

Metrolinx / City of Mississauga

Draft Arborist Report

Dundas Bus Rapid Transit Mississauga East

Date: November 2021

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Executive Summary

Project Background and Study Purpose

In 2020, Metrolinx completed the Dundas Bus Rapid Transit Initial Business Case, which recommends a preferred Bus Rapid Transit alignment, and supportive service concept along Dundas Street between Kipling Station, in the City of Toronto, through the City of Mississauga and Halton Region, to Highway 6 in the City of Hamilton. AECOM Canada Limited (AECOM) was retained by Metrolinx and the City of Mississauga to evaluate the proposed 48-kilometre transit corridor. The evaluation involves the completion of the Preliminary Design, Preliminary Design Business Case and Transit Project Assessment Process.

A Transit Project Assessment Process is a focused environmental impact assessment process created specifically for transit projects. The process involves a pre-planning phase followed by a regulated (up to 120 days) consultation and documentation period. These phases include consultation, assessment of impacts, development of measures to mitigate negative impacts, and documentation. Consultation occurs with the public, stakeholders and Indigenous Nations throughout the process. Following these phases, there is a 30-day public review period where the public has the opportunity to review the Environmental Project Report and provide additional comments, followed by a 35-day Minister's review period.

The preliminary design phase will build upon the pre-planning completed as part of the Transit Project Assessment Process. In this phase, the project team will utilize the environmental impact assessment from the Transit Project Assessment Process to refine the Bus Rapid Transit design to a 30% design level. The Preliminary Design Business Case analyzes the Dundas Bus Rapid Transit corridor against strategic objectives, financial and economic impacts and operations considerations. The Preliminary Design Business Case will compare the corridor against a business-as-usual scenario (i.e., without the project).

In 2018, the Dundas Connects Master Plan (Dundas Connects) was completed by the City of Mississauga. It guides future development and intensification along the Dundas Street Corridor in the City of Mississauga. Bus Rapid Transit, cycling infrastructure, and an enhanced public realm for pedestrians were among the recommendations in the Plan. Dundas Connects is being implemented through various studies and initiatives, including this Transit Project Assessment Process.

The Dundas Bus Rapid Transit Mississauga East Project (the Project) includes the planning and design of a 7-kilometre Bus Rapid Transit corridor from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of

Mississauga. This Arborist Report has been prepared to support the Dundas Bus Rapid Transit – Mississauga East Transit Project Assessment Process.

Tree Inventory, Tree Impact Analysis and Tree Preservation Plan

In support of the Dundas Bus Rapid Transit Mississauga East Project an in-field tree inventory and a desktop-based tree impact analysis were conducted, in order to assess and quantify the existing condition of onsite trees as well as determine their potential impacts due to the Project. Tree data were collected and analysed in compliance with applicable municipal tree protection by-laws and guidelines, as well as applicable conservation authority guidelines and arboricultural standards set by the International Society of Arboriculture.

One thousand, five hundred and sixty-five (1,565) trees were inventoried and assessed for the Project. Based on the results of the tree impact analysis it is recommended that 922 trees will have to be removed in order to accommodate the construction of the Project whilst a further 133 trees are recommended for injury with protection. A further 430 trees are recommended for protection without injury and the remaining 80 trees are considered to be potential hazard trees, due them being dead, in poor condition or classed as a hazard tree upon field assessment but are being retained. In terms of tree compensation 1,535 replacement trees and a monetary value of \$377,419.29 is required to replace trees being removed or injured (tree injuries in City of Toronto only), whilst a cash-in-lieu amount of \$120,376.50 is required as an alternative to tree replacement.

The purpose of the following Arborist Report is to compile detail the results of the onsite tree inventory and subsequent desktop-based tree impact analysis, in order to quantify and illustrate a detailed tree removal and preservation plan in support of the Project and to fulfil the requirements of applicable tree protection by-laws and guidelines.

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Appendix A. Tree Assessment Results

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1. Introduction

1.1 Background

Previous municipal planning studies and the Metrolinx Initial Business Case confirmed the need for improved bus transit infrastructure along Dundas Street. Metrolinx is now advancing plans for the Dundas Bus Rapid Transit corridor. More than 20 kilometres of the 48-kilometre Bus Rapid Transit corridor will operate in bus lanes or in a dedicated right-of-way, separate from other traffic, allowing faster and more reliable transit connections.

In 2020, Metrolinx completed the Dundas Bus Rapid Transit Initial Business Case, which recommends a preferred Bus Rapid Transit alignment, and supportive service concept along Dundas Street between Kipling Station, in the City of Toronto, through the City of Mississauga and Halton Region, to Highway 6 in the City of Hamilton. AECOM Canada Limited (AECOM) was retained by Metrolinx and the City of Mississauga to evaluate the proposed 48-kilometre transit corridor. The evaluation involves the completion of the Preliminary Design, Preliminary Design Business Case and Transit Project Assessment Process.

A Transit Project Assessment Process is a focused environmental impact assessment process created specifically for transit projects. The process involves a pre-planning phase followed by a regulated (up to 120 days) consultation and documentation period. These phases include consultation, assessment of impacts, development of measures to mitigate negative impacts, and documentation. Consultation occurs with the public, stakeholders and Indigenous Nations throughout the process. Following these phases, there is a 30-day public review period where the public has the opportunity to review the Environmental Project Report and provide additional comments, followed by a 35-day Minister's review period.

The preliminary design phase will build upon the pre-planning completed as part of the Transit Project Assessment Process. In this phase, the project team will utilize the environmental impact assessment from the Transit Project Assessment Process to refine the Bus Rapid Transit design to a 30% design level. The Preliminary Design Business Case analyzes the Dundas Bus Rapid Transit corridor against strategic objectives, financial and economic impacts and operations considerations. The Preliminary Design Business Case will compare the corridor against a business-as-usual scenario (i.e., without the project).

In 2018, the Dundas Connects Master Plan (Dundas Connects) was completed by the City of Mississauga. It guides future development and intensification along the Dundas Street Corridor in the City of Mississauga. Dundas Connects was developed over a 2-year period with extensive consultation from the public. It was endorsed by City Council on June 18, 2018. Bus Rapid Transit, cycling infrastructure, and an enhanced public realm for pedestrians were among the recommendations in the Plan. Dundas Connects is being implemented through various studies and initiatives, including this Transit Project Assessment Process.

The Dundas Bus Rapid Transit Mississauga East Project (the Project) includes the planning and design of a 7-kilometre Bus Rapid Transit corridor from Confederation Parkway to the City of Toronto boundary at Etobicoke Creek, within the City of Mississauga. The Project has been submitted under the Government of Canada's Investing in Canada Infrastructure Program and is currently awaiting approval. This Arborist Report has been prepared to support the Dundas Bus Rapid Transit – Mississauga East Transit Project Assessment Process.

