located within the existing right-of way.

Detailed discussion on the indirect impacts and proposed mitigation measures is provided below:

8.8.1 HP 1 - 3014 Lakeshore Road West (Bronte Bluffs and Bronte Harbour)

Description of Anticipated Impact

Realignment of sidewalk along the western boundary of the Cultural Heritage Landscape. Realignment of the asphalt driveway between 2514 and 2500 Lakeshore Road West. No property acquisition is planned. Two tree removals planned. The two tree removals are adjacent to Lakeshore Road West and are not listed as heritage attributes of the CHL since these do not appear to form the tree canopy at the top of the Bluffs.

Mitigation Measures

Site Plan Control

Drawings of the proposed work show that sections of new sidewalk are anticipated along the west boundary of HP 1 and that the driveway between 2514 and 2500 Lakeshore Road West will be realigned. In addition, two tree removals are planned. The heritage status of this property should be depicted on project drawings. In addition, a general note should be added to project drawings and construction drawings during the detailed design phase of the project with the following (or comparable) text:

"A 'Notice Intention to Designate' this property as a cultural heritage landscape under Part IV of the Ontario Heritage Act has been issued by the Town of Oakville. This cultural heritage landscape includes 2484, 2508, 2514, and 3014 Lakeshore Road West and 7, 35, and 75 West River Street. Impacts to the landscape elements of this property should be avoided, including but not limited to: mature trees, gardens, stylized lighting, and commemorative signs."

Design Guidelines

Work is proposed within the existing property limits of HP 1 (3014 Lakeshore Road West - Bronte Bluffs and Bronte Harbour). Impacts to landscape elements (mature trees, gardens, stylized lighting, and commemorative signs) should be avoided. If impacts to landscape elements are anticipated, then lost landscape features should be replaced with the same, or compatible elements:

- Existing light poles should be retained and re-installed post-construction

- Commemorative signs should be retained and re-installed post-construction
- Removed trees should be replaced with large stock trees of the same, or similar species
- Gardens and lawns should be replaced in kind post-construction
- Sidewalk and driveway materials should match the existing materials within the property (concrete and asphalt)

8.8.2 HP 5 - 2457 Lakeshore Road West (Bronte Cenotaph)

Description of Anticipated Impact

Realignment of sidewalk through the southwest corner of the property. Removal of one tree.

Mitigation Measures

Site Plan Control

Drawings of the proposed work show that a new sidewalk is located along the southwest corner of HP 5 and one tree will be removed. The heritage status of this property should be depicted on project drawings. In addition, a general note should be added to project drawings and construction drawings during the detailed design phase of the project with the following (or comparable) text:

"2457 Lakeshore Road West is listed on the Town of Oakville's Heritage Register. Impacts to the landscape elements of this property should be avoided, including but not limited to: mature trees, water fountain, commemorative signs and plaques, and the cenotaph".

Design Guidelines

Work is proposed within the existing property limits of HP 5 (2457 Lakeshore Road West - Bronte Cenotaph). Direct impacts to landscape elements (mature trees, water fountain, commemorative signs and plaques, and the cenotaph) should be avoided. If impacts to landscape elements are anticipated, then lost landscape features should be replaced with the same, or compatible elements:

- The cenotaph, and stone with plaque should be retained in situ
- The water fountain should be retained and re-installed post-construction
- Commemorative signs (i.e., Halton Region The Veterans Highway) should be retained and re-installed post-construction
- Removed tree should be replaced with large stock tree of the same, or similar species

- Gardens and lawns should be replaced in kind post-construction
- Sidewalk and walkway materials should match the existing materials within the property (concrete and asphalt)

8.8.3 HP 13 - 372 Lakeshore Road West (Private residence)

Description of Anticipated Impact

No anticipated impacts are depicted to this property. However, the low stone wall along the northwest property line is depicted within the existing right-of-way. No impacts to the low stone wall are shown but this feature should be avoided during construction.

