



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

June 9, 2021



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Prepared by:

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June 9, 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.

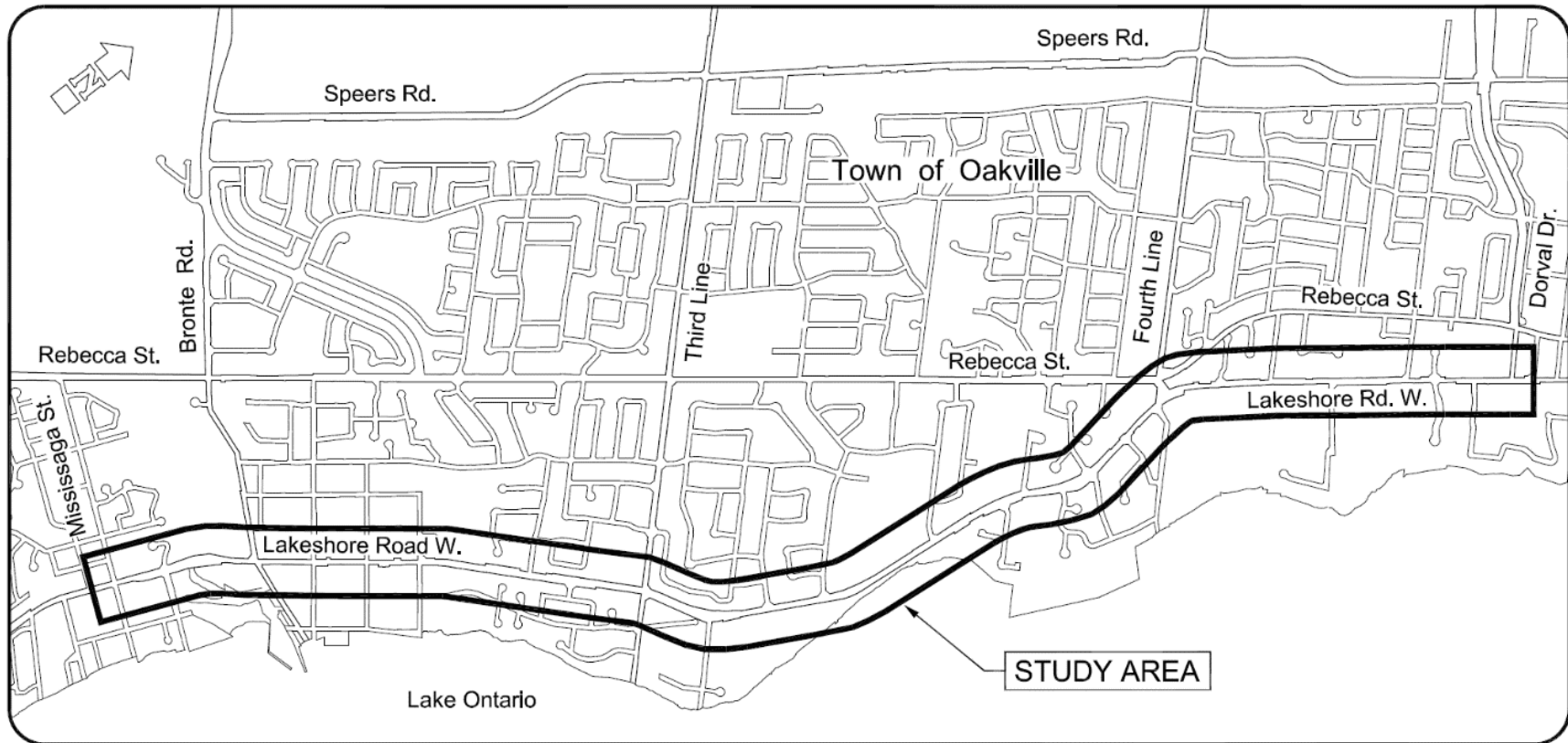
The purpose of this Class EA study was to determine what improvements are required for Lakeshore Road West, to select the preferred design and to identify any measures needed to mitigate impacts of the works.