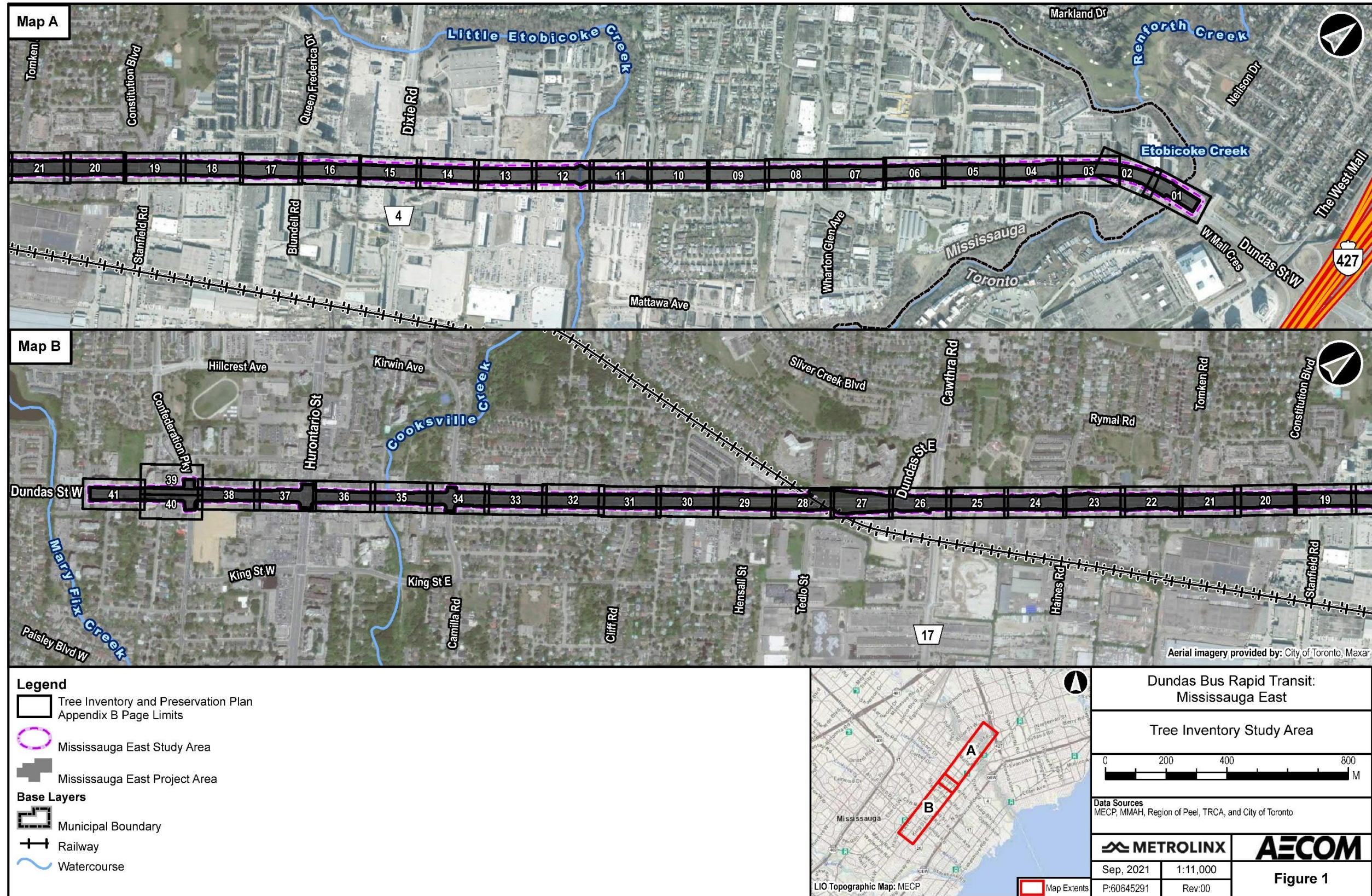
1.2 Purpose

The purpose of the tree inventory and tree impact analysis assignment is to assess the general health and structure of onsite trees as well as determine their potential impacts, due to the Project. The City of Mississauga and City of Toronto requires an Arborist Report and Tree Preservation Plan for all construction related applications where trees are in proximity to the proposed work. Therefore, this Arborist Report has been prepared in accordance with the City of Mississauga's tree protection by-laws and guidelines, the City of Toronto's tree protection by-laws and guidelines as well as the Toronto and Region Conservation Authority's *Guideline for Determining Ecosystem Services* (2018).

1.3 Study Area

The Project Area is the area of direct disturbance required for the construction and operation of the Project. It includes the proposed alignment for the Project and additional area for potential refinements as the design progresses, which is currently at 10% detailed design. The Project Area is shown in **Figure 1**. The Study Area for the Project's tree inventory is defined as the Project Area plus a 6 metre, 10 metre or 12 metre Buffer Area, as required by the City of Mississauga's tree protection protocols (6 metres), the City of Toronto's *Ravine and Natural Feature Protection By-law* (12 metres) and Toronto Region Conservation Authority guidelines (10 metres). The Study Area is also shown in **Figure 1**.

Figure 1: Tree Inventory Study Area



It should also be noted that the Study Areas for Mississauga East (this Arborist Report) and Toronto (a separate Arborist Report) have an overlapping area of approximately 7,900 m² which includes 109 trees. Given that Mississauga East is to be prioritized, these 109 trees and their applicable tree compensation, if required, are included within this Arborist Report and are omitted from the Toronto Arborist Report in order to avoid duplicate information. The details of these 109 overlapping will also be included in the Toronto Arborist Report for reference purposes only.

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2. Applicable By-laws & Regulations

2.1 City of Mississauga

Application to the City of Mississauga for a permit is required prior to undertaking any work that includes the injury or removal of a tree. The City of Mississauga's tree protection by-laws provide for the protection of trees on both private and City-owned property.

2.1.1 Private Tree Protection By-law

The City of Mississauga's *Private Tree Protection By-law 254-2012 (2013)* prohibits the injury or destruction of Heritage Trees without approval under the *Ontario Heritage Act (2005)* and the injury or destruction of three or more trees with a diameter at breast height of equal to or greater than 15 centimetres on a lot within one calendar year without a permit (including dead and/or dying trees). Application for a permit includes the submission of an Arborist Report and Tree Preservation Plan as required by the commissioner.

2.1.2 Encroachment By-law

Trees are also protected by the City of Mississauga's *Encroachment By-law 57-04 (2004)* which prohibits unauthorized use of City of Mississauga's property including unauthorized mowing, cutting, pruning or removal of trees or shrubs by individuals or corporations for their own purposes. Removal of trees through the site plan process are subject to the *Site Plan Control By-Law (2006)*.

2.1.3 Parks By-law

Trees located within the City of Mississauga parkland are protected by *Parks By-law 197-2020 (2020)* which prohibits the planting, pruning, removal or damage of any type to trees within parks. Permission must be obtained by the City regulators for the removal or destruction of any tree within Parks property.

2.1.4 Tree Preservation and Protection Standards

The City of Mississauga's *Tree Preservation & Protection Standards (2017)* provides guidance and procedures for tree preservation and protection for development/utility applications on Public Lands. Compensation for individual trees on public property

within the City of Mississauga is determined by diameter at breast height. Replacement tree ratios are based on 60 millimetre caliper deciduous trees, and 1.8 metres tall coniferous trees.

2.2 City of Toronto

Application to the City of Toronto for a permit is required prior to undertaking any work that includes the injury or removal of a tree, placing or dumping fill or refuse, or altering the existing grade of land. The City of Toronto's tree protection by-laws provide for the protection of trees on both private and City-owned property. As per page 2 of the *Guidelines for Completion of an Arborist Report* (2011), trees protected by the by-laws are classified as one of five categories based on location and measurable diameter at breast height:

- Trees with diameters of 30 centimetres or more, situated on private property on the subject site.
- Trees with diameters of 30 centimetres or more, situated on private property, within 6 metres of the subject site.
- Trees of all diameters situated on City-owned parkland within 6 metres of the subject site.
- Trees of all diameters situated on lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection.
- Trees of all diameters situated within the City road allowance adjacent to the subject site.

Trees protected under the City of Toronto's tree protection by-laws are subjected to tree protection zones and requirements laid out within the City of Toronto's *Tree Protection Policy and Specifications for Construction Near Trees* (2016). For the purposes of this report, the "subject site" will be represented by the components of the proposed design (i.e., Project Area) illustrated in figures provided in **Appendix B**.

2.2.1 City of Toronto Private Tree By-law

The City of Toronto's *Private Tree By-law* (Municipal Code, Chapter 813, Article III) protects significant trees on private property. Category 1 includes trees with diameters of 30 centimetres or more, situated on private property within 6 metres of the Project Area. Category 2 includes trees with diameters of 30 centimetres or more situated on private property within the Study Area. Injury or removal of these trees requires a permit. For the purposes of this Arborist Report, trees of all diameters situated on

private property within the Project Area have been identified as Category 1, whilst trees of all diameters situated on private property within the Buffer Area have been identified as Category 2.

2.2.2 City of Toronto Parks By-law

The City of Toronto's *Parks By-law* (Municipal Code, Chapter 608, Article VII) prohibits all activities that may impact trees in parks. Category 3 includes trees of all diameters situated on City-owned parkland within the Study Area. Injury or removal of these trees requires written approval of the General Manager of Parks, Forestry and Recreation. For the purposes of this Arborist Report, trees of all diameters situated on City-owned parkland within the Study Area have been identified as Category 3.

2.2.3 City of Toronto Ravine and Natural Feature Protection By-Law

The City of Toronto's *Ravine and Natural Feature Protection By-law* (Municipal Code, Chapter 658) regulates all properties either partially or entirely located within a ravine protected area. Trees regulated under this code are classified as Category 4, which includes trees of all diameters situated within 12 metres of any construction activity. This by-law promotes the management, protection and conservation of ravines and associated natural and woodland areas. Application to the City of Toronto for a permit may be required prior to undertaking any work that includes the injury or removal of a tree, or dumping fill or refuse, or altering the existing grade of land.