Mitigation Measures

Site Plan Control

Drawings of the proposed work show that the low stone wall along the northwest side of HP 13 (372 Lakeshore Road West - Private residence) is located within the existing right-of-way. While no impacts are depicted to the wall, the heritage status of this property should be depicted on project drawings. In addition, a general note should be added to project drawings with the following (or comparable) text:

"372 Lakeshore Road West is listed on the Town of Oakville's Heritage Register. Impacts to the landscape elements of this property should be avoided, including but not limited to: mature trees, the low stone walls, and stone pillars at the end of the driveway."

8.9 Erosion and Sediment Control

Prior to the commencement of construction, standard erosion and sediment control (ESC) measures should be designed and implemented and should meet or exceed Ontario Provincial Standards and Specifications (OPSS), and in accordance with Town of Oakville and Conservation Halton standards. The control measures shall be implemented prior to work and be maintained through all phases of the project until vegetation is re-established, and all disturbed ground is permanently stabilized.

8.10 Permitting Requirements

Table 8-1: Permitting Requirements

Agency	Permit / Approval	Comments
Ministry of the Environment, Conservation and Parks	Environmental Activity and Sector Registry (EASR) - Self Registration of Water Taking Activity	For road construction and construction site dewatering.
Ministry of Heritage, Sport, Tourism and Culture Industries	Stage 2 Archaeology Assessment	Required to be completed for identified areas during detailed design.
Ministry of Natural Resources and Forestry	Endangered Species Act	Notification and permitting requirements for species at risk to be determined during detailed design.
Ministry of Natural Resources and Forestry	Licence to Collect Fish for Scientific Purposes	Required if a cofferdam is used during the replacement of the McCraney Creek Bridge.
Fisheries and Oceans Canada	Fisheries Act	Request for Review of activities that have the potential to harm fish and fish habitat.
Environment and Climate Change Canada	Species at Risk Act	To determining permitting requirements under SARA for any impacts to Redside Dace in 14 Mile Creek.
Ministry of the Environment, Conservation and Parks	Environmental Compliance Approvals (ECA)	Sanitary and Storm Sewer infrastructure approvals delegated by MECP under Transfer of Review program
Conservation Halton	Permit under O. Reg. 162/06	Required to develop in areas of natural hazards or to alter a creek.
Town of Oakville	Tree Protection Agreement, Tree Protection Zone Encroachment Permit, Tree Permit	Required for the removal of trees during construction.

9.0 Summary of Proposed Mitigation Measures and Future Commitments

A summary of proposed mitigation measures and commitments to further work is provided in **Table 9-1**.

Table 9-1: Summary of Proposed Mitigation Measures and Future Commitments

	Details	Relevant Organization(s)	ID	Details
1	Stormwater management	Conservation Halton	1.1	Oil/grit separators (OGS) will be installed at various locations. Whenever possible, additional water quality measures have been recommended in addition to the OGS.
			1.2	Offsite LID BMP retrofits have been recommended on a trial basis to provide water quality and will be further evaluated during detailed design.
			1.3	LID BMP source controls to capture 25 mm of precipitation will be influenced by the long-term ground water elevation and should be assessed at the next stages of planning and design.
2	Surface Water Quality	MECP, Conservation Halton & Town of Oakville	2.1	The construction contract shall specify that mitigation measures for erosion and sedimentation from construction operations are required to be implemented by the contractor. An erosion and sedimentation plan is to be submitted to the Conservation Halton during detailed design. Work is to be controlled to prevent the entry of any deleterious materials to watercourses and located downstream of the study area. Refuelling of all vehicles and equipment is to be conducted away from the watercourse to prevent any material from entering the watercourse. Any material (excavated soil, sediment, and backfill material) that is removed during construction is to be placed above the high-water mark and contained in a manner to ensure sediment will not enter the watercourse.
			2.2	Specialized ESC measures specific to Redside Dace protection within 14 Mile Creek, will be utilized in the stabilization of the site. This includes the use of double-row non-woven, wire-backed silt fencing and the installation of staked straw bales between the silt fences.
			2.3	All spills that could potentially cause damage to the environment will be reported to the Spills Action Centre of the Ministry of the Environment, Conservation and Parks. A detailed protocol will be developed during detailed design to be implemented during construction if an incidence should occur.
			2.4	Stormwater management quality control measures will be further evaluated during detailed design.
			2.5	Dewatering methods will be reviewed during detailed design, along with permitting requirements.
3	Disposal of Excess Material and Contaminated Material	Town of Oakville	3.1	Soil characteristics may need to be monitored during excavation activities and if field observations warrant, Sampling may be required to ensure appropriate disposal or re-use of surplus soil.
		Town of Oakville	3.2	Handling and disposal of contaminated soil material during construction will be detailed in the contract specifications during the detailed design stage in accordance with Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04, Records of Site Condition.
		MECP	3.3	Activities involving the management of excess soil should be completed in accordance with the MECP's current guidance document titled Management of Excess Soil – A guide for Best Management Practices (2014) available online.
		MECP	3.4	All waste generated during construction must be disposed of in accordance with MOECC requirements.