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 with Conservation Halton Staff – Stormwater Management Focus (Technical Agency Committee)	January 30, 2017

Meeting	Date
Meeting)	
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
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.	November 16, 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
Public Information Centre No. 3	April 6 to April 20, 2021 (interested individuals were encouraged to continue to submit comments past April 20, 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: Mississauga 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:

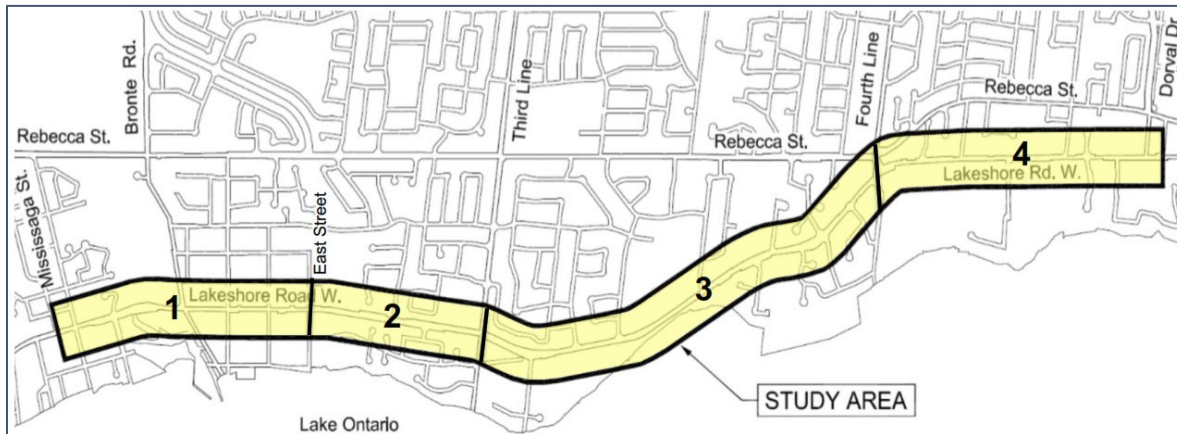
- 3.3 metre through lanes (no centre turn lane)
- 1.8 metre on road bike lanes with a 0.5m painted buffer
- 1.5 metre continuous sidewalk on the north side and 3.0 metre continuous multi-use path on south side
- Convert to urban-standard curb & gutter cross-section with storm sewer system
- Intersection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