2.2.4 City of Toronto City Street By-Law

The City of Toronto's *Street Tree By-law* (Municipal Code, Chapter 813, Article II) protects all trees situated on City Streets. Category 5 includes trees of all diameters situated within the City road allowance within the Study Area. For the purposes of this report, trees of all diameters situated on City road allowance and other City-owned property (excluding parks) within the Study Area have been identified as Category 5.

2.3 Region of Peel

At the time of this Arborist Report being done there are no applicable tree protection by-laws or guidelines for trees located within Region of Peel right-of-way. Therefore, tree protection guidelines from the City of Mississauga's *Tree Preservation & Protection Standards* (2017) will be utilized for tree impact analyses parameters and tree protection measures for Region-owned trees within the Project, with the exception of permitting and compensation. Permission for the removal or injury of any Region-owned trees will need to be obtained as part of the Project.

2.4 Tree Compensation

2.4.1 Metrolinx Vegetation Guideline

Tree compensation will be calculated according to the *Metrolinx Vegetation Guideline (2020)*. According to the *Metrolinx Vegetation Guideline (2020)*, a variety of compensation approaches can be used to determine tree compensation based on location, ownership and applicable by-laws of the trees to be removed. **Appendix A1** outlines the compensation approach that has been used to determine the recommended compensation for each tree that is required to receive compensation in the City of Mississauga, whilst **Appendix A2** outlines the compensation approach that has been used to determine the recommended compensation for each tree that is required to receive compensation in the City of Toronto. .

Metrolinx compensation approaches include the *Baseline Compensation Approach*, a 1:1 replacement ratio for trees 10 centimetres diameter at breast height or greater for municipalities that do not have tree compensation guidelines (**Table 2**), the *Ecological Compensation Approach*, based on Toronto and Region Conservation Authority tree compensation rates for regulated areas, the *By-Law Compensation Approach*, which defers to applicable by-laws that have an established compensation approach, or a combination of *By-Law and Ecological Compensation*, where, if where ecological compensation is greater than by-law/regulation requirements, the by-law/regulation shall be followed and the difference between the two will be implemented through ecological compensation. The various compensation approaches are shown in **Table 1**. With respect to trees under the *By-Law Compensation Approach*, the City of Mississauga or the City of Toronto compensation requirements, respectively, apply.

For every regulated tree that is recommended to be removed in the City of Mississauga and the City of Toronto, compensation in the form of tree plantings will be required. Category 4 trees within the City of Toronto also require compensation for injury. If there is insufficient space to plant the trees on the subject property, cash-in-lieu may be provided to the City of Toronto and to the City of Mississauga for park trees and regulated private trees. It should be noted that both the City of Mississauga and the City of Toronto will only consider large-growing, native shade trees as a compensation tree. **Table 3** provides a summary of the tree replacement ratios and appraisal values for public trees within the City of Mississauga, per the *Tree Preservation and Protection Standards (2017)*, whilst **Table 4** provides a summary of the tree replacement ratios for regulated private trees and park trees within the City of Mississauga, per the *Metrolinx Vegetation Guideline (2020)*. Furthermore, **Table 5** provides a summary of tree replacement ratios as per requirements based on the City of Toronto's *Memo Tree By-laws – Compensation Planting Ratios (2019)*; and **Table 6** shows the ratios used in the *Ecological Compensation Approach* which will apply to regulated areas within both cities.

Table 1: Metrolinx Compensation Approach Based on Tree Location, *Metrolinx Vegetation Guideline (2020)*

Location	Applicable By-law with Compensation Approach	Within A Designated Natural Area	Compensation Approach
Metrolinx ROW	No	No	Baseline Compensation
Metrolinx ROW	No	Yes	Ecological Compensation
Public/Private Land	Yes	No	By-Law Compensation
Public/Private Land	Yes	Yes	By-law + Ecological Compensation
Public/Private Land	No	Yes	Ecological Compensation
Public/Private Land	No	No	Baseline Compensation

Table 2: Baseline Compensation Replacement Table, per *Metrolinx Vegetation Guideline (2020)*

Diameter at Breast Height (centimetres)	Replacement Ratio
≥10 centimetres	1:1

Table 3: By-Law Compensation Replacement Table for Public Trees (City of Mississauga), per City of Mississauga *Tree Preservation and Protection Standards (2017)*

Diameter at Breast Height (centimetres) of Tree Being Removed	Replacement Ratio	Appraisal Value
6 to 15	1:1	Based on CTLA Trunk Formula Method
16 to 30	2:1	Based on CTLA Trunk Formula Method
31 to 45	3:1	Based on CTLA Trunk Formula Method
46 to 60	4:1	Based on CTLA Trunk Formula Method
61 to 75	5:1	Based on CTLA Trunk Formula Method
76 to 90	6:1	Based on CTLA Trunk Formula Method
91 to 105	7:1	Based on CTLA Trunk Formula Method
106 to 120	8:1	Based on CTLA Trunk Formula Method
greater than 120	9:1	Based on CTLA Trunk Formula Method

Table 4: By-Law Compensation Replacement Table for Park Trees and Regulated Private Trees (City of Mississauga), per *Metrolinx Vegetation Guideline (2020)*

City of Toronto Tree Category	Replacement Ratio	Cash-in-lieu (per replacement tree)
Park Trees	3:1	\$574.50
Private Trees 15 to 50 centimetres	1:1	\$574.50
Private Trees greater than 50 centimetres	2:1	\$574.50

Table 5: By-Law Compensation Replacement Table (City of Toronto), per the City of Toronto’s *Memo Tree By-laws – Compensation Planting Ratios (2019)*

City of Toronto Tree Category	Replacement Ratio	Cash-in-lieu (per replacement tree)
Private Trees – Category 2 Removal (healthy tree)	3:1	\$583.00
Private Trees – Category 2 Removal (poor tree)	1:1	\$583.00
Park Trees – Category 3 Removal	3:1	\$583.00
Ravine and Natural Feature Protection – Category 4 Removal (poor tree)	1:1	\$583.00
Ravine and Natural Feature Protection – Category 4 Removal (healthy trees <10 centimetres diameter at breast height)	1:1	\$583.00
Ravine and Natural Feature Protection – Category 4 Removal (Due to Construction)	3:1	\$583.00
Ravine and Natural Feature Protection – Category 4 Injury	1:1	\$583.00
City Street Trees – Category 5 Removal	3:1	\$583.00