	Details	Relevant Organization(s)	ID	Details
4	Fisheries/ Watercourse	Conservation Halton, DFO, MECP	4.1	During the detailed design phase, further communication with the Conservation Halton, DFO and/or MECP will be necessary to determine the need for permitting related to project works
			4.2	If required in 14 Mile Creek, the timing window for in-water works, is July 1 to September 15.
			4.3	If required in Bronte Creek, the timing window for in-water works is July 1 to September 15.
			4.4	If required in McCraney Creek, the timing window for in-water works is June 15 to March 31.
5	Property Impacts	Residents & Town of Oakville	5.1	All impacts to private property will be mitigated where appropriate as documented within this report.
6	Landscaping and Vegetation	Conservation Halton, Residents & Town of Oakville	6.1	Removal of vegetation and disturbance of soils will be minimized.
			6.2	Vegetation removals should be completed prior to the onset of the Breeding Bird period (April 1 st to August 30 th)
			6.3	Staging of the project will limit vegetation disturbance and minimize the amount of time disturbed soil is exposed.
			6.4	A Tree Replacement Plan / Landscape Planting Plan will be prepared during detailed design following the Town of Oakville Tree Protection and Removal Policy. Conservation Halton will be consulted.
			6.5	All tree and shrub plantings within the corridor are to be salt-tolerant, non-invasive, low maintenance, disease/pest resistant and drought tolerant. Native plant species are preferred. Tree and shrub plantings to be selected during detailed design in consultation with Town of Oakville's Forestry Department.
			6.6	Construction impacts at stream crossing areas are to be mitigated with the planting of riparian vegetation. This vegetation should be native, non-invasive, riparian vegetation, as approved by the Conservation Halton.
7	Traffic and Access	Residents, Town of Oakville Halton Region	7.1	A traffic management and construction staging plan will be prepared at the detailed design stage.
			7.2	The pedestrian crossings identified in the ESR should be considered to be a "long list" of potential locations, with ultimate list of pedestrian crossings to be identified during the detailed design phase. Potential interaction between the pedestrian signals and existing traffic signals should be further evaluated at the detailed design phase.
8	Utilities	Utility Companies	8.1	Required utility relocations will be coordinated with relevant companies during detailed design.
9	Noise	Town of Oakville, Residents	9.1	No traffic noise mitigation measures are required.
			9.2	Construction noise control measures are to be implemented. General noise control measures to be referred to or placed into the contract documents, include: <ul style="list-style-type: none"> • The contractor shall ensure that construction equipment is maintained in good operating condition to prevent unnecessary noise. The contractor shall also restrict construction activities to hours prescribed by the Town of Oakville Noise By-law 2008-098. • Identify appropriately low speed limits via signage.