Study Corridor Blocks

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

- Block 1 - Mississauga 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

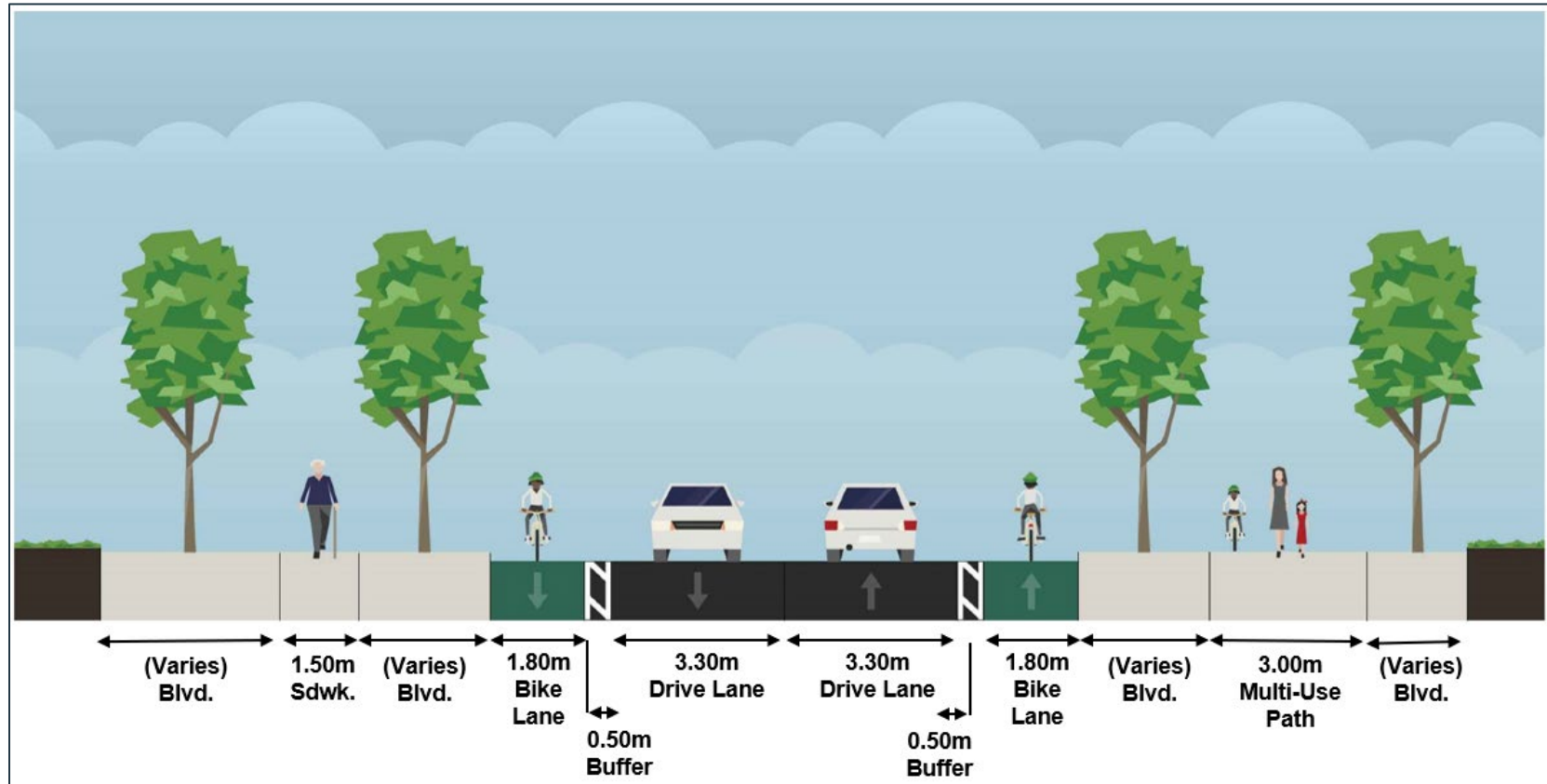
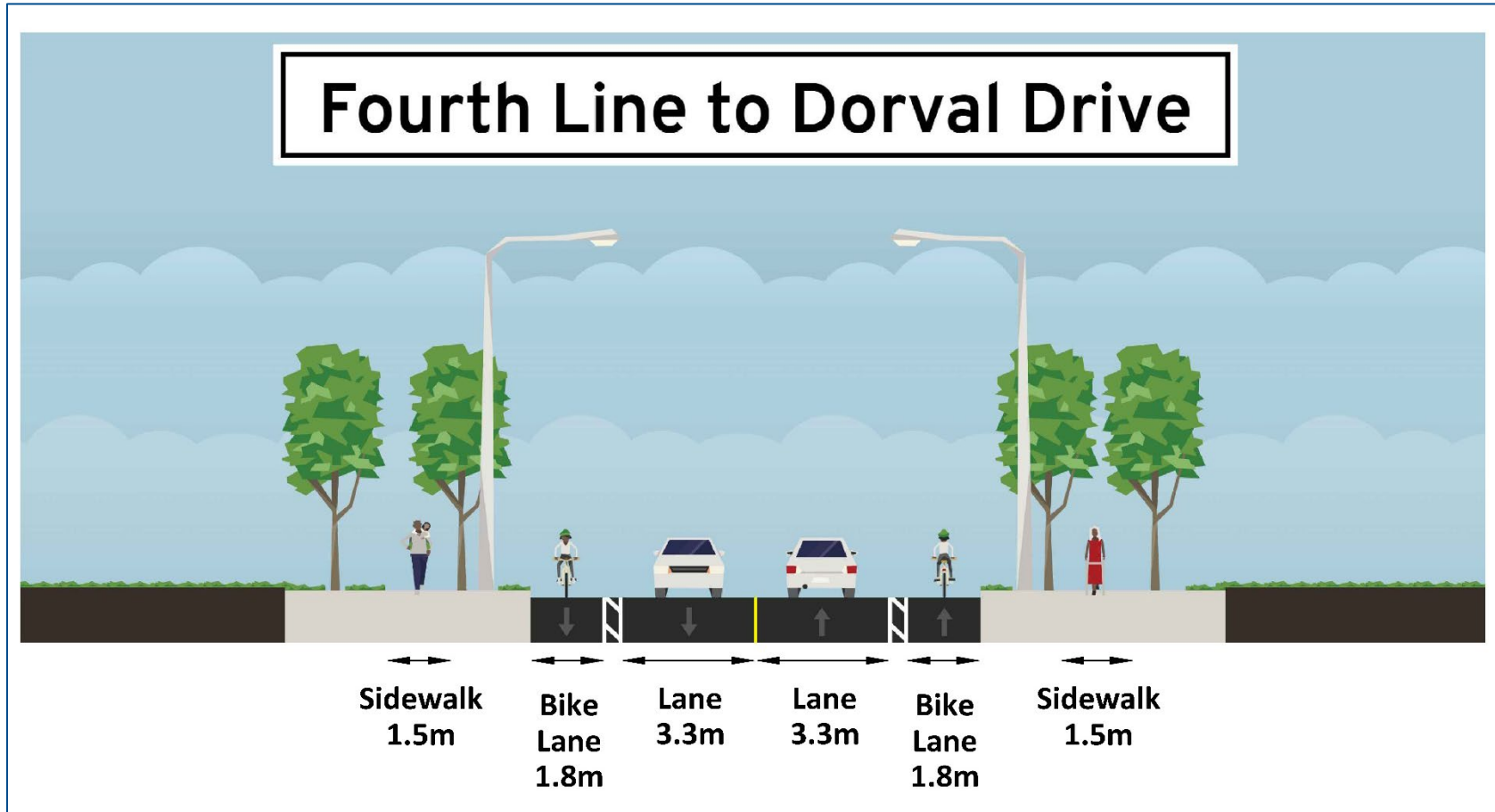


Figure E-5: Block 4 - Fourth Line to Dorval Drive – Preferred Design



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 Mississaga Street to Dorval Drive.