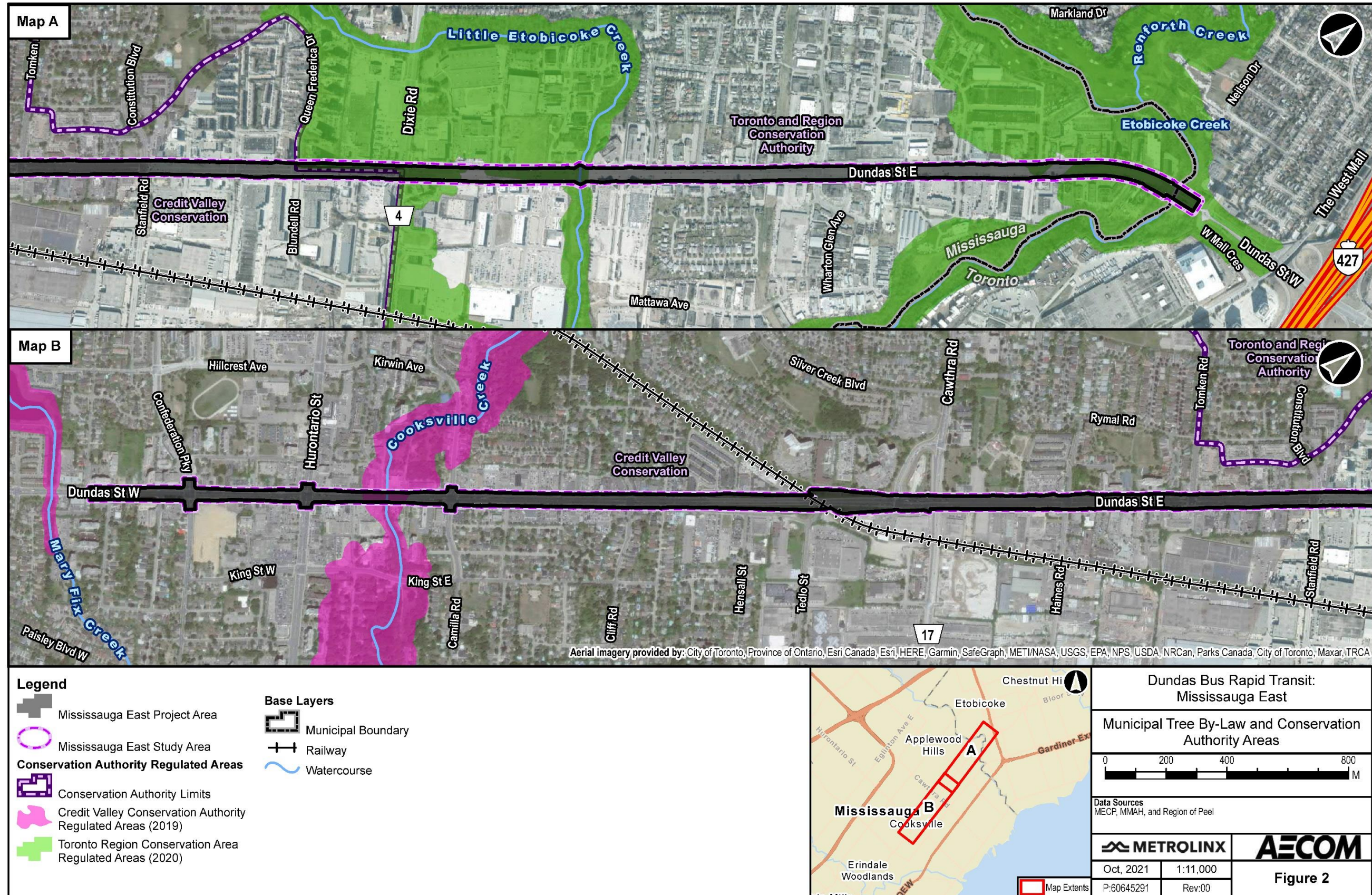
Table 6: Ecological Compensation Replacement Table, per *Metrolinx Vegetation Guideline (2020)*

Diameter at Breast Height (centimetres) of Tree Being Removed	Replacement Ratio
10.1 to 20	3:1
20.1 to 30	10:1
30.1 to 40	15:1
40.1 to 50	20:1
50.1 to 60	30:1
60.1 to 70	40:1
70.1 +	50:1

2.5 Species at Risk

The Endangered Species Act, 2007, provides for the conservation of threatened, rare or special concern species and their habitat in Ontario. The Endangered Species Act regulates the recovery or any other aspect involving a protected species. Specific regulations for individual species can be found in the provincial regulations. Any protected species found within the Study Area that may be impacted by the proposed work will be identified and subjected to applicable regulations.

Figure 2: Municipal Tree By-law and Conservation Authority Areas



2.6 Other Important Tree-related Information

During the tree inventory other important information about individual trees will be collected. This will include but not be limited to memorial trees or other factors that may be of importance. Memorial trees or trees with special status will be noted and confirmed with the respective municipal authority.

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3. Methods

The tree inventory and assessment were completed by AECOM's International Society of Arboriculture Certified Arborists on July 27 to 29 and August 3 to 4, 2021. Data were collected using the accepted standard arboriculture techniques as outlined in the Council of Tree & Landscape Appraisers' (CTLA) *Guide for Plant Appraisal, 9th Edition* (2000), as well as the City of Mississauga's and City of Toronto's respective tree protection protocols, where applicable.

3.1 Tree Inventory

All trees with a measurable diameter at breast height that were within the Study Area and were located within the City of Mississauga's right-of-way, the City of Toronto's right-of-way and Ravine and Natural Feature Protection areas, and Toronto and Region Conservation Authority/Credit Valley Conservation Authority regulated areas were inventoried in accordance with the aforementioned arboricultural best practices and municipal guidelines. Additionally, all trees with a diameter at breast height of equal to or greater than 15 centimetres on private property that were within the Study Area were also inventoried. The locations of all identified trees were recorded using an SX Blue II GPS unit and Samsung tablet or smartphone.

3.2 Tree Assessment

The assessment included a visual examination of above-ground parts for each measurable tree. These trees were not inspected at height, probed, cored, or dissected, and excavation for detailed root crown inspection was not completed. Since some symptoms may only be present seasonally, the extent of observation that can be made may be limited by the time of year in which the assessment took place. As this tree inventory was conducted during the summer and leaf-on season, all trees underwent a full crown assessment by examining the proportion of live crown. It is understood that trees are living organisms and their health and vigour are continually changing over time due to factors such as seasonal variations and changes in site conditions. For this reason, the assessment presented in this report is valid at the time of inspection and no guarantee is made about the continued health of trees that were deemed to be in good, fair or poor condition.

In accordance with the aforementioned guidelines, all trees with a measurable diameter at breast height were to be identified, sized and assessed for condition. The visual inspection included recording abiotic and biotic disorders as well as structural defects. These defects and disorders are listed within the Observations/Comments column of

Appendix A1 (City of Mississauga trees) and **Appendix A2**(City of Toronto trees). The condition rating designated to each tree was based on the results of the basic assessment. The hazard potential of trees was assessed using the method outlined in the International Society of Arboriculture publication *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas – 2nd Edition* (Matthey and Clark, 1994). Using this guide, an overall condition rating (i.e., dead, hazard, poor, fair, or good) was given to each tree included in the inventory.

- Dead:** A specimen tree is considered dead when it has no living tissue.
- Hazard:** The specimen tree could either be alive or dead but the tree in its part could pose an imminent hazard to people or property during normal weather conditions. These trees have the potential for splitting, breaking and/or falling over during inclement weather, and because of their proximity to various targets (i.e., people or property), could cause personal injury and/or severe damage to municipal infrastructure and/or private property.
- Poor:** Trees in poor condition show major symptoms of decline. At least 50% of main scaffold branches are dead, missing or in diseased state. The trunk shows evidence of advanced rot, deadwood or is hollow throughout. Twig development on the main branched or throughout the canopy is poor and may have limited sucker growth. Callus growth around wounds is minimal. A tree in poor condition could decline further to become a safety hazard. Removal prior to development should be considered if it is considered a hazard tree.
- Fair:** Trees in fair condition show moderate symptoms of decline in lower canopy or scaffold branches, but more than 50% of scaffold branches are present and viable. The trunk shows limited evidence of rot or insect damage. Good callus growth is present near wound areas. Trees that have scaffold branches that are healthy, but are in a “Y” formation may also be included in this category, if “included-bark” is evident as the risk of splitting or breakage increases as the tree matures. Removal or preservation of these trees depends on the location of the specimen and associated target potential, and would depend on the species, and its tolerance to grading, trenching and surviving in an urban environment. Some major arboricultural maintenance may be required and may include major scaffold or secondary branch removal, bracing and/or cabling.
- Good:** The specimen tree shows no symptoms of decline in the trunk, and all scaffold branches are present and are in good condition. Most scaffold

branches are at right angles to the trunk, and show good vigour. Small amounts of dead wood may be present in secondary branches, but account for less than 25% of the canopy. Depending on the grading in the immediate area, a tree in good condition would be recommended for preservation. Such a tree would typically survive to maturity without major arboricultural maintenance.

3.3 Tree Impact Analysis

Using data collected during the tree inventory and assessment, a tree impact analysis was performed using ESRI ArcGIS software. Determination of each tree's recommended action (i.e. remove, minor injury and protect, injure and protect, protect or retain) were based on several factors including each tree's current condition and its location in relation to the Project Area. As per the respective tree protection guidelines for each municipality, a recommended tree protection zone was applied around each tree. The tree protection zone is an area around each tree, typically established based on the species and size of the tree and is intended to provide a buffer protecting the tree from potential impacts, including root and soil compaction and mechanical damage of above-ground *parts*.