	Details	Relevant Organization(s)	ID	Details
				<ul style="list-style-type: none"> Use industry standard equipment and vehicle idle reduction initiatives, as possible. Provide direction for equipment which must be left running to have the maximum practical separation distance from potential receptors. Establish communication and requirements for contractor to reduce or eliminate tailgate banging on material delivery.
10	Property Requirements	Town of Oakville	10.1	Limited property purchase will be required. Property purchase requirements to be minimized where possible.
11	Archaeology	MHSTCI	11.1	A Stage 2 Archaeological Assessment will be completed as part of the detailed design phase.
			11.2	Prior to the commencement of a Stage 2 Archaeological Assessment the Mississaugas of the Credit First Nation, the Six Nations of the Grand River, and the Haudenosaunee Development Institute will be contacted to determine the nature of indigenous participation.
			11.3	If any archaeological artifacts are located during construction, work in the area will cease and the MHSTCI will be contacted. If human remains are encountered during construction, the MHSTCI and the Registrar of the Cemeteries Regulation Unit will be contacted.
12	Wildlife	Environment and Climate Change Canada	12.1	Vegetation clearing and grubbing should occur between September 1 st and March 31 st to avoid harming breeding birds.
			12.2	Vertical facings suitable for nesting by bird species (i.e. bridge structures, soil piles, and excavation areas) should be covered using tarps, or plastic sheets, or any other means of preventing nesting within the construction zone. Such barriers should be installed prior to March 15 and shall remain in place until August 30, or until the completion of rehabilitation works.
13	Built Heritage and Landscape Assessment	MHSTCI	13.1	Protection/retention measures for the identified built heritage features will be further evaluated at the detailed design phase.
14	Construction Dewatering	MECP	14.1	Permits for construction dewatering will be acquired as appropriate.
15	Air Quality	MECP	15.1	<p>The following measures to minimize/mitigate impacts on air quality should be included in the contract specifications:</p> <ul style="list-style-type: none"> Use new or well-maintained heavy equipment during construction; Fit equipment with muffler/exhaust system baffles, and/or engine covers; Comply with operating specifications for heavy equipment and machinery; Minimize operation and idling of gas-powered equipment, in accordance with Town of Oakville's Anti-Idling By-law (2002-135); Stabilize stockpiled excavated soils; Cover or otherwise contain loose construction materials that have potential to release airborne particulates; Spray water to minimize the release of dust and/or use chemical dust suppressants (non-chloride-based); and Minimize the duration of soil exposure.

10.0 Implementation

10.1 Construction Phasing

The Town of Oakville identifies completion of the project in four phases. The recommended phasing schedule differs from the schedule contained in the Capital Forecast due to the need to accommodate the future Berta Point Pumping Station and 2 twin forcemains along Lakeshore Road West from East Street to West River Street / Triller Place. The timing of construction has not been confirmed but is expected to start around 2024. The recommended phasing is as follows:

Phase 1 – Lakeshore Road West from Fourth Line to Dorval Drive (including replacement of McCraney Creek Bridge):

Detailed design 2022, land acquisition and utility relocation 2023, construction 2024

Phase 2 – Lakeshore Road West from Fourth Line to Sandwell Drive:

Detailed design 2023, land acquisition and utility relocation 2024, construction 2025-2026

Phase 3 – Lakeshore Road West from Sandwell Drive to Third Line:

Detailed design 2023, land acquisition and utility relocation 2024, construction 2025-2026

Phase 4 – Lakeshore Road West from Mississaga Street to Third Line:

Detailed design 2024, land acquisition 2025 and utility relocation 2026, construction 2027

10.2 Notable Items to be Considered in Phase 5 – Implementation

During this Environmental Assessment (EA), several items were recorded as needing further consideration or discussion after the EA is filed and the project moves into Phase 5 – Implementation. Notable items include the following:

- The lane reduction from 4 lanes to 3 lanes from Mississaga Street to Bronte Road is to be deferred until such time as the east / west extension of Wyecroft Road (west of Bronte Road) is completed.
- A Stage 2 Archaeological Assessment is required. This is to be completed as part of the detailed design.
- The existing trees located along the Lakeshore Road corridor will be preserved, where possible. Where tree removals are required these trees will be replaced. A

Tree Replacement Plan will be developed during the detailed design phase, consistent with town policy. The Tree Replacement Plan will recommend native trees and vegetation and identify areas for their planting.

- As part of the detailed design, traffic signal timings and traffic progression should be reviewed and optimized.
- Access control and access management along Lakeshore Road West should be reviewed further for opportunities to combine commercial accesses where possible.
- The proposed pedestrian crossing locations and crossing types identified in this report are to be reviewed further during detailed design. Careful planning will be required to ensure no conflict between the proposed crossings and the transit stops.
- The recommended LID BMPs within the right-of-way should be further investigated by assessing groundwater and bedrock elevations and ensuring the required clearances can be obtained. Detailed stormwater management commitments are discussed in Section 7.2.7 of this report.

11.0 References

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