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 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-4) 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.

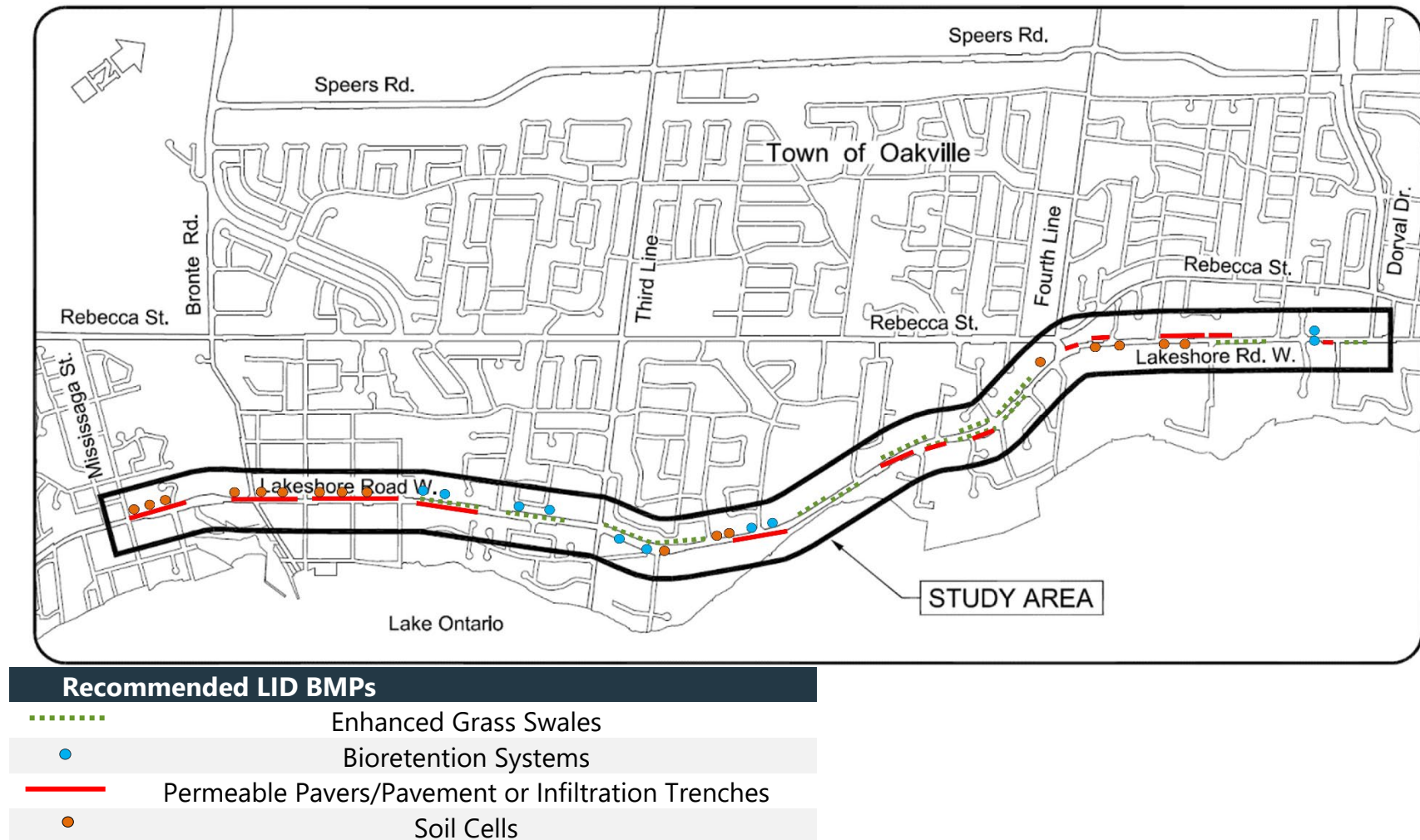
14 Mile Creek Bridge

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



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 Mississaga 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 property, utilities or engineering.

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 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. 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 Mississauga 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 Mississauga 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 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 – Mississauga 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.