As such tree protection zone for the trees within the City of Mississauga were determined based on each tree's diameter class, as per the Tree Protection Zone table within the *Tree Preservation and Protection Standards* (2017). For trees within the City of Toronto, per **Table 1** within the *Tree Protection Policy and Specifications for Construction Near Trees* (2016), a tree protection zone for a tree found within a non-Ravine and Natural Feature Protection Ravine and Natural Feature Protection area was determined based on the tree's diameter class, whilst for a tree found within an Ravine and Natural Feature Protection area the tree protection zone was determined based on either the tree's dripline or its diameter class, whichever was largest. Furthermore, based on a directive from the Toronto and Region Conservation Authority, trees that were located within a Toronto and Region Conservation Authority regulated area were to have a tree protection zone that was 1 metre beyond the dripline. As such, for the purposes of this tree impact analysis the largest tree protection zone (i.e., diameter class or dripline +1 metre) was used for trees found within a Toronto and Region Conservation Authority regulated area. Generally, the following guidelines are followed in obtaining a tree's recommended action:

- Trees with equal to or greater than 40% of its tree protection zone affected by proposed work activities are recommended for **removal** as there would likely be negative impacts to the tree.

- Trees with 25% to 39% of its tree protection zone affected by proposed work activities are recommended for **injury and protection** in order to mitigate further damage to the tree's below-ground parts and above-ground parts.
- Trees with 0% to 24% of its tree protection zone affected by proposed work activities are recommended for **minor injury and protection** in order to mitigate further damage to the tree's below-ground parts and above-ground parts.
- Trees with tree protection zones that are not impacted by the proposed work activities that are found within the Buffer Area or within 2 metres of the Buffer Area are recommended for **protection with no injury**, in order to mitigate the chances of accidental injury from adjacent work activities.
- Trees with tree protection zone found greater than 2 metres from the outside of the Buffer Area are recommended for **retention with no protection** as it is unlikely that there would be negative impacts to the tree.
- Hazard trees, as well as trees found to be in poor or dead condition that could pose a hazard, that are within the Buffer Area or outside of the Study Area that are not being affected by the proposed work will be identified as a **potential hazard** for safety reasons. It will be at the discretion of Metrolinx and the City of Mississauga if these trees are to be removed.

3.4 Tree Valuation

As outlined in the City of Mississauga's *Tree Preservation & Protection Standards* (2017), a Tree Appraisal Value using the Trunk Formula Method for City of Mississauga-owned trees recommended for removal is a requirement for an Arborist Report. The Council of Tree & Landscape Appraisers provides guidance on using the Trunk Formula Method to appraise the monetary value of trees that are considered too large to be replaced with nursery or field-grown stock. There are several factors to be considered when appraising a tree recommended for removal, including (but not limited to) its species factor, condition factor, installation cost and replacement cost. These factors are based on the *Guide for Plant Appraisal (2000) Ontario Supplement (2020)* document which provides regionally relevant data pertaining to species ratings, and basic costs for trees and/or current industry tree replacement costs. The values of each City of Mississauga-owned tree recommended for removal within the Study Area that was appraised using the Trunk Formula Method can be found in **Appendix C**.

4. Results

4.1 Tree Inventory

A total of 1,565 individual trees were inventoried and assessed for the Project, which comprised of 1,460 trees within the City of Mississauga and 105 within the City of Toronto. **Appendix A1** summarizes the data collected for all trees within the Study Area situated within the City of Mississauga including species name, diameter at breast height, location, condition and recommended action, whilst **Appendix A2** summarizes the same data for trees situated within the City of Toronto. Trees inventoried are illustrated on figures provided in **Appendix B**.

In terms of tree location in proximity to the Project Area, 861 trees were directly located within the Project Area and 702 trees within the Buffer Area (Study Area), collectively. An additional two trees that were inventoried were situated outside of the Study Area. **Table 7** below provides a summary of tree locations within Study Area, whilst **Table 8** provides a summary of trees inventoried as well as their City of Mississauga ownership or their City of Toronto By-law category, as described in **Section 2.2**.

Table 7: Summary of Tree Locations

Location	Trees Within the Project Area	Trees Within Buffer Area*	Trees Located Outside Study Area	Total Number of Trees
City of Mississauga	847	612	1	1,460
City of Toronto	14	90	1	105
Total	861	702	2	1,565

Note: * Trees located within 6 metre, 10 metre or 12 metre from Project Area, as required by the applicable by-laws and guidelines.

Table 8: Summary of Tree Inventory and Total Trees in Each Category

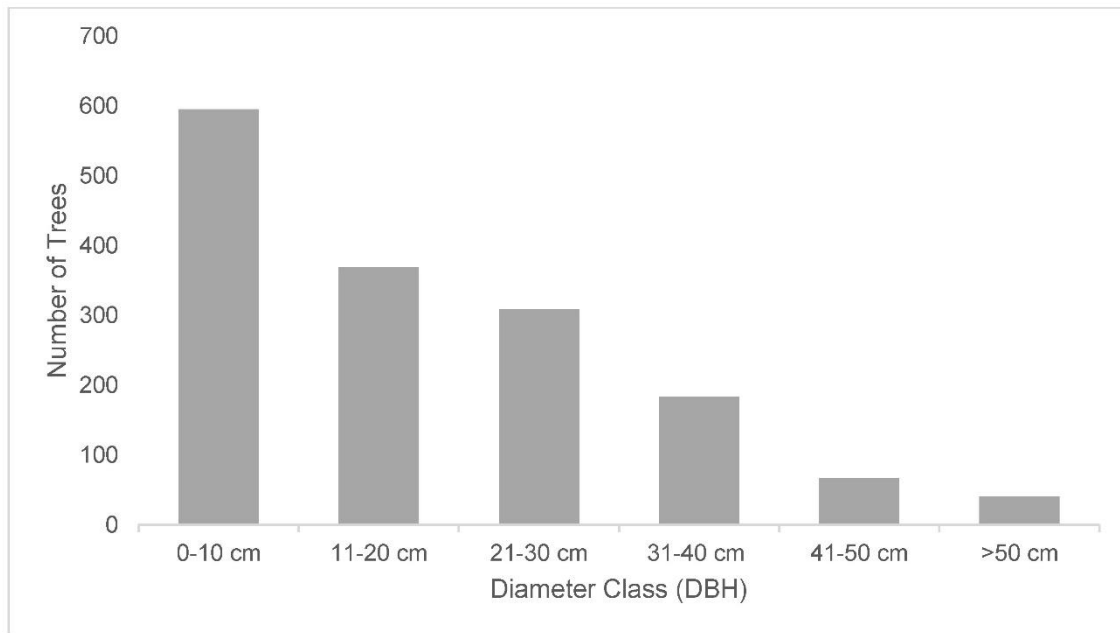
City Name	Ownership/Category	Description	Total
City of Mississauga	City of Mississauga	Trees of all diameter situated on City of Mississauga ROW or City-owned property	770
City of Mississauga	Region of Peel	Trees of all diameter situated on Region of Peel ROW or Region-owned property	82
City of Mississauga	Private	Trees of all sizes situated on private property	607
City of Mississauga	N/A	Trees of all diameters located outside the Study Area within City of Mississauga	1
City of Mississauga	-	Total	1,460

City Name	Ownership/ Category	Description	Total
City of Toronto	1	Trees of all diameters situated on private property within the Project Area	0
City of Toronto	2	Trees of all diameters situated on private property within the Study Area	0
City of Toronto	3	Trees of all diameters situated on City-owned parkland within the Study Area	0
City of Toronto	4	Trees of all diameters that are located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	0
City of Toronto	5	Trees of all diameters situated on City's road allowance, as well as other City-owned property, within the Project Area and Study Area	0
City of Toronto	Shared (1,4)	Trees of all diameters situated on private property within the Project Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	14
City of Toronto	Shared (2,4)	Trees of all diameters situated on private property within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	64
City of Toronto	Shared (3,4)	Trees of all diameters situated on City-owned parkland within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	10
City of Toronto	Shared (5,4)	Trees of all diameters situated on City's road allowance, as well as other City-owned property, within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection within the Study Area	16
City of Toronto	N/A	Trees of all diameters located outside the Study Area within City of Toronto	1
City of Toronto	-	Total	105
Cities of Mississauga and Toronto	-	Grand Total	1,565

4.2 Tree Assessment

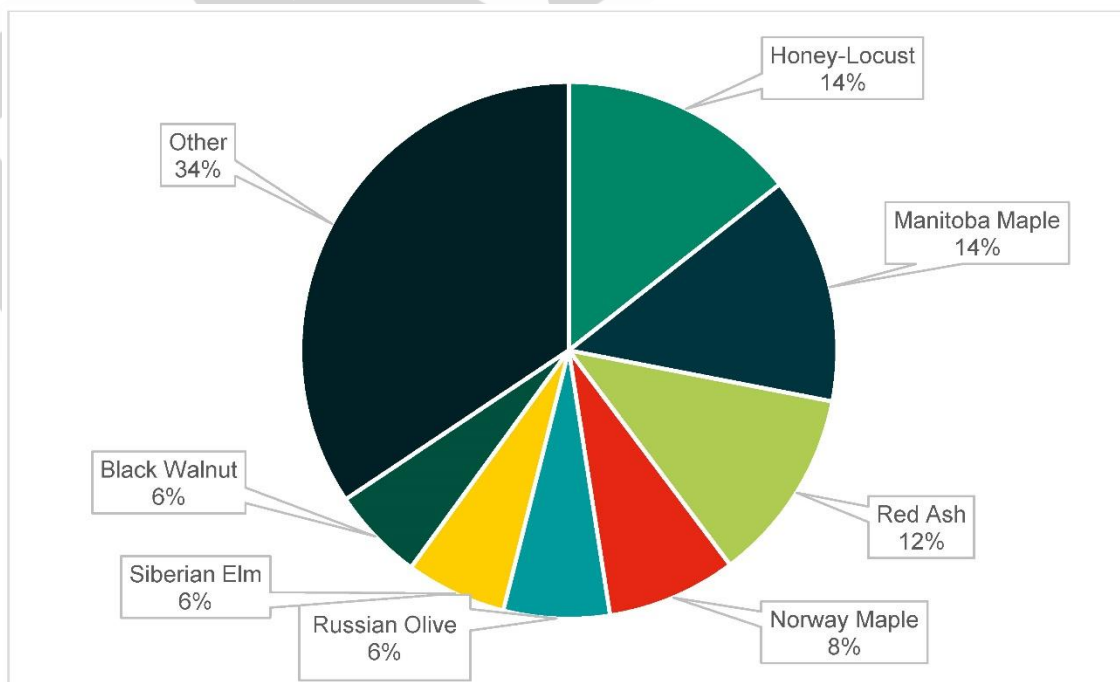
All trees surveyed as part of the tree inventory and assessment were found within an urban/natural environment and consisted of small, medium and large trees with diameter at breast height measurements ranging from 1 centimetre to 99 centimetres; the average diameter at breast height was 18 centimetres (**Figure 3**).

Figure 3: Distribution of Diameter Class Across the Study Area



Several tree species were identified during the tree inventory, with the most abundant being honey-locust (*Gleditsia triacanthos*) and Manitoba maple (*Acer negundo*) at 14% of the overall trees collected, respectively, followed by red ash (*Fraxinus pennsylvanica* var. *pennsylvanica*) at 12% of the overall trees collected (Figure 4).

Figure 4: Species Composition Across the Study Area



The majority of the defects observed were caused by either human interference or natural occurrences including mechanical damage, insects, weather and natural environmental conditions. Biotic and abiotic disorders and structural defects observed are included in **Appendix A1** (City of Mississauga trees) and **Appendix A2** (City of Toronto trees). **Table 9** provides a summary of the overall condition of the trees ranging from a rating of good to dead.

Table 9: Summary of Tree Condition

Tree Condition	Total Number of Trees
Good	751
Fair	644
Poor	102
Dead	60
Hazard	8
Total	1,565

4.3 Tree Impact Analysis

Based on the results of the tree impact analysis a total of 922 trees are recommended for removal including 861 within the Project Area and 61 within the Buffer Area, collectively. Furthermore, 133 trees are recommended for injury with protection, with 46 being recommended for injury and 87 for minor injury. A further 430 trees have been recommended to have protection placed around them, due to their tree protection zones being within the Buffer Area. The remaining 80 trees located within the collective Buffer Area are being retained but are considered potential hazards. **Table 10** summarizes the number of trees recommended for removal, injury and protection, minor injury and retention. Figures within **Appendix B** indicate each tree's recommended action and illustrates the tree protection zones for all trees that are recommended for protection and retention for the Project.

Table 10: Summary of Tree Removal and Preservation Recommendations

Location / Ownership	Removal Permit Required	Removal No Permit Required	Minor Injury with Protection Permit Required	Minor Injury with Protection No Permit Required	Injury with Protection Permit Required	Injury with Protection No Permit Required	Protection with No Injury No Permit Required	Retention with No Protection No Permit Required	Potential Hazard Trees No Permit Required	Totals
City of Mississauga	577	22	32	0	22	0	94	0	23	770
Region of Peel	61	0	0	0	0	0	20	0	1	82
Private (Mississauga)**	157	85	43	7	17	2	266	0	30	607
City of Toronto	0	0	0	0	0	0	13	0	13	26
Private (Toronto)**	20	0	5	0	5	0	35	0	13	78
N/A*	0	0	0	0	0	0	2	0	0	2
Totals	815	107	80	7	44	2	430	0	80	1,565

Note: * Trees located outside of the Study Area (i.e., Project Area and Buffer Area) that have not been included in the final required permitting counts or tree compensation numbers

** For Private Tree Permitting, private landowners should be notified.

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4.4 Tree Permits

The following tables summarize the separate tree permit acquisitions and/or permissions that are required prior to the recommended tree removals and injuries being undertaken within the City of Mississauga/Region of Peel (**Table 11**) and the City of Toronto (**Table 12**), respectively. **Appendix A1** provides the details of permitting requirements for each individual tree within the City of Mississauga, whilst **Appendix A2** provided the details of permitting requirements for each individual tree within the City of Toronto.

Table 11: Summary of Tree Permits Required within the City of Mississauga/Region of Peel

Category	Description	Total Removals	Removal Permits Required	Total Injuries	Injury Permits Required	Total Permits Required
City of Mississauga	Trees of all diameters situated on City-owned property within the Study Area	599	577	54	54	-
Private	Trees with diameters of ≥15 centimetres located on private property within the Study Area	242	157	69	60	-
Totals		841	734	123	114	-
Total Permits Required (City of Mississauga)		-	-	-	-	848
Region of Peel*	Trees of all diameters situated on Region-owned property within the Study Area	61	61	0	0	-
Total Permits Required (Region of Peel)		-	-	-	-	61

Note: * Permission from the Region of Peel for the injury or removal of Region-owned trees must be obtained for the Project.

Table 12: Summary of Tree Permits Required within the City of Toronto

Category	Description	Total Removals	Removal Permits Required	Total Injuries	Injury Permits Required	Total Permits Required
1	Trees with diameters of 30 centimetres or more situated on private property within the Project Area	0	0	0	0	-

Category	Description	Total Removals	Removal Permits Required	Total Injuries	Injury Permits Required	Total Permits Required
2	Trees with diameters of 30 centimetres or more situated on private property within the Study Area	0	0	0	0	-
3	Trees of all diameters situated on City-owned parkland within the Study Area	0	0	0	0	-
4	Trees of all diameters that are located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	0	0	0	0	-
5	Trees of all diameters situated on City's road allowance, as well as other City-owned property, within the Project Area and Study Area	0	0	0	0	-
Shared (1,4)	Trees of all diameters situated on private property within the Project Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	14	14	0	0	-
Shared (2,4)	Trees of all diameters situated on private property within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	6	6	10	10	-
Shared (3,4)	Trees of all diameters situated on City-owned parkland within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection	0	0	0	0	-

Category	Description	Total Removals	Removal Permits Required	Total Injuries	Injury Permits Required	Total Permits Required
Shared (5,4)	Trees of all diameters situated on City's road allowance, as well as other City-owned property, within the Study Area that are also located within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection within the Study Area	0	0	0	0	-
-	Total	20	20	10	10	30

4.5 Tree Compensation

As described in **Section 2.3.1** of this Arborist Report, tree compensation was calculated according to the *Metrolinx Vegetation Guideline (2020)*. **Appendices A1** and **A2** outline the compensation approach that has been used to determine recommended compensation for each tree to be removed within the City of Mississauga (**Appendix A1**), or removed or injured, if applicable, within the City of Toronto (**Appendix A2**).

Trees that require compensation under the respective City of Mississauga or the City of Toronto jurisdictions only followed each respective City's replacement ratios, as per the Metrolinx 'By-Law Approach'. Trees that were in under City of Mississauga jurisdiction and within a Toronto and Region Conservation Authority or Credit Valley Conservation Authority regulated area, as well as trees that were under City of Toronto jurisdiction and within a Toronto and Region Conservation Authority or Ravine and Natural Feature Protection regulated area, were subject to the 'By-Law and Ecological Approach', where a maximized compensation ratio was used whereby, if ecological compensation was greater than the respective City's by-law requirements, the by-law was followed and the difference between the two was implemented additionally through ecological compensation. The 'Baseline Approach' was utilized for tree removals within Region of Peel property as no applicable tree compensation guidelines were available.

A total of 694 trees recommended for removal or injury (as applicable for tree injury in a Ravine and Natural Feature Protection area in the City of Toronto) require compensation, based on the various compensation approaches mentioned in **Section 2.3**. A total of 1,535 trees are recommended for compensation under the approaches outlined in the *Metrolinx Vegetation Guideline (2020)*. The following tables

summarize the total number of compensation trees required within the City of Mississauga/Region of Peel (**Table 13**) and the City of Toronto (**Table 14**), respectively. Furthermore, **Table 15** presents a breakdown of the monetary value for replacing regulated private trees within the City of Mississauga whilst **Table 16** presents a breakdown of the monetary value for the replacement of all tree removals (and injuries in Ravine and Natural Feature Protection areas) within the City of Toronto if there is insufficient space to plant the replacement trees on the subject property, as per **Tables 14** and **16**. As such, it recommended \$99,355.00 cash-in-lieu (\$574.50 per replacement tree) is paid to the City of Mississauga to compensate for the removal of regulated private trees, whilst \$20,988.00 cash-in-lieu (\$583.00 per replacement tree) is paid to compensate for the proposed tree removals and injuries (injuries within an Ravine and Natural Feature Protection only) as an alternative to direct tree replacement.

Table 13: Summary of Trees Requiring Compensation (City of Mississauga/Region of Peel)

Location	Compensation Approach	Trees to be Removed	Recommended Trees for Compensation
City of Mississauga	By-Law Compensation	520	765
Private	By-Law Compensation	206	155
City of Mississauga & Regulated Area	By-Law & Ecological Compensation	79	398
Private Land & Regulated Area	By-Law & Ecological Compensation	36	98
Total	(City of Mississauga)	841	1,416
Region of Peel	Baseline Compensation	61	6
Total	(Region of Peel)	61	6

Table 14: Summary of Trees Requiring Compensation (City of Toronto)

Location	Compensation Approach	Trees to be Removed (or injured as applicable)	Recommended Trees for Compensation
Private Land in Regulated Area	By-Law & Ecological Compensation	30	113
City of Toronto & Regulated Area	By-Law & Ecological Compensation	0	0
Total	-	30	113

Table 15: Summary of Trees Requiring Monetary Compensation (City of Mississauga)

Tree Replacement Category	Trees to be Removed with Compensation Required	Total Replacement Trees Required for City of Mississauga	Total Cash-in-Lieu
Park Trees Removal (healthy tree)	3	9	\$5,170.50
Private Trees 15-50 centimetres Removal (healthy tree)	150	150	\$86,175.00
Private Trees > 50 centimetres Removal (healthy tree)	7	14	\$8,043.00
Total	160	173	\$99,388.50

Table 16: Summary of Trees Requiring Monetary Compensation (City of Toronto)

Tree Replacement Category	Trees to be Removed with Compensation Required	Total Replacement Trees Required for City of Toronto	Total Cash-in-Lieu
Private Trees - Category 1 or 2 Removal (healthy tree)	0	0	\$0.00
Private Trees - Category 1 or 2 Removal (poor tree)	0	0	\$0.00
Park Trees – Category 3 Removal (healthy tree)	0	0	\$0.00
Ravine and Natural Feature Protection – Category 4 Removal (poor tree)	3	3	\$1,749.00
Ravine and Natural Feature Protection – Category 4 Removal (healthy tree <10 centimetres diameter at breast height)	14	14	\$8,162.00
Ravine and Natural Feature Protection – Category 4 Removal (healthy tree >10 centimetres diameter at breast height)	3	9	\$5,247.00
Ravine and Natural Feature Protection – Category 4 Injury (healthy tree)	10	10	\$5,830.00
City Street Trees – Category 5 Removal (healthy tree)	0	0	\$0.00
Total	30	36	\$20,988.00

4.6 Tree Valuation

All public trees within the City of Mississauga that are recommended for removal that were found within the Study Area were appraised using the Council of Tree & Landscape Appraisers' Trunk Formula Method, as described in **Section 3.4**. Based on the Trunk Formula Method and the individual values of the 599 trees that are being recommended for removal in the City of Mississauga, a monetary value of \$377,419.29 is required for their compensation. Further detailed information per can be found in **Appendix C**.

4.7 Species at Risk

There were no Species at Risk located within the Study Area during the time of field investigations.

4.8 Other Important Tree-related Information

There were no memorial trees or trees with any other special status noted during the tree inventory and assessment.

5. Tree Removal, Preservation and Maintenance Recommendations

There are many social, economic and environmental benefits of trees including aesthetics, increased property values, improved air quality, as well as food and shelter for resident wildlife. As per the City of Mississauga's *Tree Preservation and Protection Standards* (2017) and the City of Toronto's *Tree Protection Policy and Specifications for Construction Near Trees* (2016), damage should be minimized to existing trees within development limits wherever feasible, as a priority. The assessment results and recommendations for each tree are summarized in **Appendix A1** (City of Mississauga trees) and **Appendix A2** (City of Toronto trees).

5.1 Tree Removal

It is recommended that a Certified Arborist be retained during tree removal operations in order to ensure that standardized arboricultural techniques are employed, prior to and during the proposed work activities, and to confirm the need to remove or protect additional trees in proximity to the Study Area. Additionally, it is recommended that a Certified Arborist return at the conclusion of construction to assess the health of trees that were protected during construction and identify opportunities for mitigation should any trees display signs of stress (i.e. falling limbs, declining health, etc.).

5.2 Tree Preservation

It is recommended that a Certified Arborist be retained to regularly monitor the Project's construction activities in order to ensure that all trees that are recommended for protection and retention are being maintained adequately, in relation to standard arboricultural practices and the aforementioned respective City protocols. Additionally, no grading, excavation or restoration-related activities are to occur within the tree protection zone of any protected or retained trees, if it cannot be avoided, without the supervision of a Certified Arborist. Should the limits of the proposed excavation areas change, a Certified Arborist will be retained to review trees with tree protection zones intersecting new excavation area limits in order to determine whether trees shall be recommended for removal, injury and protection or retention.

5.3 Tree Protection Recommendations

The following subsections outline tree protection measure recommendations that will further reduce the potential for negative impacts to preserved trees. Furthermore, the following subsections provide standard protection recommendations shall apply to trees that require tree protection fencing for protection during construction activities. Notwithstanding this, recommendations for the timing of vegetation clearing apply to the site in general.

5.3.1 Tree Protection Fencing and Ground Compaction Mitigation

Tree protection fencing shall be installed around trees recommended for protection and retention, where retained trees are in close proximity to the Project Area (i.e., where a retained tree's tree protection zone is within the Study Area but is not touching or intersecting the Project Area), prior to the any work activities taking place within the Study Area. The tree protection fencing shall be installed in accordance with the City of Mississauga's and the City of Toronto's respective tree protection guidelines and standards. The tree protection fencing around the tree protection zone shall be installed with orange safety fencing and framed with lumber at 5 centimetres x 10 centimetres (2 inches x 4 inches) dimensions. Alternatively, steel T-bars can also be used to erect the orange safety fencing. All tree protection fencing shall remain in place prior to any construction activity and in good repair until construction is complete.

It is recommended that tree protection zone signage be installed on the fence. Tree protection signage shall be installed by the contractor to clearly delineate tree protection zones. The sign shall be a minimum of 40 centimetres (15.75 inches) x 60 centimetres (23.5 inches), made of white gator board and outline the following:

- That no grade change, storage of materials or equipment is permitted within the tree protection zone;
- Contact information of the municipal forestry department; and
- The potential fine for contravention of disobeying by-laws in which the tree protection zone TPZ was installed.

For any trees recommended for preservation there shall be no storage or movement of equipment or hoarding of materials within the tree protection zone. If work must be completed within the tree protection zone, 10 centimetres to 15 centimetres (4 inches to 6 inches) of mulch shall be spread over the area which is to be worked upon. Additionally, sheets of 2 centimetres (0.75 inches) thick plywood (minimum) or steel plating shall be applied on the mulch in order to help distribute the weight of the heavy equipment to avoid soil compaction. After construction, these measures shall be

removed to allow proper aeration and water infiltration to the soil. This shall include removing the bulk of mulch so that only 5 centimetres to 10 centimetres (2 inches to 4 inches) remain. It is recommended that a Certified Arborist be on-site when work that could impact trees is required within the tree protection zone of trees identified for preservation.

5.3.2 Vegetation Clearing and Management

Vegetation removal, including tree removal will be limited to the specified activity areas and shall not commence until required permits and approvals are obtained.

Clearing of vegetation outside of the breeding bird season is recommended to reduce potential impacts to migratory birds and avoid contravention of the Migratory Birds Convention Act. Searching for nests by a qualified biologist are not recommended within complex habitats, as the ability to detect nests is low while the risk of disturbance to active nests is high. This disturbance increases the risk of nest predation or abandonment by adults. Nests searches may be completed during the nesting period (April 1st to August 31st) by a qualified biologist within 'simple habitats' (ECCC, 2018) which refer to habitats that contain few likely nesting spots or a small community of migratory birds. Clearing in simple habitats during the nesting season can only occur if a qualified biologist has confirmed it would not affect the nest or young of a protected species.

Where works are proposed within a tree protection zone of a tree proposed for preservation, clearing of vegetation shall be performed manually to reduce soil compaction and mechanical damage to the tree.

5.3.3 Branch Pruning

Where branches are likely to be damaged during construction, they shall be pruned accordingly, prior to construction activities, in order to avoid unnecessary damage to the tree.

Pruning should be completed in a three-step process. The first step of this process is to cut through approximately one-third of the branch's diameter from the bottom side. The second step of the process is to remove the majority of the branch and its lateral weight, through proceeding to make a cut on the top side, which is to be approximately half the diameter from the cut on the bottom side. This cut is to be made approximately 2.5 centimetres to 5 centimetres (1 inch to 2 inches) further out on the branch from the first cut in order to reduce the risk of tearing. Once the weight (majority of the branch) has been removed, the final step of the process is to remove the remaining stub by

completing the final cut at the branch bark ridge. This final cut must be a smooth surface with no jagged edges or torn bark.

5.3.4 Roots

Root damage shall be minimized by restricting equipment in the vicinity of the existing tree protection zone and limiting equipment within the construction limits. This will help minimize damage if there is any excavation in the areas of a preserved tree. It is critical to avoid damage to the structural root plate in order to prevent affecting tree stability and thus creating a hazard tree. In general, most of the fibrous roots of the tree are contained in the top 30 centimetres (11.75 inches) of the soil and may easily be severed during excavation, whilst structural roots are located deeper. Hand digging, low pressure hydro-vac or air spade exploratory digging will aid in determining the damage of the tree root system. As mentioned earlier, all opportunities to avoid root and grade damage within the tree protection zone shall be taken – this shall include limiting machinery within the tree protection zone as much as possible and the employment of horizontal hoarding where work is proposed within the tree protection zone of a tree recommended for preservation.

Any roots that are severed during construction shall be cut cleanly to minimize decay and entry points for disease. If roots will be exposed for more than a few hours, mulch, wet burlap or soil shall be applied as soon as possible and watered regularly to prevent roots from drying-out, under the supervision of a Certified Arborist.

5.3.5 Excavation

Methods of excavation within tree protection zone of trees proposed for protection or retention shall include those which cause the least harm to the tree, such as pneumatic or hydraulic excavation. These methods include tools which use high-pressure air or water to remove the soil around the roots without damaging the larger roots.

Fill within the tree protection zone shall not be permitted unless it is mitigated in a way that maintains air and water availability for roots.

All grade changes within and adjacent to tree protection zones shall be undertaken in accordance with the previously specified tree protection guidelines.

Access routes shall be established away from the tree protection zone. The existing grades within the tree protection zone shall not be disturbed to avoid damage to trees and soil compaction.

5.4 Recommended Future Commitments

As the Project is at a preliminary stage of design it is likely that the recommended actions of trees, based on the Project's anticipated impacts, may change as the Project's design advances. As such specifics on seeking permission from private landowners to remove or injure privately owned trees or boundary trees as well as to install tree protection hoardings on private property, are not recommended at this time. It will be the responsibility of the Design Builder, Metrolinx and the City of Mississauga to pinpoint the timing of these written legal requests and permissions as design progresses. Notwithstanding this every effort should also be made to minimize the impact and intrusion of the Project to private property owners as the Project's design progresses.

Furthermore, it is strongly recommended that a Certified Arborist, who is either directly employed by or contracted through the Design Builder, monitor the Project's tree removals and tree injuries as well as the tree protection and mitigation measures for trees being preserved throughout the Project's duration. It will be expected that the Certified Arborist will provide written confirmation, in the form of a detailed letter, when all recommended tree protection and mitigation measures are fully installed prior to construction commencing. Lastly, it will also be expected that the Certified Arborist will provide detailed written confirmation at the conclusion of the Project. This report, which will form a detailed memorandum, will detail all monitoring events during the Project's construction and confirm that the work was done in accordance with arboricultural best practices, as stated in this Arborist Report.

6. Summary and Recommendations

One thousand, five hundred and sixty-five trees were inventoried and assessed for the Project, with 1,460 being located within the City of Mississauga and 105 located within the City of Toronto. Of these 1,565 trees that were inventoried for the Project, 861 were located within the Project Area, 702 trees were located within the Buffer Area, collectively, and two were located outside the Study Area.

Based on the results of the tree impact analysis it is recommended that 922 trees will have to be removed in order to accommodate the construction of the Project whilst a further 133 trees are recommended for injury with protection, with 46 being recommended for injury and 87 for minor injury. A further 430 trees are recommended for protection without injury as they are located within the collective Buffer Area. The remaining 80 trees are considered to be potential hazard trees, due them being dead, in poor condition or classed as a hazard tree upon field assessment but are being retained. It is at the discretion of Metrolinx and the City of Mississauga if these trees should be removed in addition to those being impacted by the Project Area.

In terms of tree compensation, 1,535 replacement trees are required to replace trees being removed within the City of Mississauga (902) and the City of Toronto (20) or injured (10) within City of Toronto (Ravine and Natural Feature Protection areas only), as per the *Metrolinx Vegetation Guideline* (2020). A monetary value of \$377,419.29 is also required to compensate for the public trees within the City of Mississauga that require removal, based on the Trunk Formula Method, whilst \$99,388.50 cash-in-lieu is required to compensate for the removals of park trees and regulated private trees as an alternative to direct tree replacement if there is insufficient space to plant the replacement trees on the subject property. Furthermore, \$20,988.00 cash-in-lieu is required to compensate for tree removals and injuries in the City of Toronto as an alternative to direct tree replacement if there is insufficient space to plant the replacement trees on the subject property.

In regard to the 922 trees that are identified for removal prior to construction operations commencing, it is recommended that a Certified Arborist be retained during tree removal operations to ensure proper arboricultural techniques are employed prior to and during proposed activities and to confirm the need to remove or preserve trees within close proximity to the Project Area. It is also strongly recommended that a Certified Arborist supervise any root pruning that needs to be done to trees recommended for injury or minor injury. Additionally, it is recommended that a Certified Arborist return at the conclusion of construction to assess the health of preserved trees after construction

is complete and to mitigate risk associated with falling limbs and declining health from potentially stressful conditions.

Tree protection fencing must be installed prior to initiation of the work. Tree protection fencing shall be installed to protect trees recommended for protection with injury, protection with minor injury, or protection without injury (i.e., where trees are not being impacted but are within the Buffer Area or 2 metres outside of the Buffer Area). The installation of tree protection fencing will reduce the potential for negative impacts including soil and root compaction as well as the potential for mechanical damage to trunks or branches. Lastly, it is recommended that any necessary pruning be conducted prior to tree removal by a Certified Arborist or trained professional with adequate arboricultural experience, in order to ensure that trees marked for preservation do not experience unnecessary stress or damage.

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7. Certification

I certify that all the statements of fact in this assessment are true, complete, and correct to the best of my knowledge and belief, and that they are made in good faith.

AECOM Canada Ltd.
Report Certified By:

[Insert Signature]

Alexander MacLeod, B.Sc. (Hons.), M.Sc.
ISA Certified Arborist ON-2142A

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